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Preface

We are happy to present the 15th edition of *The Pearson Concise General Knowledge Manual,* to our readers. We started this manual in 2003 and it has been a long and eventful journey since then. General knowledge, also known as general awareness or general studies, constitutes a major portion of almost all competitive examinations. Therefore, it is important to master *general knowledge* in order to compete in the examinations. This book has been especially designed to cover various competitive examinations, including:

- UPSC Civil Services and Other State Civil Services Examinations
- Combined Defence Services (CDS); National Defence Academy (NDA) and Central Police Services (CPF)
- Staff Selection Commission (SSC) Examinations
- Railway Recruitment Boards (RRBs) and Special Class Railway Apprentices (SCRA)
- CWE (Common Written Examinations conducted by IBPS for the Probationary Officers, Clerical Cadre and Specialist Officers in Nationalized Banks)
- State Bank of India (SBI) Examinations for the Probationary Officers (POs) and Clerical Cadre
- LIC, GIC, AAO's, RBI Grade 'A' and 'B', Other Administrative Officers examinations
- MBA, MCA, BCA, BBA Entrance Tests including CMAT (Common Management Admission Test).

A careful scrutiny of the test papers of various competitive examinations conducted by the UPSC, SSC, banking services and railway recruitment boards, and other central and state bodies during the past years was made for the compilation of this book. The objective is to provide the vast subject in a structured and useful manner so as to familiarize candidates taking the examinations with the current trends and types of questions asked. Important data and useful information are tabulated for quick revision. The growing number of questions on current events in the general knowledge section of various recruitment examinations has made it necessary to update Chapter 12 regularly. This is apart from the usual revision and modification that is a part of annual editions.

Additionally, we have provided a bonus chapter on 'Banking and Financial Institutions in India'. This section is a little different from the regular general knowledge sections but now it has become an important element in the banking recruitment examinations.

Online Resources

More than 3000 MCQ's, divided by topic covering all possible subject areas have been provided to facilitate practice.

The website www.thorpeseducation.com offers the latest general knowledge questions/sections from various competitive examinations, practice exercises and online test preparations. All aspirants can download these questions after login to the website.

Online resources are available at www.pearsoned.co.in/ShowickThorpe.

Showick Thorpe

Acknowledgements

As I always say, any work of this nature could not have been attempted without reference to the works of others. In the preparation of this book, I have had to constantly consult numerous encyclopedias, dictionaries, yearbooks, atlases and textbooks on a variety of subjects. I hereby acknowledge my indebtedness to all of them.

I would also like to express my heartfelt thanks to my late father Edgar Thorpe and my late mother Asha Thorpe, without whose wholehearted support and inspiration, this book would have never seen the light of the day. I am thankful to my publisher for allowing me to keep my father's name on the cover of this book. Last but not the least, my wife Vandana has been the most encouraging and helpful in this exercise.

As the world changes at a very rapid pace, so do facts and figures. It would be an endeavour to constantly revise each edition of this book in order to keep it as up-to-date as possible. I hope readers will appreciate the book. I trust that the book will not only serve the need of a preparatory book for most of the competitive examinations and a textbook in schools and colleges, but also students will find it both informative and a pleasure to study and refer to. Any suggestions for further improvement would be most welcome.

Showick Thorpe

1 Geography of India

LOCATION, DIMENSIONS AND FRONTIERS

Location

India is the seventh largest country in the world in terms of area—accounting for about 2.4% of total world area and also ranks second in terms of population. It lies in the northern hemisphere between 8°4′ N and 37°6′ N parallels of latitude and between 68°7′ E and 97°25′ E meridians of longitude and is part of the Asian continent. The country can be divided into 6 zones—north, south, east, west, central and north-east zone. It has 29 states and 7 union territories.

India stands apart from the rest of Asia, marked off by mountains and the sea, which give her distinct geographical entity. Bounded by the great Himalayas in the north, it stretches southwards and at the Tropic of Cancer (23° 30′ N) tapers off into the Indian Ocean between Bay of Bengal on the east and the Arabian Sea on the west. It is a country in South Asia that lies entirely on the Indian Plate in the northern portion of the Indo-Australian Plate.

Dimensions

Distance from north to south	3214 km
Distance from east to west	2933 km
Length of coastline	7516.6 km
Length of land frontier	15,200 km
Total geographic land area	32,87,263 km^2
Percentage of earth's surface covered by India	2.4%
Percentage of world's population living in India	17.5%

Frontiers

1. *North*: The Himalayan range, China (border length: 4057 km), Bhutan (border length: 699 km) and Nepal (border length: 1751 km) separate India from Tibet. The Siliguri Corridor, sandwiched between the borders of Bhutan, Nepal and Bangladesh, connects mainland India with the north-eastern states. The boundary line between India and China is called the *McMahon Line*.

The latitudinal and longitudinal extent of India is almost the same in degrees, i.e., 30°. But in km, the north-south distance (approx. 3200 km) is more than that of the east-west distance.

2. *East*: The Chin Hills and Kachin Hills, deeply forested mountains, separate India from Myanmar or Burma to the far north-east. Bangladesh is separated from India (border length: 4096 km) by watershed region of the Indo-Gangetic plan, the Khasi hills and the Mizo Hills.

3. *West*: Pakistan, lies in the Punjab Plain and the Thar desert (border length: 3323 km). Afghanistan lies on the north-west (border length: 106 km).

4. *South*: Indian Ocean and Sri Lanka, Gulf of Mannar and Palk Straits separates India from Sri Lanka.

International Boundaries Touching Indian States

Afghanistan	1 state [Jammu and Kashmir (Pakistan occupied area)]
Bangladesh	5 states [West Bengal, Mizoram, Meghalaya, Tripura, Assam]
Bhutan	4 states [West Bengal, Sikkim, Arunachal Pradesh, Assam]
China	5 states [Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, Arunachal Pradesh]
Nepal	5 states [Bihar, Uttarakhand, Uttar Pradesh, Sikkim, West Bengal]
Myanmar	4 states [Arunachal Pradesh, Nagaland, Manipur, Mizoram]
Pakistan	4 states [Jammu and Kashmir, Punjab, Rajasthan, Gujarat]

Map 1.1 This map is a sketch only, drawn not to scale, presented for reference and to aid understanding of the concept discussed.

India is bounded by the Indian Ocean in the South, in the south-west by the Arabian Sea, in the south-east by the Bay of Bengal. The territorial waters of India extend into the sea to a distance of 12 nautical miles (22.2 km). The Maldives, Sri Lanka and Indonesia are island nations to the south of India. Kanyakumari constitutes the southern tip of the Indian peninsula, which narrows before ending in the Indian Ocean. The southernmost point of India is Indira Point in the Andaman and Nicobar Islands. Indira Point got submerged under the sea water in 2004 during the Tsunami.

PHYSICAL FEATURES

India comprises four well-marked physical divisions:

1. *The Himalayan Range*: The Himalayas, amongst the youngest fold mountains in the world, surround India on the north, north-west and north-east forming an arc. It is part of the Great Mountains of the north which run along the northern border of lndia has two parts—the Karakoram and the Himalayas. The Karakoram has a number of ranges like Zaskar, Ladakh and Pir Panjal with mainly river Jhelum flows in this region. The Himalayas has three important ranges—Himadri, Himachal and Siwalik, about 2400 km in length and varying in width from 240 to 320 km.

   (i) The Greater Himalayas (northern range, average approx. 6000 m in height and contain three highest mountains on earth—Mount Everest (8848 m), K2 or Mount Godwin Austin (8611 m) and Kanchenjunga (8598 m). Such high altitudes admit travel to a few passes only, notably Shipki La [in Satluj valley—north-east of Kalpa (Kinnaur)] and Jelep La and Nathu La [on the main Indo-Tibet trade route through the Chumbi valley, north-east of Darjeeling]. Greater Himalayas or Himadri, under perpetual snow, contains several glaciers which are sources of rivers like Ganges and Yamuna. The core of this part of Himalayas is composed of granite.

   (ii) The Lesser Himalayas (averaging 1500 to 5000 m in height) or *Himachal* (averaging 1500 to 5000 m in height), are situated south of the Greater Himalayas, the average width is of 50 km. While the Pir Panjal range forms the longest and the most important range, the Dhaula Dhar and the Mahabharat ranges are also prominent ones. This range consists of the famous valley of Kashmir, the Kangra and Kullu Valley in Himachal Pradesh. Many health resorts are situated on the southern sole of the mountain range. These ranges are mainly composed of highly compressed and altered rocks.

   (iii) The Outer Himalayas (or the Southern Himalayas), (averaging between 900 m and 1200 m in height lie between the Lesser Himalayas and the Indo-Gangetic plains). These discontinuous ranges joins the Lesser Himalayas in the extreme east. The longitudinal valley lying between Lesser Himalaya and the Shiwaliks are known as Duns. Dehra Dun, Kotli Dun and Patli Dun are some of the well-known Duns. These ranges are composed of unconsolidated sediments brought down by rivers from the main Himalayan ranges located farther north. These valleys are covered with thick gravel and alluvium.

Fact Bytes

➤ The Great Mountains of the North run along the northern border of India. ➤ They consist of Karakoram and the Himalayas. Karakoram has a number of ranges like—Zaskar, Ladakh and Pir Panjal. River Jhelum flows in this region. ➤ The Himalayas has three important

ranges—Himadri, Himachal and Shiwalik. The eastern extension of eastern Himalayas is called *Poorvanchal Mountains*. Himadri has high peaks of the world. Himachal has important hill stations of India and Shiwalik, the thick forests. ➤ Besides the longitudinal divisions, the Himalayas have been divided on the basis of regions from west to east. These divisions have been demarcated by rivers and valleys. ➤ There are regional names also in these broad categories. ➤ The part of Himalayas lying between Indus and Satluj has been traditionally known as *Punjab Himalaya* but regionally it is also known as *Kashmir and Himachal Himalaya* from west to east, respectively. ➤ The part of the Himalayas lying between Satluj and Kali rivers is known as *Kumaon Himalayas*. ➤ The Kali and Tista rivers demarcate the *Nepal Himalayas.* ➤ The part lying between Tista and Dihang rivers is known as *Assam Himalayas.* ➤ The Brahmaputra marks the eastern most boundary of the Himalayas. Beyond the Dihang gorge, the Himalayas bend sharply to the south and spread along the eastern boundary of India. They are known as the *Purvanchal* or the Eastern hills and mountains. ➤ These hills running through the north-eastern states are mostly composed of strong sandstones which are sedimentary rocks. Covered with dense forests, they mostly run as parallel ranges and valleys. ➤ The Purvanchal comprises the Patkai Hills, the Naga Hills, Manipur Hills and the Mizo Hills.

2. *The Northern Plains or the Indo-Gangetic Plains*: One Formed by the valleys of the rivers Ganges and Brahmaputra, with a length of about 2400 km and width ranging between 240 km to 320 km. These plains occupy one-third of India's land surface and form the most fertile region. According to terrain characteristics, this plain consists of two parts:

   (a) The upland plains which lies above the flood level is made up of alluvial soil. It is one of the most fertile areas in the world.
   (b) The low lands which are liable to inundation during floods.

   The Great plains comprises of levelled land to the south of the Great Mountains of the North made up of fertile allvium soil. It consists of the Indus Basin, Ganga Basin and Brahmaputra Basin. River Indus and its tributaries—Jhelum, Chenab, Ravi, Beas and Sutlej rise beyond the Himalayas. The tributaries of River Ganga either rise in the Himalayas or in the Peninsular Plateau. Yamuna, Ghaghara, Gandak, Kosi and Tista rise in the Himalayas. Chambal, Sindh, Betwa, Son, Ken and Damodar rise in the Peninsular Plateau. River Brahmaputra rises beyond the Himalayas.

3. *The Deccan Plateau*: Lying south of the northern plains, the plateau is flanked by mountain ranges called the Eastern and Western Ghats. It is geographically the oldest region of India, with rocks which are 3000 to 5000 million years old. The higher Deccan peaks reach over 2500 m which include the Nilgiri Hills.

4. *Coastal Plains*: The northern portion of the western coastal plain is called the Konkan and the southern portion is called the Malabar coast. The eastern coastal strip is known as the Coromandel Coast.
   The Aravallis and the Deccan Mountains

   (a) *The Aravallis*: The oldest mountain range in India. The highest peak in this range is Guru Shikhar at Mount Abu, rising to 1722 m, lying near the border with Gujarat.

> The Great Plateau of Peninsular India is located to the south of the Great Plains made up of hard igneous rocks. It has two parts: the Malwa Plateau in the north which slopes towards north and Deccan Plateau in the south. To the north west of the Malwa Plateau lies the Great Indian Desert, a region of inland made up of rocks and sand. The Deccan Plateau is located to the South of River Narmada. It is enclosed by Western Ghats and Eastern Ghats. They are old mountains. Western Ghats are formed by four major hills which run parallel to the Arabian Coast. The Eastern Ghats are low and discontinuous. They are near to the Bay of Bengal Coast. There are many rivers in the Plateau which flow either into Arabian Sea or Bay of Bengal. The Western Coastal plains which is a narrow strip is divided into Konkan Coast and Malabar Coast. It has estuaris and lagoons. The eastern coastal plains is wider and is divided into Northern Circas and Coromandal Coast. It possesses fertile deltas.

(b) *The Vindhya Range*: Separate the southern part of India from the northern part. Extending 1050 km, the average elevation of these hills is 3000 m.

(c) *The Satpura Range*: Lies between the rivers Narmada and Tapti. It extends to 900 km with many peaks rising above 1000 m. It runs parallel to the Vindhya Range, which lies to the north and these two east-west ranges divide the Indo-Gangetic plain from the Deccan Plateau located north of River Narmada.

(d) *Western Ghats*: Run along the western edge of India's Deccan Plateau and separate it from a narrow coastal plain along the Arabian Sea. The range runs approximately 1600 km and average elevation is about 915 to 1220 m.

(e) *Eastern Ghats*: Though not as tall as the Western Ghats, some of its peaks are over 1000 m in height. Average elevation is about 610 m. The Nilgiri Hills in Tamil Nadu lies at the junction of the Eastern and Western Ghats.

ISLANDS

There are two groups of Islands:

1. *Andaman and Nicobar Group*: The northern cluster of 204 small islands comprise the Andamans and the southern cluster of 19 small islands are the Nicobar islands.

2. *Lakshadweep*: A group of 27 coral islands scattered in the Arabian Sea 300 km west of Kerala.

DESERTS

The Thar Desert, also known as the Great Indian Desert, is a large, arid region in the north-western part of the Indian subcontinent and forms a natural boundary running along the border between India and Pakistan. It extends from the Sutlej River and has the Indus River on the west. The Aravalli forms the main landmark to the south-east of Thar Desert with Rann of Kutch, the salt march, sometimes included in Thar is on its south. It lies mostly in the Indian State of Rajasthan (touches the southern portion of Haryana and Punjab and northern Gujarat). The Cholistan Desert adjoins the Thar Desert spreading into Pakistani Punjab province.

➤ India occupies the south-central peninsula of Asia. ➤ India consists of the mainland and two groups of islands, namely, Lakshadweep in Arabian Sea (southeast of mainland) and the Andaman and Nicobar in the Bay of Bengal (in the southwest of the mainland). ➤ Kanyakumari, the southmost tip on the mainland, is situated on three seas. ➤ The southernmost point of the Indian Union is Indira Point, located on Andaman and Nicobar Island group not very far from Indonesian Islands. ➤ Lakshadweep Islands are comparatively less scattered and are nearer to the Indian coast. ➤ India has a very long coastline, approximating in length of the radius of Earth. ➤ India belongs to northern hemisphere, since it is situated totally north of equator. ➤ The southern tip of Indian mainland misses the equator only by a few degrees. ➤ Six other countries larger than India are two to five times larger in area. ➤ The latitudinal and longitudinal extent of the country are almost the same in degrees, that is, about 30°, but in kilometres, the north–south distance (about 3200 km) is more than that of the east-west distance (approximately 3000 km). ➤ Time difference between the two extreme points in the east and west is of 2 h due to vast longitudinal extent. ➤ Time along the Standard Meridian of India (82°30′ E) passing through Allahabad is taken as the standard time for the whole country. ➤ The Tropic of Cancer (23°30′ N) divides India into almost two equal parts. ➤ The northern part is broad region spreading from east to west, consisting of plains and the Himalayan mountains. ➤ The areas to the south of the Tropic of Cancer are triangular in shape, having a base in the north, the land tapers towards the south. It mostly coincides with the peninsular plateau, but also includes eastern and western coastal strips. ➤ From Gujarat to Arunachal Pradesh there is a time lag of two hours. Hence, time along the Standard Meridian of India (82°30′E) passing through Mirzapur (in Uttar Pradesh) is taken as the standard time for the whole country. The latitudinal extent influences the duration of the day and night, as one moves from south to north. ➤ Coastline of Peninsular India: 5423 km and Coastline of Andaman, Nicobar and Lakshadweep Islands: 2093.6 km. The mainland coast (Peninsular India) consists of 43% sandy beaches, 11% rocky coast including cliffs and 46% of marshy coast. ➤ India's highest point officially is K2 at 8611 m and it lies in Gilgit-Baltistan region (presently lie in the POK). Kanchenjunga in Sikkim at 8598 m is the highest point within India's current geographic boundaries. ➤ Thar desert is world's 9th largest subtropical desert (Area: more than 200,000 km^2). ➤ The soils in the Thar Desert are of the Arid Zone, are generally sandy to sandy-loam in texture.

SOILS IN INDIA

1. *Alluvial Soil*: Areas of the Indo-Gangetic plain covering almost a quarter of Indian soil and are very fertile. Found in Punjab, Haryana, UP, Uttarakhand, Bihar, Jharkhand and West Bengal.

2. *Black Soil*: It is a rich mineral soil formed by deposition of lava ejected by volcanoes and is suitable for cotton cultivation. Found in Maharashtra, Gujarat, western Madhya Pradesh, Chattisgarh, Andhra Pradesh and Tamil Nadu. It is also known as regur soils.

3. *Red Soil*: Formed by the weathering of ancient metamorphic and crystalline rocks and having a high iron content. It is good for cultivation of pulses and coarse grains. Found in Madhya Pradesh, Chattisgarh, Orissa, Telangana, Andhra Pradesh, Tamil Nadu, Karnataka and the north-eastern hill states.

4. *Laterite Soil*: Formed by the weathering of laterite rocks. Found in areas occupied by the Deccan, Andhra Pradesh, Parts of Telangana, Eastern Ghats, Karnataka, Tamil Nadu, Coast of Orissa, Meghalaya and Assam.

　　Other types of soil found in India are Saline and Alkaline soils, Peat and Marshy soils, Arid or Desert soils and Forest soil.

RIVER SYSTEMS OF INDIA

The rivers of India are broadly classified into:

1. *The Himalayan River System*: These are perennial, snow-fed rivers. During the rainy season they are generally flooded and carry 70% of the total discharge of river water into the sea. The three great Himalayan river systems are mentioned in Table 1.1.

Table 1.1　The Himalayan River System

Name	Source	Length	Enters into
Indus River System	Mount Kailash in Tibet (near Mansarovar Lake)	2900 km	Arabian Sea
—Sutlej	—Mansarovar Rakas Lakes	—1050 km	—Chenab
—Beas	—Near Rohtang Pass	—470 km	—Sutlej
—Ravi	—Near Rohtang Pass	—720 km	—Chenab
—Chenab	—Near Lahol Spiti Districts of H.P.	—960 km	—Indus
—Jhelum	—Verinag in Kashmir	—725 km	—Chenab
Ganges River System	Gangotri Glacier in the Himalayas	2510 km	Bay of Bengal
—Yamuna	—Yamnotri	—1375 km	—Ganga
—Gomti	—Gomat Taal (Fulhar Jheel) near Pilibhit	—900 km	—Ganga
—Ghagra	—Matsatung Glacier	—1080 km	—Ganga
—Betwa	—Vidhyanchal	—480 km	—Yamuna
—Ken	—Ahirgawan (Kaimur Range) Jabalpur district	—427 km	—Yamuna
—Son	—Amarkantak	—780 km	—Ganga
—Kosi	—Near Gosain Dham Park	—730 km	—Ganga
—Chambal	—Chambal region in Madhya Pradesh	—1050 km	—Yamuna
Brahmaputra River System Originates in the Mansarovar Lake in Western Tibet and flows south-west of Tibet as *Yarlung Tsangpo River*, enters India in Arunachal Pradesh in rapid descent (where it is called *Siang*) and slows down in plains of Assam Valley (where it is called *Dihang*) and is joined by Dibang river and later by Lohit river and thereon gets the name '*Brahmaputra*'. The principal tributaries of Brahmaputra in India are the Subansiri, Jia Bhareli, Dhansiri, Puthimari, Pagladiya and the Manas.		2900 km (A Chinese researcher has confirmed its origination from *Angsi Glacier* and length as 3848 km. But it has not been notified by Indian authorities yet)	Bay of Bengal (flows southward through Bangladesh into the Ganges Delta and merges with the Padma, the main distributaries of the Ganges, then the Meghna on the way to Bay of Bengal)

The holy Ganges is the longest river in the country. The 2900 km Brahmaputra is longer than the Ganges but only one-third of the river passes through India. The Tibetan name of river is 'TSANGPO' and its Chinese name is 'YALUZANGU'

2. *The Deccan River System*: These are seasonal rivers as their flow mainly depends on rainfall. They carry about 30% of total discharge of Indian rivers. The list of important rivers of peninsular India are given in the table on the following page. Godavari is the largest river system in peninsular India. The Kaveri system is the southernmost in the country.

3. *Coastal River System*: These are numerous, comparatively smaller, coastal rivers. While there are more than 600 such rivers on the west coast and only a few of such rivers drain into sea near the delta on the east coast.

4. *The Rivers of the Inland drainage basin*: These are small rivers in sandy areas of Rajasthan, called *rivers of inland drainage basins*, with no outlet in sea, except Luni which drains into the Rann of Kutch. Other such prominent rivers are: Machchu, Rupen, Saraswati, Banas, Ghaggar, etc.

Table 1.2   The Third River System

Name	Source	Length	Enters into
1. Godavari	Western Ghats	1450 km	Bay of Bengal
Krishna	Mahabaleshwar	1400 km	
Kaveri	Wetern Ghats	765 km	
Pennar	Nandi hills	560 km	
2. Mahanadi	North-west of the Deccan Plateau	890 km	Bay of Bengal
Damodar	Chota Nagpur plateau	592 km	
3. Narmada	Northernmost portion of the	1312 km	Arabian Sea
Tapti	Deccan Plateau	724 km	
4. Sharawathy	Western Ghats	124 km	Arabian Sea
Netravati		—	
Bharatapuzha		250 km	
Periyar	TN, Sivagiri hills	244 km	
Pamba	Pulachimalai hills	176 km	

LAKES

The Himalaya region is dotted with hundreds of lakes. Most lakes are found at altitudes of less than 5000 m, with the size of the lakes diminishing with altitude.

The largest lake is the Pangong Tso, which is spread across the border between India and Tibet. It is situated at an altitude of 4600 m and is 8 km wide and nearly 134 km long. The highest lake is the Gurudongmar in North Sikkim, 5370 m.

Lakes of India have their different kinds of origins like:

(i) *Tectonic Lakes*: Old Pleistocene Lakes of Kashmir and Kumaon Himalayas

(ii) *Crater Lakes*: They are due to volcanicity

(iii) *Glacial Lakes*: They are in big mountains

(iv) *Alluvial Lakes:* Oxbow lakes in the Ganga plains

(v) *Aeolian Lakes*: Caused due to small depressions of hollows
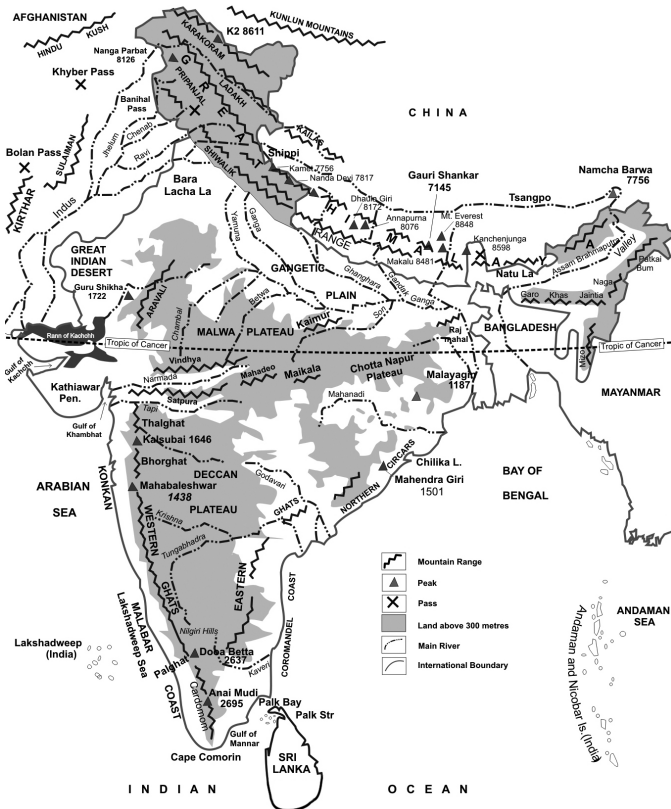
Map 1.2   This map is a sketch only, drawn not to scale, presented for reference and to aid understanding of the concept discussed.

(vi) *Lagoons*: These are formed due to depositions of sand bars along the sea coasts. The best examples are Chilka Lake (Orissa), Pulicat Lake (Andhra Pradesh) and several Kayals on the Malabar Coast of Kerala

Important Lakes of India
- Lakes of Kashmir—Dal, Wular, Shesh Nag, Verinag, Manasbal, Nagin, etc.
- Lakes of Kumaon—Nainital, Bhimtal, Khurpatal, Sattal, Punatal, etc.
- Lakes of Rajasthan—Udaisagar, Fatehsagar, Jai Samand, Pichol, Sambhar Salt Lakes.
- Other Important Lakes—Lake Lonar in Maharashtra, Chilka in Orissa, Lake Kolleru (Andhra Pradesh), Nakkital (Mount Abu).

CLIMATE AND FOREST RESOURCES

The Indian Meteorological Department recognizes four seasons, namely:

1. Winter (December–March)
2. Summer (April–May)
3. Monsoon (June–September)
4. Season of retreating south-west monsoon (October–November)

The climate of India is monsoon-type, fed by two rain bearing winds, *viz.,*

- *The South-west Monsoon (June–September)*: The south-west monsoons contribute 86% of the total rainfall in India. They open on the west coast around beginning of June and continue till September with a declining trend as they move inland.

- *The North-east Monsoon (November–December)*: These are also called winter monsoons and are confined to a smaller area, particularly the east coast. It is Tamil Nadu's major monsoon.

Regions of Heavy Rainfall (above 200 cm)

1. Assam, Arunachal, Meghalaya, Sikkim and northern parts of West Bengal
2. The Western Ghats
3. The Himalayan slopes

Regions of Scanty Rainfall (below 50 cm)

1. Kutch and Western Rajasthan
2. Southern Haryana, South-east Punjab and Ladakh

Forests in India

According to India State of Forests Report, 2015 (ISFR, 2015), the total forest cover of the country as per 2015 assessment is 701,673 km^2 (21.34% of the total geographic area of the country). Out of this, Very Dense Forest is [(VDF) 85,904 km^2, 2.61% of total geographic area], Moderately Dense Forest is [(MDF) 315,374 km^2, 9.59% of total geographic area] and the rest is Open Forest [(OF) 300,395 km^2, 9.14% of total geographic area]. At the country level, there is an increase of 2,402 km^2 in VDF area and 4,744 km^2 in OF areas, whereas there is a decrease of 3,371 km^2 in MDF areas.

India's tree cover has been estimated as 92,572 km^2 constituting 2.82% of its total geographical area. Tree cover is defined as tree patches less than 1 ha area with canopy density above 10%. It is observed that the tree cover is maximum in Central Highlands (11,004 sq. km.) followed by East Deccan (10, 120 sq. km) and Western Himalaya (9,835 sq. km).

Mangroves occupy an area of 4,740 sq. km in India accounting for nearly 3% of the world's mangrove vegetation. Sunderbans in West Bengal account for almost half of the total area under mangroves in India.

State having maximum proportion of its

Geographical area under dense forest cover—Arunachal Pradesh [20,804 km^2]

State having lowest area under forest cover—Haryana [1,584 km^2]

State having largest area under forest cover—Madhya Pradesh [77,462 km^2]

Percentage of forest cover w.r.t. total geographical area—Mizoram [88.93%]

Forest Cover of India
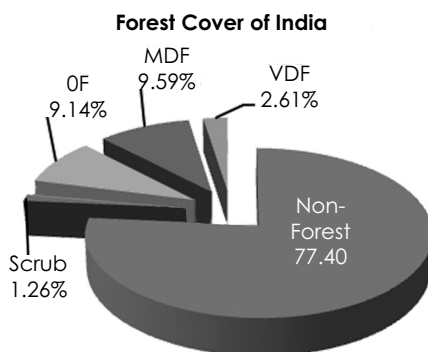
OF—'Open Forest' with canopy density between 10–40%.
MDF—'Moderate Dense Forest' with canoly density between 40–70%.
VDF—'Very Dense Forest' with canoly density more than 70%.
Scrubs—which is degraded forest land with canoly density less than 10%, is not considered a part of forest cover.
Total Forest Cover—21.05%

Forest Cover in Hill and Tribal Districts

Hill Districts: There are 124 hill districts in India and the total forest cover in the Hill districts in 283,015 sq km. 39.99% of their geographical area is under forest cover. Forest cover in the hill districts has decreased by 1,680 km^2. All districts of the states of Arunachal Pradesh, Himachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura and Uttarakhand are hill districts. The percentages of these states for forest cover is 62.57% of their geographical area.

Tribal Districts: There are 189 tribal districts in India and the total forest cover in the tribal districts in 451,223 sq km. 40.59% of their geographical area is under forest cover. Forest cover in tribal districts has decreased by 438 km^2.

> The type of natural vegetation cover changes according to fall in temperature as one goes up the mountains. In the Himalayas, we find tropical vegetation up to a height of 500 metres, sub-tropical vegetation from 500 to 1500 metres, temperate vegetation from 2500 to 3500 metres and cold desert vegetation above 3500 metres from the sea level. In the Southern India the change in vegetation type occurs at relatively high altitudes because of its tropical location.

Types of Forests in India

1. *Evergreen Forests* (*Tropical*): Found in areas where rainfall ranges between 200 and 300 cm, e.g., Western Ghats and sub-Himalayan regions. These are coniferous forests with trees having needle-shaped leaves and provide teak, rosewood, mahogany, pine and bamboo.

2. *Deciduous Forests (Monsoon Forests)*: Found in areas having rainfall between 150 and 200 cms per annum, e.g., parts of Deccan Plateau stretching across Maharashtra, Madhya Pradesh and Karnataka. They provide fine timber such as teak, sal, sandalwood, etc.

3. *Dry Forests*: Found in desert regions of Rajasthan and south of Punjab, where rainfall is below 75–100 cms per annum. The trees include babul, neem, tamarind, etc. In the regions with rainfall below 50 cms per annum like the central and western parts of Rajasthan we find semi desert and desert vegetation. The plants include scrubs, thorny bushes and cactus.

4. *Hill Forests*: Found in southern India and in the Himalayan regions and provide timber oak, deodar, pines, chir, are major trees found in these forests.

5. *Tidal Forests* (*Mangrove*): Found in coastal plains which are generally submerged, particularly on river deltas on the east coast (Ganges, Mahanadi, Godavari). The forests on the Gangetic delta in Bengal are called Sunderbans after the Sundari trees found in these forests. The mangrove cover in India is 4,740 km^2 (0.14% of India's geographic areas) spread across 12 States and UTs. [1. Andhra Pradesh; 2. Goa; 3. Gujarat; 4. Karanataka; 5. Kerala; 6. Maharashtra; 7.Odisha; 8. Tamil Nadu; 9. West Bengal; 10. Andaman & Nicobar Islands; 11. Daman & Diu, and 12. Puducherry]

Mangroves are the most productive and biologically important forest having complex ecosystems. There are highly specialized plants exhibiting a variety of adaptations in morphology, anatomy and physiology. Prominent among these adaptations are presence of *pneumatophores*, buttress, stilt roots, *vivipary* etc. Mangroves also provide breeding and nursing grounds for marine and pelagic species, food, medicine, fuel and building materials for local communities. Their protective role from natural calamities in coastal areas has been widely recognized.

Fact Bytes

➤ In terms of largest forest cover, Madhya Pradesh (77,462 sq km) is followed by Arunachal Pradesh (67,321 sq km), Chhattisgarh (55,586 sq km), Maharashtra (50,628 sq km) and Odisha (50,354 sq km). ➤ About 40% of India's forest cover is contained in 9 big patches of size more than 10,000 sq. km. These patches are confined in the state of Himachal Pradesh, Uttrakhand, Maharashtra, Karnataka, Goa, Tamil Nadu, Kerala, Telangana, Odisha, Madhya Pradesh, Chhatisgarh and NE-States. ➤ The north-east states, the region which has only 7.76% of the geographical area, together account for about 25% of India's total forest cover. ➤ Forest cover in the north-eastern states is about 65.59% of the geographic area as against the national average of 21.34%. ➤ As compared to 2013, gain of 5,871 km^2 of forest cover has been observed in north-east States. ➤ More than half of the forest cover of India occurs in 1–500 m altitude zone. ➤ Distribution of forest cover in different forest types is being presented for the first time. ➤ Nearly one-third of India's forest cover falls in the Tropical Moist Deciduous type, followed by Tropical Dry Deciduous (30.16%) ➤ Tropical Wet Evergreen type group occupies 8.75% of the country's forest cover. ➤ West Bengal has nearly half of the country's mangroves. ➤ An increase of 58 km^2 of mangrove at the national level has been observed. ➤ Decrease in Mangrove cover in Andamans and Nicobar islands is attributed to after effects of tsunami. ➤ Tree cover in India constitutes the largest in Maharashtra (9,558 km^2), followed by J&K (8,354 km^2), Rajasthan (8,269 km^2) and Gujarat (7.914 km^2). ➤ Eastern Himalayas have the lowest Tree Cover of 537 sq. km. as this zone is predominantly under natural forests. ➤ West Coast has maximum percentage of Tree Cover (8.04%) w.r.t. its geographical area followed by Western Ghats (5.08%) and East Coast (3.20%). ➤ There is heavy deforestation in the catchment areas of rivers in the Himalayan region. ➤ There is urgent need for the conservation of natural vegetation to maintain balance in environment, by controlling reckless felling of trees, overgrazing in forests, forest fire, Jhuming urbanization and shifting agriculture. ➤ Research Institutes are required to control the spread of plant

diseases. ➤ Planned conservation can be taken up by forest department. ➤ Manmade forests (afforestation) are to be encouraged to produce trees for commercial purposes and to increase people's participation in forestation and Social Forestry. ➤ In terms of percentage of forest cover w.r.t. total geographical area. Mizoram with 88.93% has highest forest cover followed by Lakshadweep (84.56%), Andaman & Nicobar (81.84%), Arunachal Pradesh (80.30%), Nagaland (78.21%), Meghalaya (76.76%), Manipur (76.11%) and Tripura (74.79%). ➤ The States/UTs which have shown considerable positive changes in area under forest cover SFR 2015 over SFR 2013 are: Tamil Nadu (2,501 sq. km); Kerala (1,317 sq. km); J&K (450 sq. km); Karanatka (289); Uttar Pradesh (112 sq. km) ➤ States/UTs that have shown considerable negative changes in SFR 2015 over SFR 2013 are: Mizoram (306 sq. km); Uttrakhand (268 sq. km); Telangana (168 sq. km); Nagaland (78 sq. km); Arunachal Pradesh (73 sq. km).

Forests in India: Contribution as a Carbon Sink

Over the last two decades, progressive national forestry legislations and policies in India aimed at conservation and sustainable management of forests have reversed deforestation and have transformed India's forests into a significant net sink of CO_2. The CO_2 removal by India's forest and tree cover is enough to neutralize 11.25% of India's total GHG emission (CO_2 equivalent) at 1994 levels, the most recent year for which comparable data is available for developing countries based on their respective National Communications (NATCOMs) to the United Nations Framework Convention on Climate Change (UNFCCC). This is equivalent to offsetting 100% emissions from all energy in residential and transport sector; or 40% of total emissions from the agricultural sector. Clearly, India's forest and tree cover is serving as a major mode of carbon mitigation for India and the world.

Carbon Stock in India's Forests

Forest Survey of India (FSI) has been estimating the carbon stock in the India's forsts as per the methodology of 'Good Practices Guidance' (GPG) developed by Inter-governmental Panel on Climate Change (IPCC). In the SRF 2015, the total carbon stock in India's forest is estimated to be 7,044 million tonnes.

Coral Reefs Areas in India

The Indian reef area is estimated to be 2375 km^2. The four major coral reef areas identified for intensive conservation and management are: (i) Gulf of Mannar; (ii) Gulf of Kachchh; (iii) Lakshadweep and (iv) Andaman and Nicobar.

AGRICULTURE

About 65–70% of people in India are engaged in agriculture. About 142.42 million hectares, or just above 50% of the total geographical area of the country is under cultivation.

Crop Seasons

There are two major crop seasons in India, *viz.*,

1. Kharif
2. Rabi

Table 1.3 The Crop Seasons

Crop	Sown in	Harvested	Examples
Kharif	June/July	September/October	Rice, Jowar, Bajra, Ragi, Maize, Cotton and Jute
Rabi	October/December	April/May	Wheat, Barley, Peas, Rapeseed, Mustard and Grams

Table 1.4 Main Crops and Producers

Type	Name	Major Producers
Cereals	Wheat	Uttar Pradesh, Punjab, Haryana
	Rice	West Bengal, Andhra Pradesh, Telangana, Uttar Pradesh, Telangana
	Gram	Madhya Pradesh, Rajasthan, Uttar Pradesh
	Barley	Maharashtra, Uttar Pradesh, Rajasthan
	Bajra	Maharashtra, Gujarat, Rajasthan
	Maize	Andhra Pradesh, Karnataka, Bihar, Telangana
	Total coarse cereals	Karnataka, Maharashtra, Rajasthan
	Total pulses	Madhya Pradesh, Uttar Pradesh, Maharashtra
Cash Crops	Sugarcane	Uttar Pradesh, Maharashtra, Tamil Nadu
	Poppy	Uttar Pradesh, Himachal Pradesh
	Potato	Uttar Pradesh, West Bengal, Bihar
	Onion	Maharashtra, Gujarat, Karnataka
Oilseeds	Coconut	Kerala, Tamil Nadu
	Linseed	Madhya Pradesh, Uttar Pradesh
	Groundnut	Gujarat, Madhya Pradesh, Tamil Nadu
	Rapeseed and Mustard	Rajasthan, Uttar Pradesh, Madhya Pradesh
	Sesame	Uttar Pradesh, Rajasthan
	Sunflower	Maharashtra, Karnataka
	Soyabean	Madhya Pradesh, Maharashtra, Rajasthan
	Total oilseeds	Rajasthan, Madhya Pradesh, Gujarat
Fibre Crops	Cotton	Gujarat, Maharashtra, Punjab
	Jute	West Bengal, Bihar, Orissa, Assam
	Silk	Karnataka, Kerala
	Hemp	Madhya Pradesh, Uttar Pradesh
Plantations	Coffee	Karnataka, Kerala
	Rubber	Kerala, Karnataka
	Tea	Assam, Kerala
	Tobacco	Gujarat, Maharashtra, Madhya Pradesh
Spices	Pepper	Kerala, Karnataka, Tamil Nadu

(*Continued*)

Type	Name	Major Producers
	Cashew nuts	Kerala, Tamil Nadu, Andhra Pradesh, Telangana
	Ginger	Kerala, Uttar Pradesh
	Turmeric	Andhra Pradesh, Orissa, Telangana
	Chillies	Maharashtra, Andhra Pradesh, Telangana
	Cloves	Kerala
	Saffron	Karnataka, Tamil Nadu, Jammu and Kashmir

Green Revolution

The green revolution was launched in 1967–68 to improve agricultural productivity in two phases:

1. *First Green Revolution*: Mainly confined to the progressive wheat producing states of Punjab, Haryana and western Uttar Pradesh.

2. *Second Green Revolution*: In 1983–84 the green revolution was extended to eastern and central states including West Bengal, Bihar, Orissa, Madhya Pradesh and Uttar Pradesh.

   As a result of the green revolution, wheat production more than doubled and rice production increased by 53%.

Dairy Farming

1. *Operation Flood-I* (*1970–81*): In collaboration with the World Bank, Operation Flood-I was launched with the intention of capturing a commanding share of the liquid milk market in the metropolitan cities.

2. *Operation Flood-II* (*1981–85*): It was launched in 1981 and extended to almost all states.

3. *Operation Flood-III* (*1985–90*): It was launched in 1985 under the Seventh Five Year Plan.

The programmes were implemented under the aegis of the National Dairy Development Board (NDDB) and the Indian Dairy Corporation (IDC).

   As a result of these programmes, India has become largest milk producer in the world. With the increase in per capita availability of dairy milk from 107 gm to 232 gm, the country is beginning to face the problem of surplus.

Irrigation

Methods of Irrigation

1. *Wells*: Used mainly in Uttar Pradesh, Punjab, Tamil Nadu and Maharashtra, accounting for about 48% of the total irrigated area in the country.

2. *Tanks*: Used in central and southern India, especially in Andhra Pradesh. About 10% of total irrigated area is irrigated by tanks.

3. *Canals*: Major source of irrigation in Punjab, Uttar Pradesh and Haryana. About 40% of total irrigated area is irrigated by canals.

MINERAL RESOURCES OF INDIA

India is rich in iron, mica, manganese, bauxite; self-sufficient in antimony, building materials, cement materials, clay, chromite, lime, dolomite and gold; deficient in copper, lead, mercury, zinc, tin, nickel, petroleum products, sulphur and tungsten.

Table 1.5 Important Minerals

Mineral	Found in	Features
Iron	Orissa, Bihar, Chattisgarh, Andhra Pradesh, Tamil Nadu, Karnataka, Maharashtra, Goa	India has the world's largest reserves of iron; approximately one-fourth of world's known reserves
Coal	Bihar, West Bengal, Madhya Pradesh, Orissa, Maharashtra, Telangana, Assam	India is the third-largest producer of coal in the world
Manganese	Orissa, Madhya Pradesh, Maharashtra, Gujarat, Karnataka, Jharkhand, Andhra Pradesh	India ranks third in the world in manganese production
Mica	Jharkhand, Rajasthan, Andhra Pradesh, Tamil Nadu, Telangana	India has the largest deposits of mica in the world
Bauxite (Aluminium ore)	Jharkhand, Gujarat, Chattisgarh, Tamil Nadu, Karnataka, Maharashtra, J&K, Orissa, Rajasthan	India is the third-largest producer of Bauxite in the world
Copper	Jharkhand, Rajasthan, Andhra Pradesh, Karnataka, Madhya Pradesh, Gujarat	
Crude Oil	Assam, Tripura, Manipur, West Bengal, Ganges Valley, Himachal Pradesh, Kutch, Andhra Pradesh, Off West Bengal, Orissa, Maharashtra and Gujarat	
Lignite	Tamil Nadu, some deposits also found in Gujarat, Puducherry, Rajasthan, Jammu and Kashmir	India ranks third in the production of lignite
Gold	Karnataka; in small quantities in Andhra Pradesh	
Magnesite	Tamil Nadu, Uttarakhand, Karnataka	
Gypsum	Rajasthan, J&K, Tamil Nadu	
Lead-Zinc	Andhra Pradesh, Gujarat, Maharashtra, Meghalaya, Tamil Nadu, Orissa, Sikkim and Rajasthan	
Chromite	Orissa, Jharkhand, Karnataka, Tamil Nadu, Maharashtra, Andhra Pradesh and Manipur	
Dolomite	Madhya Pradesh, Orissa, Gujarat, Telangana Maharashtra, Uttar Pradesh, West Bengal and Arunachal Pradesh	
Diamond	Madhya Pradesh; traces are also found in Bihar, Orissa, Maharashtra and Andhra Pradesh	

Map 1.3   This map is a sketch only, drawn not to scale, presented for reference and to aid understanding of the concept discussed.

INDIAN STATES AND UNION TERRITORIES

Table 1.6   Facts for Quick Revision

	States	Union Territories
Largest population*	Uttar Pradesh [19,95,81,477]	NCT of Delhi [1,67,53,235]; followed by Puducherry [12,44,464]
Smallest population*	Sikkim [6,07,688]	Lakshadweep [64,429]
Largest area**	Rajasthan [3,42,239 km^2]	Andaman & Nicobar Islands [8279 km^2]
Smallest area**	Goa [3,702 km^2]	Lakshadweep [32 km^2]

(*Continued*)

	States	**Union Territories**
Highest density of population	Bihar [1102 persons/km^2]	NCT of Delhi [11,297 persons/km^2] followed by Chandigarh [9252 persons/km^2]
Lowest density of population	Arunachal Pradesh [17 persons/km^2]	Andaman & Nicobar Islands [46 persons/km^2]
More females (highest sex ratio)	Kerala [1084 females per 1000 males]	Puducherry [1038 females per 1000 males]
More males (lowest sex ratio)	Haryana [877 females per 1000 males]	Daman & Diu [616 females per 1000 males]
Highest literacy rate	Kerala [93.91%]	Lakshadweep [92.28%]
Lowest literacy rate	Bihar [63.82%]	Dadar & Nagar Havali [77.65%]
State touching maximum number of boundaries of other states	Uttar Pradesh [Haryana, Uttarakhand, Madhya Pradesh, Himachal Pradesh, Jharkhand, Bihar, Chhatisgarh, Rajasthan]—total 8 states	
Largest Distrct	Kachchh (Gujarat) [45,652 km^2]	
Smallest District	Mahe (Puducherry) [9 km^2]	
Tropic of Cancer passes through 8 states	Mizoram, Tripura, West Bengal, Jharkhand, Chhatisgarh, Madhya Pradesh, Rajasthan and Gujarat	
Indian Standard Meridian (82° 20′ E Meridian) passes through 5 states	Andhra Pradesh, Orissa, Chattisgarh, Madhya Pradesh, Uttar Pradesh, Telangana	

*Area in '000 km^2; **figures (2011 census estimates)]; ***Delhi is NCT (National Capital Territory).*

NATIONAL PARKS AND WILDLIFE SANCTUARIES

National Parks

There are around 103 national parks in India, covering an area of approximately 40,500 km^2 or about 1.23% of India's total area.

Wildlife Sanctuaries

There are around 531 sanctuaries in India covering an area of about 117,602.72 km^2 or about 3.58% of total land area.

Table 1.7 Important Sanctuaries and Parks

Name	Location	Reserve for	Area
Achanakmar Sanctuary	Bilaspur, Chhatisgarh	Tiger, bear, chital, sambar, bison, hyena, jackal, wild boar, black buck	557.35 km^2
Bandipur Sanctuary	Border of Karnataka and Tamil Nadu	Elephant, tigers, panther, sambar, deer, birds	874.20 km^2
Corbett National Park	Nainital, Uttaranchal	Tiger, leopards, elephants, sambar	1318.54 km^2
Dachigam Sanctuary	Srinagar/Pulwama, Kashmir	Kashmiri stag or Hangul, Himalayan bear, musk deer, exotic Himalayan birds	141 km^2

(*Continued*)

Name	Location	Reserve for	Area
Hemis National Park	Leh, J&K	Snow leopard, Speical variety of Sheep (Argali, Shapu, Asiatic Ibex), Tibetan Wolf, Eurasian Brown bear and Red fox	4400 km^2
Gandhi Sagar Sanctuary	Mandsaur and Neemuch, Madhya Pradesh	Chital, sambar, chinkara, barking deer, wild birds	368.62 km^2
Gobind Sagar Wildlife Sanctuary	Bilaspur, Himachal Pradesh	Birds, Wild Boar, Deer, Singhara	170 km^2
Ghana Bird Sanctuary	Bharatpur, Rajasthan	Water birds, black-buck, chital, sambar	29 km^2
Gir Forest	Junagarh, Gujarat	India's biggest wildlife sanctuary famous for Gir lions	1412.13 km^2
Kaziranga National Park	Jorhat, Assam	Rhinoceros, wild buffalo, swan, deer, hog, elephant, leopard, langoor, python	430 km^2
Pakhal Sanctuary	Warangal, Telangana	Tiger, panther, sambar, nilgai, chital, spotted deer, wild boar, black buck, mountain gazzle	860 km^2
Periyar Sanctuary	Idukki, Kerala	Elephant, tiger, panther, gaur, nilgai, sambar, Nilgiri tahr	305 km^2
Rajaji National Park	Haridwar, Dehradun and Pauri Garhwal distt of Uttrakhand	Tiger	820 km^2
Ranthambore Tiger Project	Sawai Madhopur, Rajasthan	Tiger, leopard, sloth bear, crocodile	400 km^2
Sariska Sanctuary	Alwar, Rajasthan	Tiger, panther, sambar, nilgai, chital, chinkara	765 km^2
Sharaswathy Sanctuary	Shimoga, Karnataka	Elephant, tiger, panther, sambar, gaur, chital	44 km^2
Shikari Devi Sanctuary	Mandi, Himachal Pradesh	Black bear, musk deer, leopard, partridge	72 km^2
Sunderban Tiger Reserve	South 24 Parganas	Tiger, deer, wild boar, leopard	4264 km^2
Sonai-Rupai Sanctuary	Sonitpur, Assam	Elephant, sambar, wild boar, one-horned rhinoceros	175 km^2
Tungabhadra Sanctuary	Bellary, Karnataka	Panther, chital, sloth bear, four-horned antelope	492.46 km^2
Vedanthangal Bird Sanctuary	Tamil Nadu	Pelican, spoon bills, species of birds from Canada, herons, egret	72 acres
Wild Ass Sanctuary	Little Rann of Kutch, Gujarat	Wild ass, wolf, nilgai, chinkara	4953 km^2

IMPORTANT TOWNS AND LOCATIONS

Table 1.8 Indian Cities on River Banks

City	River	State
Agra	Yamuna	Uttar Pradesh
Ahmedabad	Sabarmati	Gujarat
Allahabad	Confluence of the Ganges, Yamuna and Saraswati	Uttar Pradesh
Alwaye	Periyar	Kerala
Ayodhya	Sarayu	Uttar Pradesh
Badrinath	Gangotri	Uttarakhand
Bhagalpur	Ganges	Bihar
Buxar	Ganges	Bihar
Kolkata	Hooghly	West Bengal
Cuttack	Mahanadi	Orissa
Delhi	Yamuna	Delhi
Dibrugarh	Brahmaputra	Assam
Guwahati	Brahmaputra	Assam
Haridwar	Ganges	Uttarakhand
Howrah	Hooghly	West Bengal
Hyderabad	Musa	Andhra Pradesh/Telangana
Jamshedpur	Subarnarekha	Jharkhand
Kanpur	Ganges	Uttar Pradesh
Kota	Chambal	Rajasthan
Leh	Indus	Jammu and Kashmir
Lucknow	Gomti	Uttar Pradesh
Ludhiana	Sutlej	Punjab
Mathura	Yamuna	Uttar Pradesh
Moradabad	Ram Ganga	Uttar Pradesh
Monghyr	Ganges	Uttar Pradesh
Nashik	Godavari	Maharashtra
Patna	Ganges	Bihar
Srinagar	Jhelum	Jammu and Kashmir
Surat	Tapti	Gujarat
Tiruchirappalli	Cauvery	Tamil Nadu
Ujjain	Shipra	Madhya Pradesh
Vijayawada	Krishna	Andhra Pradesh Telangana
Varanasi	Ganges	Uttar Pradesh

Table 1.9 Important Sites and Monuments

Name	Location	Famous for
Ajanta Caves	Aurangabad	Buddhist cave temples
Amarnath's cave	Kashmir	Naturally formed ice Shivlinga
Anand Bhawan	Allahabad	Ancestral house of the Nehru family which has been donated by Late Indira Gandhi for conversion into a National Museum.
Bibi-ka-Maqbara	Aurangabad	According to the Archaeological Survey of India, the Bibi-ka-Maqbara is a mausoleum of Rabia-ul-Daurani alias Dilras Banu Begum, the wife of the Mughal Emperor Aurangzeb. This mausoleum is believed to be constructed by Prince Azam Shah in memory of his mother during 1651 to 1661 AD.
Buland Darwaza	Fatehpur Sikri	The highest and biggest gateway of India near Agra built by Akbar to commemorate his victorious campaign in Deccan
Char Minar	Hyderabad	Built in 1591 CE, it is a monument, a mosque and a global icon. It was built to commemorate the second Islamic millennium year.
Dilwara Temples	Mount Abu	Jain temples, Vimal Vasahi, Luna Vasahi, Pittdhar, Parsuvanattra, Mahavir Swami, built between 11th and 13th century AD
Elephanta Caves	Mumbai	The Elephanta caves, taluka Uran, district Raigad, is located on island hills, 7 kms from the mainland Mumbai, known for sculptures
Ellora Caves	Aurangabad	Has 12 Buddhist caves, 17 Hindu caves and 5 Jain caves
Gandhi Sadan	Delhi	Birla house—where Gandhiji was assassinated in 1948
Gateway of India	Mumbai	Erected in 1911 on King George V's visit to India
Gol Gumbaz	Bijapur	Largest dome in India
Gomateshwara	Mysore	2000 year-old statue of a Jain sage carved out of a single stone
Golden Temple	Amritsar	Largest Gurudwara
Hawa Mahal	Jaipur	A pink castle of air
Jallianwala Bagh	Amritsar	A public garden infamous for the massacre of hundreds of innocent Indians by the British on 13 April, 1919
Jantar Mantar	Delhi	Observatory built in 1724 during the days of Maharaja Jai Singh II of Ajmer
Jama Masjid	Delhi	Biggest mosque built by Shah Jahan
Kanya Kumari	Tamil Nadu	Temple of the Virgin Goddess situated at Cape Camorin on the extreme southern tip of India
Kranti Maidan	Mumbai	Historical avenue where Gandhiji gave the call 'Quit India' in 1942
Khajuraho	Near Bhopal	Mahadeva temple, the embodiment of the great artistic activity of 9th to 12th centuries
Meenakshi Temple	Madurai	Hindu temple
Qutab Minar	Delhi	Largest minaret
Rajghat	Delhi	Samadhi of Mahatma Gandhi on the bank of the Yamuna

(*Continued*)

Name	Location	Famous for
Red Fort	Delhi	A red stone structure built by Shah Jahan on the bank of the Yamuna
Sabarmati	Ahmedabad	Harijan Ashram founded here by Gandhiji
Sarnath	Varanasi	Centre of Buddhist pilgrimage, the place where Gautam Buddha delivered his first sermon after enlightenment
Shaktisthal	Delhi	Situated on the bank of the Yamuna where Indira Gandhi was cremated
Shantivan	Delhi	Samadhi of Pt. Jawaharlal Nehru
Shantiniketan	Kolkata	Famous Visva-Bharati University founded by Rabindranath Tagore
Sanchi	Madhya Pradesh	Ancient Buddhist monuments
Tower of Victory	Chittorgarh	Famous tower built by Rana Sangha, the king of Mewar, in AD 1450 to commemorate his victory over the Muslim forces of Malwa
Victoria Memorial	Kolkata	Famous museum
Vijay Ghat	Delhi	Samadhi of Lal Bahadur Shastri
Vir Bhumi	Delhi	Samadhi of Rajiv Gandhi

CENSUS 2011

Population size — 1,21,01,93,422

- Male 62,37,24,248
- Female 58,64,69,174

- Rural 83,30,87,662
- Urban 37,71,05,760

Population density — 382 persons/km^2

Sex ratio — 940 females/1000 males

- Rural 9470
- Urban 926

Literacy Rate — 74.04 (7+ years persons,%)

- Males (82.14)
- Females (65.46)

Table 1.10 Basic Data

	Capital	Area ('000 km²)	Population	Percent to total Population of India	Rank in
			(2011 census)**	(2011 census)**	2011
INDIA	New Delhi	3287.3	1,21,01,93,422	100.00	
National Capital Territory***	New Delhi	1.5	1,67,53,235	1.38	18
1. Andhra Pradesh	Hyderabad	160.205	4,93,78,776	4.08	10
2. Arunachal Pradesh	Itanagar	83.743	13,82,611	0.11	27
3. Assam	Dispur	78.4	3,11,69,272	2.58	14
4. Bihar	Patna	94.1	10,38,04,637	8.58	3
5. Chhattisgarh	Raipur	136.0	2,55,40,196	2.11	16
6. Goa	Panaji	3.7	14,57,723	0.12	26
7. Gujarat	Gandhinagar	196.0	6,03,83,628	4.99	10
8. Haryana	Chandigarh	44.3	2,53,53,081	2.09	17
9. Himachal Pradesh	Shimla	55.7	68,56,509	0.57	21
10. Jammu and Kashmir	Srinagar/Jammu*	222.2	1,25,48,926	1.04	19
11. Jharkhand	Ranchi	74.7	3,29,66,238	2.72	13
12. Karnataka	Bangalore	191.8	6,11,30,704	5.05	9
13. Kerala	Thiruvananthapuram	38.9	3,33,87,677	2.76	12
14. Madhya Pradesh	Bhopal	308.0	7,25,97,565	6.00	6
15. Maharashtra	Mumbai	307.7	11,23,72,972	9.29	2
16. Manipur	Imphal	22.3	27,21,756	0.22	24
17. Meghalaya	Shillong	22.4	29,64,007	0.24	23

(Continued)

	Capital	Area ('000 km^2)	Population	Percent to total Population of India	Rank in
18. Mizoram	Aizawl	21.1	10,91,014	0.09	29
19. Nagaland	Kohima	16.6	19,80,602	0.16	25
20. Orissa	Bhubaneswar	155.7	419,47,358	3.47	11
21. Punjab	Chandigarh	50.4	277,04,236	2.29	15
22. Rajasthan	Jaipur	342.2	686,21,012	5.67	8
23. Sikkim	Gangtok	7.1	6,07,688	0.05	31
24. Tamil Nadu	Chennai	130.1	721,38,958	5.96	7
25. Telangana	Hyderabad	114.840	3,52,86,757	2.91	12
26. Tripura	Agartala	10.5	36,71,032	0.30	22
27. Uttar Pradesh	Lucknow	243.3	19,95,81,477	16.49	1
28. Uttarakhand	Dehradun	53.6	101,16,752	0.84	20
29. West Bengal	Kolkata	88.8	913,47,736	7.55	4
Union Territories					
1. Andaman & Nicobar	Port Blair	8.2	379,944	0.03	32
2. Chandigarh	Chandigarh	0.1	10,54,686	0.09	30
3. Dadar and Nagar Haveli	Silvassa	0.5	342,853	0.03	33
4. Daman and Diu	Daman	0.1	242,911	0.02	34
5. Lakshadweep	Kavaratti	0.03	64,429	0.01	35
6. Puducherry	Puducherry	0.5	12,44,464	0.10	28

*Srinagar (summer capital); Jammu (winter capital). ** (as per 2011 provisional figures) ***7th UT of India.

Table 1.11 Indian Tribes and Their Habitat

Name of Tribe	Found in
Abors	Assam, Arunachal Pradesh
Angami	Nagaland, Assam
Ao	Nagaland, Assam
Apatamis	Arunachal Pradesh
Badagas	Tamil Nadu (Nilgiri Hill)
Baiga	Madhya Pradesh, Chhattisgarh
Bhils	Madhya Pradesh, Rajasthan, Gujarat, Chattisgarh, Maharashtra
Bhotias	Uttarakhand (Garhwal and Kumaun)
Birhor	Hazaribagh, Jharkhand
Chenchus	Telangana, Orissa
Gaddis	Himachal Pradesh, J&K
Gallong	North-east Himalayan Tract
Garos	Meghalaya
Gonds	Madhya Pradesh, Jharkhand, Chhattisgarh, Orissa, Andhra Pradesh, Telangana
Khas/Khasis	Uttar Pradesh, Himachal Pradesh, Uttarakhand, West Bengal, Sikkim, Bhutan
Khasis	Assam, Meghalaya
Khonds	Orissa, Andhra Pradesh, Telangana
Kol	Madhya Pradesh, Chhattisgarh
Kolam	Andhra Pradesh, Maharashtra
Kotas	Tamil Nadu (Nilgiri)
Kuki	Manipur
Lahora	Nagaland, Assam
Lepchas	Sikkim
Lushais	Tripura
Mina	Rajasthan
Mikirs	Assam
Monpa	Arunachal Pradesh
Mundas	Jharkhand
Murias	Madhya Pradesh
Oraon/Kurukh	Jharkhand, Orissa
Onges	Andaman and Nicobar
Santhals	West Bengal, Jharkhand, Orissa, Bihar
Sema	Nagaland and Assam
Sentinelese	Andaman and Nicobar
Shomens	Andaman and Nicobar
Tangkhul	Nagaland, Assam
Todas	Tamil Nadu (Nilgiri Hills)
Uralis	Kerala
Warlis	Maharashtra

Hill Stations (Height in ft)

Almora	:	5500 ft in Kumaon Hills, Uttarakhand
Cherrapunji	:	4455 ft, 30 miles south of Shillong, Meghalaya
Coonoor	:	6740 ft in the Nilgiri Hills, Tamil Nadu
Dalhousie	:	7867 ft in Himachal Pradesh
Darjeeling	:	7168 ft in West Bengal
Gulmarg	:	8850 ft in Jammu and Kashmir
Kalimpong	:	4000 ft near Darjeeling, West Bengal
Kasauli	:	7200 ft near Shimla, Himachal Pradesh
Kodaikanal	:	7200 ft in Tamil Nadu
Kullu Valley	:	3999 ft in Himachal Pradesh
Lansdowne	:	5597 ft in Garhwal, Uttarakhand
Mahabaleshwar	:	4500 ft in Maharashtra
Mt Abu	:	4500 ft in Rajasthan
Mukteshwar	:	7500 ft in Kumaon Hills, Uttarakhand
Mussoorie	:	7500 ft in Uttarakhand
Shimla	:	7000 ft in Himachal Pradesh
Nainital	:	6365 ft in Uttarakhand
Ootacamund (Ooty)	:	7500 ft in Tamil Nadu

India
- Territorial Sea—12 nm (nautical miles)
- Contiguous Zone—24 nm (nautical miles)
- Exclusive Economic Zone—200 nm (nautical miles)
- Longest River—Ganga
- Largest Lake (Saline water)—Chilka Lake
- Largest Lake—Wulcar Lake
- Highest Point—Mt. K2 (8611 m)
- Highest Point of Himalayas—Kanchan Junga (8598 m)
- Lowest Point—Kuttanad (–2.2 m)
- Northernmost Point—Siachen Glacier near Karakoram
- Southernmost Point—Indira Point, Great Nicobar Andaman and Nicobar Islands
- Westernmost Point—West of Ghur Mota, Gujarat
- Easternmost Point—Kibithu, Arunachal Pradesh
- Highest Altitude—Kangchenjunga, Sikkim
- Lowest Altitude—Kuttanad, Kerala

Table 1.12 States at a Glance I

Sl. No.	State	Capital	Major Cities	Sex Ratio*	Population Density**	No. of Districts	Principal Languages	Main Rivers
1.	Andhra Pradesh	Hyderabad	Vishakhapatnam, Vijayawada, Guntur	992	308	13	Telugu, Urdu, English	Krishna, Pennar, Chararavati
2.	Telangana	Hyderabad	Nizamabad, Khammam, Warrangal	–	310	10	Telugu, Urdu	Godavari, Manjira, Musi
3.	Arunachal Pradesh	Itanagar	Along, Tezu, Khonsa	920	17	16	Monpa, Adi, Nishi, Miji, Wancho	Siang, Subansiri
4.	Assam	Dispur	Guwahati, Dibragarh, Jorhat, Tinsukia	954	397	27	Assamese	Brahmaputra
5.	Bihar	Patna	Gaya, Bhagalpur, Muzzaffarpur	916	1,102	38	Hindi, Urdu, Maithili	Ganga, Son, Bagmati, Koshi
6.	Chattisgarh	Raipur	Jabalpur, Bilaspur, Bhilai, Durg	991	189	27*	Hindi	Kharan, Indravati, Mahanadi, Hasdo, Godavari
7.	Goa	Panaji	Marmagao, Vasco da gama	968	394	2	Konkani, Marathi	Mandvi, Zuari
8.	Gujarat	Gandhinagar	Ahmedabad, Rajkot, Vadodara, Surat	918	308	33	Gujarati	Narmada, Sabarmati, Mahi, Mithi, Khari
9.	Haryana	Chandigarh	Ambala, Gurgaon, Faridabad, Rohtak	877	573	21	Bangru	Yamuna, Ghaggar, Satluj
10.	Himachal Pradesh	Shimla	Bilaspur, Mandi, Kulu	974	123	12	Pahari, Hindi	Satluj, Beas, Chenab, Ravi, Yamuna
11.	Jammu and Kashmir	Srinagar	Jammu, Leh, Anantnag	883	124	22	Urdu, Kashmiri, Ladakhi, Dogri, Pahari, Punjabi, Balti, Gojri and Dabri	Jhelum, Chenab, Indus, Tawi, Ravi

(*Continued*)

* 9 new districts were added on 01.01.2012.

Sl. No.	State	Capital	Major Cities	Sex Ratio*	Population Density**	No. of Districts	Principal Languages	Main Rivers
12.	Jharkhand	Ranchi	Ranchi, Gumla Singbhum, Bokaro Dhanbad, Jamshedpur	947	414	24	Hindi	Brahmani, Barakar, Subarnarekha
13.	Karnataka	Bangalore	Mysore, Mangalore, Bengalura, Hubli-Dharwad	968	319	30	Kannada	Cavery, Krishna, Hemvati, Gahataprabh, Tungabhadra, Bhima, Kabini, Sharavathi, Malaprabha
14.	Kerala	Thiruvananthapuram	Kochi, Kozhikode	1,084	859	14	Malayalam	Periyar, Pamba, Bharatapuzha, Parambikulam, Neyyar
15.	Madhya Pradesh	Bhopal	Gwalior, Indore	930	236	50	Hindi	Chambal, Tapti, Narmada, Mahanadi, Shipra, Son, Betwa
16.	Maharashtra	Mumbai	Pune, Nagpur, Nasik, Thane, Solapur, Aurangabad	925	365	35	Marathi	Godawari, Bhima, Krishna, Tapi
17.	Manipur	Imphal	Bishnupur, Imphal	987	122	9	Manipuri	Thoubal, Iril, Nambul, Sekmai, Chakpi, Khuga
18.	Meghalaya	Shillong	Cherrapunji, Tura, Jowai	986	103	11	Khasi, Garo and English	Sanda, Daring, Bandra, Bhogai, Dareng, Simsang, Nitai, Bhopai, Umkhri, Digaru, Mawpa, Myngot
19.	Mizoram	Aizawl	Lunglie, Chhimtuipui	975	52	8	Mizo, English	Dhaleswari, Tuirial, Tut, Tuivwial, Koldoyne, Karnaphuli

Sl. No.	State	Capital	Major Cities	Sex Ratio*	Population Density**	No. of Districts	Principal Languages	Main Rivers
20.	Nagaland	Kohima	Mon, Dimapur, Mokokchung	931	119	11	English, Hindi and about 16 tribal dialects such as Ao, Angami, Chang, Konyak, Lotha, Sema Sangtam and Chakesang	Doyang, Dhiku, Dhansiri, Milak, Tizu
21.	Odisha (Orissa)	Bhubaneswar	Rourkela, Cuttack Sambalpur	978	269	30	Odia	Mahanadi, Brahmani, Nagavali
22.	Punjab	Chandigarh	Amritsar, Ludhiana, Jalandhar, Patiala	893	550	22	Punjabi, Hindi	Sutlej, Beas, Indus, Ravi, Chenab
23.	Rajasthan	Jaipur	Jodhpur, Ajmer, Kota, Udaipur	926	201	33	Hindi, Rajasthani	Luni, Chambal
24.	Sikkim	Gangtok	Gyalshingh, Yoksum	889	86	4	Lepcha, Nepali Bhutia, Limbu	Rangeet, Teesta
25.	Tamil Nadu	Chennai	Coimbatore, Madurai Tirachurapalli	995	555	32	Tamil	Cauvery, Vaigai, Tamaraparni
26.	Tripura	Agartala	Kilash Nagar, Kamalpur	961	350	8	Bengali and Korborok	Deo, Gumti
27.	Uttar Pradesh	Lucknow	Kanpur, Allahabad, Varanasi	908	828	75	Hindi, Urdu	Ganga, Yamuna, Gomti
28.	Uttarakhand	Dehradun	Roorki, Nainital Haridwar	963	189	13	Hindi, English, Kumaoni, Gharwali	Ganga, Yamuna, Bhagirathi, Sharada
29.	West Bengal	Kolkata	Durgapur, Asansol, Siliguri, Bardhaman, Howrah	947	1,029	19	Bengali	Ganga/Hugli, Damodar, Kangasabati Ajay

(*Continued*)

Sl. No.	State	Capital	Major Cities	Sex Ratio*	Population Density**	No. of Districts	Principal Languages	Main Rivers
Union Territories								
1.	Andaman and Nicobar	Port Blair	Diglipur, Rangat	878	46	3	Nicobarese, Bengali, Tamil, Malayalam, Telugu and Hindi	
2.	Chandigarh	Chandigarh	Chandigarh	818	9252	1	Hindi, Punjabi and English	
3.	Dadra and Nagar Haveli	Silvassa	Khadoli, Massat	775	698	1	Hindi, Gujarati	Daman Ganga
4.	Daman and Diu	Daman	Daman, Diu	618	2169	2	Gujarati	
5.	Delhi (NCR)	New Delhi	New Delhi	866	11,297	9	Hindi, Punjabi, Urdu and English	Yamuna
6.	Lakshadweep	Kavaratti	Androth, Minicoy	946	2,013	1	Malayalam	
7.	Puducherry	Puducherry	Karaikal	1,038	2,598	4	Tamil, Telugu, Malayalam, English and French	

Notes: *Sex ratio is number of females per 1000 males. **Population density is in per square kilometres.
Ref: goidirectory.nic.in

India's eastern region has the highest density of 625 persons/km^2 and the north-eastern region has the lowest density of 176 persons/km^2.

Table 1.13 States at a Glance II

Sl. No. State	Main Crops	Chief Minerals	Main Cash Crops	Chief Industries	Tourist Spots
1. Andhra Pradesh	Jowar, rice, bajra	Manganese Ore, Asbestos, Coal Chromite, Copper Mica, Gold, Graphite, Limestone, Iron Ore	Tobacco, Oilseeds	Pharmaceuticals, Textiles, IT, Autocomponents, Horticulture, Poultry	Tirupati, Vishakapatnam, Vijawada, Kurnool, Hyderabad
2. Telangana	Rice, tobacco, mangoes	Coal, Limestone, Bauxite	Cotton, Tobacco, Sugarcane	Software	Salarjung Museum, Golconda fort, Warrangal
3. Arunachal Pradesh	Maize, millets, potatoes	Coal, Dolomite, Marble, Lead, Zinc	Pineapple, Orange	Plywood, Fruit-preservation, Handloom, Handicraft	Tawang, Pasighat, Nampdapha
4. Assam	Rice, rapeseed, mustard, tea, potato, papaya	Oil, Coal, Limestone, Fireclay, Petroleum, Natural Gas, Mica, Quatzite, Kaolin	Tea	Tea, Oil-refineries, Fertilizers, Sugar, Jute, Silk, Paper, Bamboo and Cane Articles	Kaziranga, Manas, Sibsagar, Hajo, Majuli, Sualkuchi
5. Bihar	Rice, wheat, maize	Limestone, Mica	Sugarcane, Jute, Tobacco	Cotton spinning Jute, Railway wagon, Leather, Sugar, Silk	Bodh Gaya, Nalanda, Patna, Pawanpuri, Rajgir Sasaram, Vaishali, Madhubani
6. Chhattisgarh	Rice, wheat, maize	Bauxite, Limestone Coal, Aluminium	Oil seeds, Cotton	Mining, Aluminium	Raipur, Bilaspur, Bastar, Durg
7. Goa	Rice, ragi	Manganese	Coconut, Cashew nuts	Fisheries, Mining, Ship-building, Canning, Fertilizer	Old Goa, Ponda, Dona Paula, Aravelam, Bondla
8. Gujarat	Rice, wheat, jowar, tobacco, bajra, groundnut, cotton	Bauxite, Manganese Ore Petroleum, Natural Gas, Marble, Gypsum, Limestone, Salt, Lignite, Soda Ash	Cotton, Groundnut	Agro and Food, Pharmaceutical, Mining, Jewellery, Gems	Ahmedabad, Palitana, Junagarh, Gir National Park, Somnath, Surat, Junagadh, Porbandar

Sl. No.	State	Main Crops	Chief Minerals	Main Cash Crops	Chief Industries	Tourist Spots
9.	Haryana	Wheat, oilseeds, sugarcane	Iron, Limestone, Marble, Kaolin, Sulphur, Coal, Quartz	Cotton, Oilseeds, Sugarcane	Cement, Paper, Automobiles, Dairy, Engineering, Sugar	Kurukshetra, Pinjore, Surajkund
10.	Himachal Pradesh	Rice, apples, wheat, maize, potatoes	Copper, Gypsum Mica, Natural Gas	Apple, Other fruits	Food-processing, Forest products	Manali, Shimla, Kullu, Dharamshala, Kangra Valley, Dalhousie, Lahaul and Spiti
11.	Jammu and Kashmir	Rice, wheat, maize	Limestone, Copper, Zinc, Manganese	Fruits, Oilseeds	Woollen Industries, Silk	Srinagar, Leh-Ladakh, Pahalgam, Gulmarg
12.	Jharkhand	Wheat, pulses	Mica, Uranium, Asbestos, Bauxite, Manganese Ore, Coal, Chromite, Copper Lead, Gold, Graphite, Limestone, Dolomite, Kyanite, Iron	Sugarcane, Jute, Tobaccoo	Iron and Steel, Heavy engineering, Coal, Mining, Tussar Silk, Tourism	Ranchi, Dhanbad, Bokaro, Jamshedpur, Deoghar
13.	Karnataka	Rice, jowar, groundnut, cotton, sugarcane, coffee	Asbestos, Mica, Antimony, Bauxite, Haematite (Mainly) (Iron-ore), Manganese Ore, Chromite, Copper, Lead, Gold, Limestone, Salt, Silver, Dolomite	Coffee, Sugarcane, Areca Nut	Electronics, IT, Tourism, Apparel, Handicrafts, Biotech, Agro food processing	Bangalore, Bijapur, Aihole, Pattadakal, Udipi, Halebidu, Bandipur, Hampi, Srirangapatanam, Mangalore, Karwar
14.	Kerala	Rice, rubber, tapioca, coconut	Thorium, Aluminium, Ilimenite, Iron-ore, Clay, Quartz, Bauxite, Silica Sand	Coconut, Tea, Coffee, Rubber	Coir, Cashew, Handloom	Thiruvananthapuram, Kovalam, Periyar National Park, Ernakulam
15.	Madhya Pradesh	Rice, wheat	Manganese Ore, Coal, Bauxite, Dolomite	Sugarcane, Cotton	Forest based, Handicraft, Textile	Sanchi, Gwalior, Khajuraho, Bhopal

Sl. No.	State	Main Crops	Chief Minerals	Main Cash Crops	Chief Industries	Tourist Spots
16.	Maharashtra	Wheat, rice, jowar, bajra, mango, grapes, orange, banana	Manganese Ore, Petroleum, Aluminium, Bauxite, Iron-ore, Coal, Chromite, Copper, Lead, Limestone, Salt	Sugarcane, Cotton, Groundnut	Sugar Mills, Silk, Automobiles, Floriculture, Food Processing	Mumbai, Aurangabad, Daulatabad, Elephanta Caves, Shirdi, Shrines, Pune
17.	Manipur	Maize, rice, pea, tea, rubber, coffee	Asbestos, Chromite, Lignite, Limestone, Nickel	Fruits	Tourism, Spinning, Sericulture, Sugar, Cement, Pharmaceuticals	Imphal, Mao, Ukhrul, Tamenglong, Chandel, Khongjom, Shrines, Moirang, Loktak Lake
18.	Meghalaya	Rice, maize, ginger, turmeric, potato, horticulture	Limestone, Coal, Clay	Ginger, Fruits	Cement, Horticulture, Agro, Bamboo, Sericulture	Ward's Lake, Elephant Falls, Shillong Peak, Cherapunji, Tura, Khasi Hills, Churches, Headquarters of Garo Hills Districts
19.	Mizoram	Rice, maize, pea, potato, horticulture	Coal, Limestone	Sugarcane, Fruits	Handicrafts, Food, Sericulture, Bamboo	Aizawl, Tamdil Lake, Saiha
20.	Nagaland	Rice, bean, pulses, horticulture	Coal, Petroleum	Potato, Sugarcane	Art, Handicraft, Food Processing	Wokha, Phek, Intaki, State Museum, Khonoma, Mokokchung
21	Orissa	Rice, ragi, wheat, maize	Iron-ore, Manganese ore, Graphite, Aluminium, Coal, Chromite, Lead, Nickel, Ilimenite, Limestone	Tea, Cotton, Rubber	Iron and Steel, Paper, Aluminium, Silk, Cement, Mineral based	Puri, Konark, Chilka Lake, Bhubaneswar, Cuttack
22.	Punjab	Wheat, barley, maize, paddy, bajra, jowar, chillies, onions	Glass, Sand, Potash, Limestone, Foundary, Quartzite	Cotton, Sugarcane	Cotton Textiles, Bicycles, Sports goods, Woollen Industries, Sugar, Paper	Amritsar, Bhakra Nangal, Jalandhar, Ludhiana

(*Continued*)

Sl. No.	State	Main Crops	Chief Minerals	Main Cash Crops	Chief Industries	Tourist Spots
23.	Rajasthan	Wheat, bajra, maize, lemon, orange, jowar, pomegranate	Gypsum, Mica, Lead, Silver, Marble, Asbestos, Coal, Copper, Limestone, Salt, Rock Phosphate	Cotton, Tobacco, Oil seeds	Marble, Textiles, Cement, Sugar, Mineral based	Udaipur, Mount Abu, Jodhpur, Bharatpur, Pushkar, Ranthambore, Jaipur
24.	Sikkim	Rice, tea, cardamom, apples	Copper, Lead, Zinc, Coal, Graphite, Limestone	Fruits, Cardamom	Tourism, Tea	Gangtok, Bakhim, Rumtek Monartery
25.	Tamil Nadu	Jowar, ragi, bajra, maize	Lignite, Mica, Bauxite, Limestone, Ilmenite, Natural gas, Feldspar, Gypsum, Graphite	Sugarcane, Tea, Coffee	Leather goods, Cotton Spinning, Textiles, Automobiles, Iron and Steel, Cement, Sugar, Pharmaceutical	Ooty, Rameswaram, Kodaikanal, Chennai, Kanyakumari, Madurai, Mahabalipuram
26.	Tripura	Rice, potato	Clay, Limestone, Lignite	Tea, Rubber	Handloom, IT, Natural gas, Tea, Rubber, Bamboo	Dumbur, Jampui
27.	Uttar Pradesh	Wheat, rice, mango	Limestone, Rock Phosphate, Coal, Magnesite	Sugarcane, Oil seeds, Cotton	Shoe manufacturing, Information technology, Mineral based, Tourism	Agra, Varanasi, Mathura, Kashi, Vrindavan, Fatehpur Sikri, Lucknow
28.	Uttarakhand	Rice, potato, pulses	Copper, Lead, Gypsum, Limestone, Rock Phosphate, Dolomite	Sugarcane, Fruits, Potatoes	Food-processing, Forest products, IT, Handicrafts, Biotech, Agro-based, Forest	Mussoorie, Dehradun, Almora, Nainital, Badrinath, Rishikesh, Haridwar, Corbett National Park
29.	West Bengal	Rice, maize, jute, tea	Coal, Clay, Iron Ore, Limestone, Dolomite, Copper	Jute, Tea, Oil seeds	Jute, Paper, Automobiles, Leather goods, Iron and Steel, Sugar	Darjeeling, Sunderbans, Shantiniketan

Sl. No. State	Main Crops	Chief Minerals	Main Cash Crops	Chief Industries	Tourist Spots
Union Territories					
1. Andaman and Nicobar Islands	Rice, pulses	—	Coconut, Areca Nut Spices	Plywood, Handicraft, Food products, Tourism, Fisheries, Industrial financing	Port Blair, Barren Island, Viper Island, Mahatma Gandhi Marine National Park at Wandoor
2. Chandigarh	Wheat, rice, maize	—	Fruits, Flower	Machineries, Tractors	Rose Garden, Rock Garden
3. Dadra and Nagar Haveli	Rice, ragi, pulses	—	Fruits	Fisheries	Bindrabin, Deer Park at Khanvel, Vanganga Lake, Tribal Museum and Hiravan Garden
4. Daman and Diu	Rice, ragi, pulses, fruits	—	—	Fisheries	Bom Jesus Church, Forts of Moti Daman, Devka Beach, Diu Fort Nagoa
5. Delhi	Wheat, bajra	—	Sugarcane, Oil seeds	Electronics, Plastics, Cycles, Electricals, Pharmaceuticals	Qutab Minar, Red Fort, Rajghat, Jama Masjid, Purana Qila, Bahai Temple
6. Lakshadweep	Coconut	—	Coconut	Coir fibre, Fisheries	Cheriyam, Suheli
7. Puducherry	Rice, ragi	—	Sugarcane, Coconut	Cotton textile, Paper	Puducherry, Karaikal, Agatti, Auroville Chunnambar Resort, Beaches

Table 1.14 States at a Glance III

Sl. No.	State	Festivals	Handicrafts	Dances	Cuisine
1.	Andhra Pradesh	Vinayaka Chavithi, Pongal, Ugadi, Maha Shivratri	Bidriware, Kalamkari, Cherial or Scroll Painting, Eluru carpets	Kuchipudi, Bhamakalapam, Veeanatyam, Kolattam	Bagara baigan, Pulihora, Hyderabadi biryani, Haleem
2.	Telangana	Bonalu, Bathukamma, Ugadi	Bidriware, Kalamkari	Kuchipudi	Rice, Wheat and Meat dishes
3.	Arunachal Pradesh	Losar, Saga Dawa, Torgya, Monpa, Choekhor, Tamladu and Sangken Buddha Festival	Woven shawls and carpets, Woven jackets, Colourful masks, Agarbattis, Leather items, Tangkha paintings, Religious art (Buddha)	Pantomime, Dawa Chukchipah, Ponung dance, Noctes and Wancho dance	Wungwutngam (chicken with rice powder), Apong (rice beer)
4.	Assam	Bihu, Devaddhvani, Rongali Bihu	Handloom weaving, Cane and bamboo, Wood carving, Terracotta, Brass and Bell metal	Bihu dance, Satriya dance, Barpeta's Bhortal Nritya	Pitha, Fish, Tenga, Sira Doi
5.	Bihar	Chath Puja, Makar Sakranti, Bihula, Ram Navami	Madhubani paintings, Wooden works, Pottery, Zari works	Jhijhian, Jat-Jatin, Sohar Kilouna, Jhumeri	Litti chokha, Dalpuri, Malpua, Balushahi
6.	Chattisgarh	Hareli, Pola, Madai, Charta	Wood carving, Bamboo work, Bell metal (Dhokra), Painting, Ornaments	Raut Nacha, Panthi, Suwa	Lentil pudding, Kusli, Cashew Barfi
7.	Goa	Shigmo, Zagor, Diwali, Feast of Mae De Deus, Feast of Passion of Christ	Pottery and terracota, Brass metal work, Wooden laquer ware and wooden turning, Crochet and embroidery	Dashavtara, Ghode Modni dance, Gorf dance	Ambot-tik, Prawn Balchao, Sortpotel
8.	Gujarat	Navratri, Diwali, International Kite Festival, Janamastami	Patola, Jari industry, Cloth painting	Ras, Hallisaka, Dangi Nritya	Dhokla, Khandvi, Thepla, Shrikhand
9.	Haryana	Diwali, Holi, Lohri, Gugga Navami	Pottery, Phulkari	Phag, Dhamal, Rasleela	Kachri ki sabzi, Singri ki sabzi, Bajra aloo roti
10.	Himachal Pradesh	Pori festival, Phulaich, Kullu Dussehra	Metal craft, Stone work, Floor and wall paintings	Mala (garland) dance, The Demon (Rakshasa) dance or Chamba dance, Dalshone and Cholamba dances, Jataru Kayang	Sidu, Dham, Ankolas, Patande, Aktori

Sl. No.	State	Festivals	Handicrafts	Dances	Cuisine
11.	Jammu and Kashmir	Guru Ravi Das's birthday, Tihar, Urs (or Ziarats), Navroz	Shawls, Carpets, Embroidery	Rouf, Dhumhal	Gushtaba, Haak, Roath
12.	Jharkhand	Chhath Puja, Rammavami, Holi	Woodcraft, Paitkar paintings, Toy making, Bamboo craft, Ornaments	Chhou dance, Paika dance	Baiganee Chop, Thekua, Hadia
13.	Karnataka	Yugadi, Hampi festival, Rajyotsava Day, Kar Hunnive	Wood carving, Sandal wood craft, Ivory carving	Kunitha, Nagamandala	Akki roti, Mysore masala dosa, Chiroti
14.	Kerala	Onam, Vishu, Easter, Attukal Pongala	Coconut shell craft, Coir products, Wood carving, Bamboo mat	Kathakali, Mohiniattam, Kalaripayattu	Rasam, Appam, Puttu
15.	Madhya Pradesh	Madai, Gana Gour, Ganga Dashmi, Kajri Navmi	Bamboo work, Pottery, Dhurries, Textile weaving	Gaur dance, Kaksar dance, Chaitra festival dance	Bhutte ki kees, Chakki ki shaak, Tapu, Shrikhand
16.	Maharashtra	Gudi Padwa, Ganesh Chaturthi, Makar Sakranti	Sawantwadi crafts, Bidri works	Lavni, Koli, Dindi, Tamasha	Pav bhaji, pooran Poli, Bombil, Bakarwadi
17.	Manipur	Leiharaoba celebrations, Heikru Middongba, Gaan Ngai, Kekru Hitongba, The Kwak Yatra, Yaosang, The Rath Jatra	Manipuri handwoven textiles, Manipuri dance doll	Rasleela, Thabal Chongba	Eromba, Kabok, Sekmai
18.	Meghalaya	Nongkrem, Khasi festival of Shad Sukmyniem, Beh Behdienkhlam, Festival of Garos (Wangala dance)	Handwoven shawls, Baskets, Open weave carrying basket, Winnowing trays and fan, Khasi bamboo comb and pipes, Mud Shovel	Doregata dance, Chambil Mesara or Pomeleo dance	Jadoh, Pukhlein, Ktungrymbai
19.	Mizoram	Chapchar Kut, Mim Kut and Pawl Kut	Water-proof Mizo hat, Traditional handloom shawls, Bags and bamboo handicrafts	Cheran dance, Khuallam, Sawlakin, Chheihlam	Bai Sawchair, Locally prepared wine
20.	Nagaland	Tsokum, Tuluni, Amongmong, Aoling Monyu, Metemneo festival, Moatsu, Naknyulum, Nagada, Sekrenyi, Tokhu Emong	Woven shawls, Wood carving, Bamboo work, Pottery, Black smith	Energetic rhythmic dance	Pork meat with bamboo shoots

Sl. No.	State	Festivals	Handicrafts	Dances	Cuisine
21.	Odisha	Ratha Yatra, Ram Navmi, Prathamashtami	Metal works, Silver Filigree work or Tarakasi, Applique work or Chandua, Wood work	Odissi, Chhau, Ghumra	Pithas, Maha prasad, Rasagolla, Dalma
22.	Punjab	Baisakhi, Lohri, Teeyan, Diwali, Gurupurav	Phulkari, Wood works, Dolls	Bhangra, Gidda, Kikli	Navratan korma, sarson da Saag and Makki di roti, Butter chicken, Dal makhani
23.	Rajasthan	Bikaner Festival, Teej, Gangaur	Bandhani or Tie and Dye, Block printing, Stone carving and sculpture	Bhavai, Gair, Ghoomar	Dal baati, Churma, Ghevar, Aloo ka bharta
24.	Sikkim	Losar, Losoong, Bhumchu, Saga Dawa, Tse Chhu Chham, Drukpa Tseshi, Pang Lhabsol	Hand woven carpets, Blankets, Wood carving, Thanka painting, Chortse table	Kagyat dance	Gya-thuk, Tomba
25.	Tamil Nadu	Pongal, Chitri Rai, Mahamagam festival	Paintings of Tanjore, Metal ware, Pottery	Bharat Natyam, Kolattam, Puraviattam	Pepper rasam, Dosa, Rice upma
26.	Tripura	Kharchi Puja, Diwali, Pous Sankranti Mela, Ashokastami festival, Orange and Tourism festival	Traditional handlooms, Cane and bamboo crafts	Hozagiri dance, Hai Hak dances, Cheraw dance, Basanta Raas, Garia dance	Mui borok, Berma, Apong
27.	Uttar Pradesh	Karva Chauth, Navaratri, Janmashtami	Zardozi, Chikankari, Metalware, carpets and floor coverings	Kathak, Charkula	Kundan kaliya, Lucknowi biryani, Shami kebab, Zamin doz
28.	Uttarakhand	Basant Panchami, Bhitauli, Dasar festival	Wood carving, Wall paintings	Langvir Nritya, Barada Nati, Chancheri dance	Garhwal ka fannah, Kafuli, Bhatti ki churd Kani, Arsa
29.	West Bengal	Durga Puja, Kali Puja, Jagaddhatri Puja, Maha Shivratri	Masks and puppets, Jute products, Brass and bell metal	Chhau, Rava dance, Raibense dance	Machcher jhol, Jhal muri, Shondesh

2 Indian History at a Glance

The history of India has been broadly divided into three distinct periods:
1. Ancient India
2. Medieval India
3. Modern India

The history of modern India is further sub-divided into two major periods:
1. The British Period
2. The Indian Freedom Struggle and Partition of India

ANCIENT INDIA

Indus Valley Civilization (2600–1900 BC)

This was the earliest civilization that flourished in India on the banks of the river Indus. The important sites connected with the Indus Valley civilization are: Lothal near Ahmedabad (in Gujarat); Kalibangan in Rajasthan; Banwali in district Hissar (in Haryana); Ropar near Chandigarh (in Punjab); Mohenjodaro in Larkana district of Sind (now in Pakistan); Harappa in Montgomery district of Punjab (now in Pakistan).

One of the first great civilizations—with a writing system, urban centres and a diversified social and economic system—appeared approximately 2600 BC along the Indus River Valley in Punjab and Sindh. Indian historians like D. P. Aggrawal, however, believe that the Indus Valley Civilization dates back to 2300 BC on the basis of C-14 dating technique. The civilization seemed to have flourished at the maximum 1800 BC. Afterwards each urban phase marked by systematic town planning, extensive brick work, art of writing, use of bronze tools and red ware pottery painted with black designs practically disappeared. It covered more than 12,99,600 km^2, from the borders of Baluchistan to the deserts of Rajasthan, from the Himalayan foothills to the southern tip of Gujarat.

Fact Bytes: Important Findings and Their Sites

➤ Cemetery H: Harappa ➤ Cemetery R 37: Harappa ➤ Coffin burial: Harappa ➤ Two rows of six granaries: Harappa ➤ Stone dancing Natraja: Harappa ➤ Figure of youth whose legs, hands and head are missing: Harappa ➤ Urn burial: Harappa ➤ Person wearing Dhoti: Harappa ➤ Nine-hundred seals: Harappa ➤ Human anatomy figure: Harappa ➤ Vanity box: Harappa ➤ Copper model of carts: Harappa and Chanhudaro ➤ Great bath: Mohenjodaro ➤ Great granary: Mohenjodaro ➤ Naked bronze dancing girl: (Proto-Australoid) Mohen-

jodaro ➤ Bearded man: Mohenjodaro (Mongoloid) ➤ Seven layers of towns: Mohenjodaro ➤ Ship on seal and terracotta amulet: Mohenjodaro and Lothal ➤ Seals with figures of composite animals: Mohenjodaro ➤ One thousand and five hundred seals: Mohenjodaro ➤ Woven cotton cloth: Mohenjodaro ➤ Cylindrical seals of Mesopotamia: Mohenjodaro ➤ Ink-well: Chanhudaro ➤ Persian gulf seal: Lothal ➤ Double burial: Lothal and Rangpur ➤ Terracota horse figure: Lothal ➤ Horse bone: Surkotada ➤ Dockyard: Lothal ➤ Bead-making factory: Lothal and Chanhudaro ➤ Fire altars: Lothal and phendan Kalibangan ➤ Bustrophendan writing style: Kalibangan ➤ Houses opening on main street: Lothal ➤ Scale: Lothal ➤ Bun shaped copper ingots: Lothal ➤ Brick chamber grave: Kalibangan ➤ Stone button seal: Mundigak (S. E. Afghanistan) ➤ Limestone male head: Mundigak ➤ Humpless bull seals (common): Harappa ➤ Sun dried bricks (common): Kalibangan ➤ Rhinoceros on seal: Amri.

Common Features of Harappan Culture

1. *Town Planning*: There was a differentiated system of town planning based on the grid patterns. Streets and roads were cutting each other at right angles. Harappa, Mohenjodaro and Kalibangan had their its own citadel. Burnt bricks were used for in all constructions. There is no evidence of any stone buildings. The underground
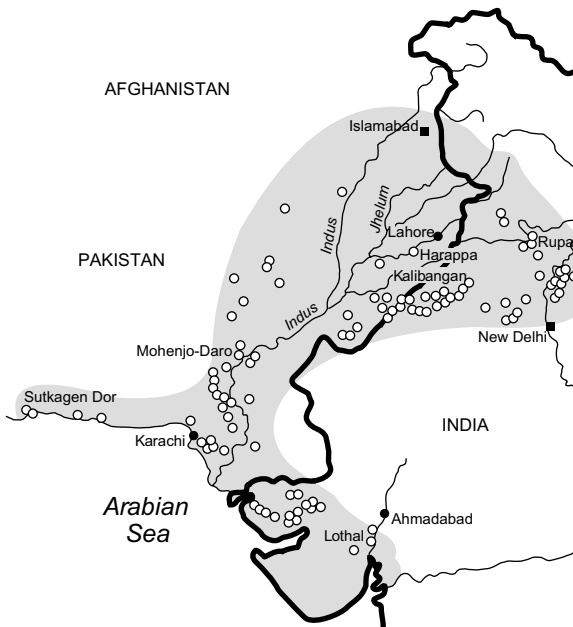
Map 2.1   Sites of Indus Valley Civilization

This map is a sketch only, drawn not to scale, presented for reference and to aid understanding of concept discussed.

drainage system connected all the houses to the street drains. The main attraction of Mohenjodaro was the Great Bath, the floor of which was made of burnt bricks. 'Granary' was the largest building found in Mohenjodaro.

2. *Social Life*: Both men and women dressed up with two pieces of cloth – One upper garment and the other lower garment. Women wore Jewelleries such as bangles, fillets, anklets, earrings, bracelets which were made of gold, silver, copper, bronze and semi-precious stones. There was common use of cosmetics. Many types of household articles have been found at Mohenjodaro which were made of pottery, stone shells, ivory and metal. The main occupation of the people was fishing but hunting and bull fighting were other popular attractions. Children use to enjoy playing with marbles, balls and dice.

3. *Economic Life*: The Harappan civilization was urban. Agriculture, trade, industry and crafts were very much flourished in the Harappan culture. Many groups of artisans were made in which goldsmiths, weavers, stone-cutters, boat builders etc. were prominent. Plain Pottery was used but in some places red and black painted pottery has also been found. There was an extensive internal trade with other parts of India.

4. *Political Life*: There was no evidence found of any kind of Monarchy. It seems that Indus Valley Civilization was ruled by a class of merchants. Foreign trade was conducted with Mesopotamia, Afghanistan and Iran from Lothal which was the ancient port of Indus Valley Civilization. Items of import – Gold, Copper, tin and several semi–precious stones were imported. Items of export – Agricultural products such as wheat, barley, peas, oil seeds and finished products such as Cotton goods, pottery, beads, terracotta figures and ivory products were exported.

5. *Religious Life*: The religious life of the Harappans is actually described from the excavated seals, terracotta figurines and copper tablets.

   The Chief male deity was Pashupati Shiva and the Chief female deity was mother Goddenss (Maitridevi) or Shakti. Linga Yoni Worship was also prevalent in later times. The Harappans worshipped trees and animals too. The people of Harappan culture also believed in ghosts and evil forces. 'Swastika' symbol can be co-related with the Indus Valley civilization.

6. *Burial Methods*: Cemeteries were also discovered around the cities like Harappa, Mohenjodaro, Kalibangan and Lothal. Post – cremation burial and complete burial were popular at Mohenjodaro. In Harappa, wooden coffins were found. No evidence Sati practice is found in the Harappan culture.

7. *Arts*: There was a high degree of proficiency found on the figures of men and women, animals and birds made of terracotta and the carvings on the seals. The figure of dancing girl from Mohenjodaro was a remarkable example of workmanship. The Harappan pottery is a fine specimen of the art of Indus people. Humpless bull was also found in most of the Harappan seals. Various designs were used to paint pots and jars. Many fine figures of fish, peacock, leaves plants and trees were used on some pottery pieces. Seals were manufactured with the help of 'Steatite'.

8. *Script*: The Harappan script was mostly written from right to left which is yet to be deciphered. A group of Soviet scholars believed that the Harappan language was Dravidian. Many other scholars had a view that the Harappan script is connected with Brahimi. Undoubtedly, the decipherment of Harappan script will bring revelation in the information of Harappan culture.

9. *Decline of Harappan Culture*: No definite evidence can be pointed out for the cause of decline of Harappan Culture. Some historians gave a view point that the natural

calamities like floods, drying up of rivers, decreasing fertility of soil and occasional earthquakes had coursed the decline of Harappan cities. The invasion by the Aryans in the region might be the another reason of the decline of the civilization.

Vedic Period: The Aryans

Early Vedic Period (1500–1000 BC)

The Aryans were semi-nomadic, pastoral people who originally inhabited the area around the Caspian Sea in Central Asia and entered the country in around 1500 BC in search of pastures through the passes in the Hindu Kush mountains. They first settled down in Punjab and later moved eastwards and spread all over the Gangetic plains. Being lovers of nature, Aryans worshipped the sun, the water, the fire, etc. They are said to have been the originators of the Hindu civilization. There were six religious books of the Aryans which reveal their beliefs, customs and culture.

1. *The Vedas*: There were four Vedas, viz.,
    (i) *Rig Veda*: It is oldest among the Vedas and contains 1017 hymns in the form of prayers to gods; Rig Veda is claimed to be the oldest book in the world.
   (ii) *Sama Veda*: Deals with music.
   (iii) *Yajur Veda*: Deals with sacrifices, rituals and formulae.
   (iv) *Atharva Veda*: Deals with medicine.

2. *The Upanishads*: The main source of Indian philosophy and theology; there are about 108 known Upanishads.
3. *The Brahamanas*: Throw light on the socio-political life of the Aryans and form the basis of their religion.
4. *The Aranyakas*: Forest books, are the concluding portion of the Brahmanas and are essentially treatises on mysticism and philosophy.
5. *Manu Smriti*: Manu was the great law giver in the Aryan period and his book Manu Smriti deals with the laws of inheritance, duties of the kings and his subjects.
6. *The Puranas*: They give religious and historical details of the Aryan civilization and contain discourses on legends, rituals, traditions and moral codes. They are 18 in number.

Concepts of Vedic Philosophy
- *Atma* (Soul)—An atom of life, it is also called *jeevatma* or living soul. It is a part of *Paramatma* or the supreme soul (God). It is invisible and is liberated from the body after death.
- *Karma* (Deeds)—These are good and bad actions a human commits during his life period.
- *Pap and Punya* (Sins and Merits)—*Pap* is result of bad deeds and *Punya* is result of good ones. A human being is happy and satisfied if he earns more merits (*punyas*) and is full of sorrows if he commits more sins (*pap*) during his lifetime.
- *Punarjanma* (Rebirth)—The soul never dies but is reborn after each life period is over. The soul enjoys the fruits of *punya* or *pap* of the previous life in the present life period.

Later Vedic Period (1000–600 BC)

More developed than the early Vedic period, the tiny tribal settlements were replaced by strong kingdoms. There was a growth of big cities like Ayodhya, Indraprastha and Mathura. This was also called the *Brahmanical age* and came very close to the modern form of Hinduism. The society was divided into four castes, initially based on occupation, but which later became hereditary.

1. Brahmins (priestly class)
2. Kshatriyas (military class)
3. Vaishyas (business or trading class)
4. Shudras (labour class)

The Ramayana—The Ramayana originally consisted of 12,000 verses which were later raised to 24,000. The Ramayana, like the Mahabharata, is a composite work which grew by accretion over the course of many years, beginning approximately in 300 BC and continuing for the next 500 years.

The Mahabharata—Composition of the Mahabharata may have begun as early as 500 BC. It continued for 900 years, until it reached its present form approximately in AD 400 under the Gupta kings. Originally of Kshatriyan origin, over the years it became a distinctly Brahman work. During the course of its growth, it absorbed the Bhagavad Gita and other works in their entirety, until it reached a length of 1,07,000 octameter couplets; more than seven times the length of the iliad and the odyssey combined together. Its cumulative origin is evidenced in the fact that the name given of the author is Vyasa, a Sanskrit term meaning 'arranger'. Originally, the Mahabharata was an account of a conflict between the Kurus and the Pandavas, two prominent Aryan tribes claiming descent from the mighty Bharata and therefore, known as the *Maha Bharata* or *Great Bharata* tribes; hence, the name of the work. It is from Bharata that the present name of India is taken. The Mahabharata was possibly the earliest attempt in ancient India to write history. Its value as a source of political history is yet to be critically assessed, though scholars agree that the basis of the epic story has a foundation of facts. It is useful for reconstructing the social and cultural history of the period. The Mahabharata originally had 8800 verses and was called *Jaya Samhita*. These were raised to 24,000 and came to be known as Bharata. The final compilation brought verses to 1,00,000 which came to be known as the Mahabharata or the Satasahasri Samhita.

1. *The Epic Age*: It was in the epic age that the Aryan tribes established themselves in the whole of northern India. The Mahabharata and the Ramayana are the two great epics of this period.

2. *The Rise of Brahmanism*: During the later Vedic period, the observance of religion was made very complicated with the addition of several rituals. Consequently, only Brahmins could perform religious ceremonies.

3. *The Revolt against Brahmanism*: As Brahmins monopolized religion, the other castes revolted against the Brahmanical exploitation.

The later Vedic Period, the Aryans started moving towards east. The expansion of Aryans to the eastern Gangetic plains was referred to the Satapatha Brahmana. The growth of

large kingdoms is one of the important developments during this period. Kuru kingdom under the ruler Parikshat and Panchala kingdom under the ruler Janamejaya were the main kingdoms flourished in the beginning of this period. The famous king of the Panchalas was Pravahana Jaivali, who was a patron of learning. Kosala, kasi and Videha kingdoms started flourishing after the fall of kurus and panchalas. Kasi's famous ruler was Ajatashatru. Videha's famous king was Janaka and his Capital was Mithila. The famous scholar 'Yajnavalkya' was the pride of Janaka's court. The eastern most tribal kingdoms flourished during this period were Magadha, Anga and Vanga. According to the later Vedic texts, India was divided into three parts – Aryavarta (Northern India), Madhyadesa (Central India) and Daskshinapatha (Southern India).

Political Organization: The later Vedic period is known for the formation of larger kingdoms. In the later Vedic period, Many Janapadas or rashtras were formed by amalgamating many janas or tribes. The kings were used to perform different kinds of rituals and sacrifices to solidify his position. Many kinds of Yajnas were performed during this period in which Rajasuya (consecration ceremony), Asvamedha (horse sacrifice) and Vajpeya (Chariot race) were included prominently. Many titles like Rajavisvajanan, Ahilabhuvanapathi, Ekrat and Samrat were assumed by the kings during this period.

Economic Condition: Agriculture was the chief occupation of the people during this period. In the later Vedic period, iron was used prominently. That is why improved types of implements in agriculture were used. Barley, rice and wheat were the major crops of this period.

Another major improvement in the field of agriculture in this period was the 'knowledge of manure'. Greater specialization was also achieved by the people in industrial activity in this period. Prominent growth and progress was noted in the areas of metal work, leather work, carpentry and pottery. Foreign trade also began flourishing with the internal trade. The people of the later Vedic period started trading with the countries like Babylon. 'Vaniya', a class of hereditary merchants also existed in this period. Trade and commerce was carried on by the Vaisyas during this period. Vaisyas organized themselves into different working groups called guilds which were known as ganas. On the pattern of Nishka (gold coins) of the Rig Vedic period. Satamana (gold coins) and krishnala (Silver coins) were used as the medium of exchange in the later Vedic period also.

Social Life: During the later Vedic Period, a thorough Varna system was prevalent. The society was divided into four Varnas – Brahmins, Kshatriya, Vaisyas and Sudras). Brahmanas and Kshatriyas were considered as the two higher classes. These higher classes enjoyed many Previliges which were not given to Vaisyas and Sudras at all. A Brahmin enjoyed the highest status in all the four Varnas. Many Sub – castes were emerged in this period on the basis of the occupation of the people. Status of women was not improved so much in this period. Women were still considered the subordinate to men. The practice of child marriage started gaining popularity in the later Vedic period. 'Aitreya Brahmana' described a daughter in the family as a source of misery. Royal household women enjoyed many types of privileges. Pushana became the god of Shudras. He protected cattle in

the early Vedic period. The institution of Gotra i.e. the clan appeared in later Vedic Period. According to Maitrayani Samhita, there are three evils – woman, liquor and dice.

Religious Life: Indra and Agni, the prominent gods of the Rig Vedic Period, lost their significance in the later Vedic Period. In the later Vedic Period, Prayapathi (the creator), Vishnu (the protector) and Rudra (the destroyer) become the most important gods. Importance of sacrifices remained prominent. Rituals associated with sacrifices became more prominent and its was a hereditary also. Different formulae were extensively created for sacrifices. Reactions against priestly domination and against sacrifices and rituals were very strong towards the end of this period. As a result of these sacrifices Buddhism and Jainisim were risen in this period.

Emergence of Kingdoms or Mahajanapadas

From the sixth century BC, the widespread use of iron in eastern Uttar Pradesh and Western Bihar facilitated the formation of large territorial states. People began owing strong allegiance to the Janapada or the territory to which they belonged and not to the Jana or tribe to which they belonged (as was the case in the Later Vedic period). Buddhist texts list sixteen mahajanapadas or major janapadas, as having been in existence in the sixth century BC. The 16 mahajanapadas of that era were:

1. *Magadha Kingdom* (*South Bihar*): The first capital was Rajagriha and the later capital, Pataliputra. Brihadrata is claimed to be the founder of the Magadha Kingdom.
2. *Anga and Vanga Kingdoms* (*East Bihar*): The capital was Champa, prosperous business centre. The kingdoms were later merged by Bindusara into Magadha.
3. *Malla Kingdom* (*Gorakhpur region*): The capital was Kushinagar. It was the seat of many other smaller kingdoms. Their main religion was Buddhism. The Malla Kingdom was later merged into the Magadha Kingdom.
4. *Chedi Kingdom* (*Yamuna and Narmada belt*): The capital was Tisvathirati. One of the families from this kingdom later merged into Kalinga Kingdom from this royal family.
5. *Vatsa Kingdom* (*Allahabad*): The capital was Kausambi. The most important ruler of this kindom was King Udayan.
6. *Kashi Kingdom* (*Banaras*): The capital was Varanasi. Although many battles were fought against the Kosala Kingdom, eventually Kashi was merged with the Kosala Kingdom. Dhrutarashtra once ruled over the Kashi and Anga Kingdoms.
7. *Kosala Kingdom* (*Ayodhya*): Although its capital was Sravasti which is identical with Sahet Mahet, Ayodhya was an important town in Kosala. It was merged in the Magadha by the Magadha ruler Ajatashatru. Kosala also included the tribal republican territory of Sakyas of Kapilvastu.
8. *Vajji Kingdom* (*North Bihar*): Its capital Vajji was the seat of a united republic of eight smaller kingdoms of which Lichhavis, Janatriks and Videhas were also members. The Lichhavis Kingdom had its capital at Vaishali. It was a prosperous kingdom of North Bihar, but was later merged with the Magadha Kingdom. The Videhas Kingdom had its capital at Mithala. Its most important ruler was King Janaka. This kingdom too was merged with the Magadh Kingdom.

9. *Kuru* (*Thaneswar, Meerut and present day Delhi*): The capital city was Indraprastha. It was an important kingdom during the Vedic era and was friendly to the kingdoms of the Bhoja and Panchala.
10. *Panchala Kingdom* (*Uttar Pradesh*): Its capital was at Kampila. Earlier it was a monarch state but later it became an independent republic. Kanauj was an important town in this kingdom.
11. *Matsya Kingdom* (*Jaipur*): Its capital was Viratanagar. The Matsya Kingdom got its independence from the Chedi Kingdom (ruled by King Sahaja) under the leadership of Virat Raja.
12. *Surasena Kingdom* (*Mathura*): Its capital was at Mathura and its most famous ruler was Avantiputra.
13. *Assaka Kingdom* (*Godavari*): Its capital was at Potali and Brahamdatta was its most important ruler.
14. *Gandharva Kingdom* (*Peshawar and Rawalpindi*): Its capital Taxila was important as a trade and education centre during the later Vedic age. Its ruler King Pukkusati was defeated by the Magadha ruler Bindusara.
15. *Kamboj Kingdom* (*North-east Kashmir*): Its capital was Rajapure. Hajara was important trade and commerce centre of this kingdom.
16. *Awanti Kingdom* (*Malwa*): Awanti was divided into two parts—north and south. The northern part had its capital at Ujjain and the southern part had its capital at Mahismati. It was the most vulnerable of all the mahajanapadas and was ruled by many kingdoms before being finally merged into the Magadha Kingdom.

Growth of Buddhism and Jainism (6th Century BC)

As a result of the revolt against the supremacy of Brahmanical priests, several schools of philosophy opposing Brahmanism developed. The movement was spearheaded by the Kshatriyas of the royal families of Magadha who later helped in the propagation of Buddhism and Jainism.

Buddhism

Founded by Gautama Siddhartha who was a Kshatriya prince of the Saka clan. He was born in 563 BC (or, 576 BC as is believed by some historians) at Lumbini in Nepal. He left his family at the age of 29 years in search of truth and wandered for about six years. He attained enlightenment at Bodh Gaya under a pipal tree. He spread his message for about 45 years and died at the age of 80 in 483 BC at Kushinagar. Buddhism received state patronage of kings such as Ashoka the Great and it spread to neighbouring countries.

Doctrine of Buddhism

1. The four great truths: (i) The world is full of sorrow and misery, (ii) The cause of all pain and misery is desire, (iii) Pain and misery can be ended by killing or controlling desire and (iv) Desire can be controlled by following the eight-fold path.
2. The eight-fold path consists of: right faith, right thought, right action, right livelihood, right effort, right speech, right remembrance and right concentration.

3. Belief in Nirvana: When desire ceases, rebirth ceases and Nirvana is attained, i.e., freedom from the cycle of birth, death and rebirth is gained by following the eight-fold path.
4. Belief in ahimsa.
5. Law of karma.
6. Existence of God.

Fact Bytes: Buddhism

➤ Buddha's Birthplace: Lumbini (near Kapilavastu) ➤ Father: Suddhodana, the king of Shakyas ➤ Mother: Mahamaya ➤ Wife: Yashodhara ➤ Son: Rahul ➤ Cousin: Devadatta ➤ Charioteer (Horse): Channa (Kanthaks) ➤ Teacher of meditation: Alara Kama ➤ Place of enlightenment Nirvana: Gaya in Magadha (at age of 35) ➤ Tree under which he attained enlightenment: Tree of Wisdom Bodhi Tree (Pipal) ➤ Famous words: 'I am his witness' ➤ First nun and his foster mother: Gautami ➤ Gotra of Buddha (Siddhartha): Gautama ➤ Died at: Kushinagar (487 BC) ➤ First Buddhist Council (Rajagriha in Bihar) 483 BC (King-Ajatshatru; Chairman-Mahakassapa) ➤ Second Buddhist Council (Vaishali in Bihar) 383 BC (King Kalasoka; Chairman-Sabakami) ➤ Third Buddhist Council (Patliputra) 250 BC (King-Ashoka; Chairman-Mogaliputta Tissa) ➤ Interim Buddhist Council (Tambapanni in Sri Lanka) 29 BC (King-Vattagewani; Chairman-Mahinda) ➤ Fourth Buddhist Council (Kundalvana in Kashmir) AD 72 (King-Kanishka, Kushan ruler; Chairman-Vasumitra) ➤ Two Buddhist Councils in Modern Times: The Fifth Buddhist Council (Mudopa in Burma) 1871; The Sixth Buddhist Council (Rangoon in Burma) 1956. ➤ The development of new ideas resulted in the division of Buddhism into the Mahayana and Hinayana sects. Codification of Sarvastivadin doctrine as Mahavibhasa took place.

Sacred Bhuddist shrines—

—Eight Ashtamahasthanas

➤ Lumbini, ➤ Bodhgaya, ➤ Sarnath, ➤ Kushinagar, ➤ Sarasvati, ➤ Pajgriha, ➤ Vaishali and ➤ Sankasya)

—Other main centers

➤ in Andhra Pradesh (*Amravati, Nagarjuna-konda*); ➤ in Gjarat (*Junagarh and Valabhi*); ➤ in Madhya Pradesh (*Sanchi and Bharhut*); ➤ in Maharashtra (*Ajanta-Ellora*); ➤ in Orissa (*Dhaularigi*); ➤ in Uttar Pradesh (*Kannauj, Kausambi and Mathura*); ➤ in West Bengal (*Somapuri and Jagadala*)].

Spread of Buddhism

Buddha had two kinds of disciples—monks (*bhikshus*) and lay worshippers (*upasikas*). The Organization of monks into the Sangha was done for the purpose of spreading Buddha's teachings. All persons—male or female, without any caste restrictions – were allowed to be the members of the Sangha. Sariputta, Moggallana and Ananda were some of the famous monks. The Sangha was governed on democratic lines and was given power to enforce discipline among its members. Due to devoted efforts of the Sangha,

Buddhism progressed rapidly in North India. Kosala, Magadha, Kausambi and several republican states of North India, adopted Buddhism. Even the famous Mauryan emperor, Asoka embraced Buddhism after two hundred years of the death of Buddha. Asoka spread Buddhism into west Asia and Ceylon through his concerted efforts.

Sects of Buddhism

Buddhism was divided into two sects in fourth Buddhist council – Mahayana and Hinayana. The followers of Hinayana i.e the lesser Vehicle believed in the original teachings of Buddha. They gave stress on salvation through self discipline and meditation. They did not believe in idol – worship. They advocated Pali language. Hinayana sect was more prevalent in South India, Sri Lanka, Java, Syam (Thailand) and Burma (Myanmar). Hinayana had two sub-sects – Vaibhashika and Sautantrika. The followers of Mahayana i.e the Greater Vehicle believed in the heavenliness of Buddha. They gave stress on salvation though the grace and help of Buddha and Bodhisatva. They advocated idol – worship.

They adopted Sanskrit language. Mahayana sect was more prevalent in North India, China, Korea and Japan. Mahayana had two sub-sects – Madhyamika/Shunyavada (founded by Nagarjuna) and Yogachar/Vijnanavada (Founded by Maitreganath and his disciple Asanga). Another sect was Vajrayana whose believers gave stress on salvation by acquiring magical power which they called vajra. The Taras were the Chief divinities of this new sect. It was prominent in Bengal and Bihar.

Bodhisattavas

- *Vajrapan* [He hold a thunderbolt like Indra, enemy of sin and evil].
- *Avlokitesvara* [also called Padmapani (the Lotus bearer), kind hearted].
- *Manjushri* [He holds a book describing spiritual perfections].
- *Maintreya* [The future Buddha].
- *Kshitigriha* [Guardian of purgatories].
- *Amitabha/Amitayusha* [Heavenly Buddha].

Buddhist contribution to Indian Culture

Indian culture was highly developed by the contribution of Buddhism. Buddhist stupas at Sanchi, Bharhut and Gaya are wonderful pieces of architecture. Chaityas and Viharas are the major contribution of Buddhism in different parts of India. Many residential universities like Taxila, Nalanda and Vikramsila promoted the education. Pali and other local languages were developed through the teachings of Buddhism. The Concept of Ahinsa was the chief contribution of Buddhism

Main Causes for the decline of Buddhism

1. The popularity of Buddhism was fallen away due to the revival of Brahamanism and the rise of Bhagvatism.
2. Adoption of Sanskrit language which was the language of elite, was one of the Major reasons of decline.
3. The practice of idol worship and making offerings led to the deterioration of moral standards.
4. The attack of the Huns in 5th and 6th Centuries and the Turkish invaders in 12th Century destroyed the monasteries.

Jainism

A non-brahmanical religion like Buddhism, founded by Rishabha, father of King Bharata the first Chakravartin of India. Jainism became the major religion under Vardhamana Mahavira who was the 24th Tirthankara or prophet of Jainism. Vardhamana Mahavira was a great Kshatriya belonging to the royal family of Magadha. He was born in 540 BC at Kundagrama (Vaishali) in Bihar. At the age of 42 he attained perfect knowledge—Kaivalya. He died at the age of 72 years in 468 BC.
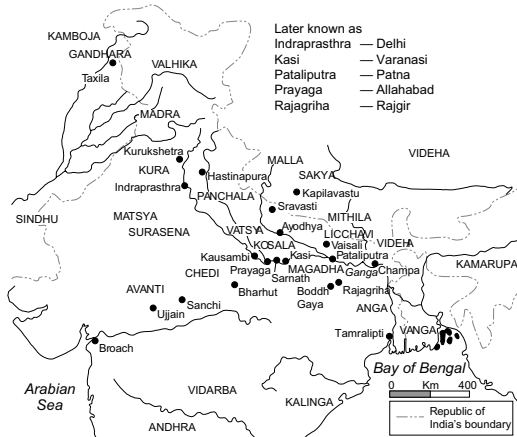
Map 2.2   India in Sixth Century BC

This map is a sketch only, drawn not to scale, presented for reference and to aid understanding of concept discussed.

Jain Councils

Two important Jain Councils were held in order to settle prevailing differences between the Jain scholars of respective era. The main difference in opinion was between the followers of Parsvanatha and those of Mahavira. However, the second council failed to solve the differences and thus, was the last council. It also marked the split in the religion and the advent of the two new sects within Jainism: Swethambaras and Digambaras. Swethambars are flexible in their approach, follow the teachings of the 23rd Thirthankara Parasvanatha and clad themselves in white garments. Digambaras are followers of the 24th Thirtankara Mahavira. They believe in rigid penance, which can be attained by punishment to self and body. They stress on nudity and do not allow the use of cloth to cover the body.

Fact Bytes: Jainism

➤ Founded as a result of revolt against Brahmanism (sixth century BC) ➤ Important Facts About Mahavira—Mahavira's original name: Vardhamana ➤ Date of birth: 540 BC ➤ Place of birth: Kundagrama (in Vaishali) ➤ Father: Siddhartha, head of the Inatrika tribe ➤ Mother:

Trishala, Lichhhavi Princess ➤ Became a monk: At the age of 30 ➤ Period of ascetism: 12 years ➤ Attainment of Nirvana: At the age of 42 ➤ Death: At the age of 72 (468 BC) ➤ Cause of death: Self-starvation at Pava, near Rajagriha ➤ Number of Tirthankaras: 24 ➤ 24th Tirthankara: Mahavira ➤ 23rd Tirthankara: Parsvanath ➤ Founded by: Rishabha ➤ Digambaras: Space-clad; naked ➤ Swethambaras: White clothes clad ➤ Nigrantha: Those who are free from every bond ➤ Arhant: Refers to one who has attained Nirvana

Doctrine of Jainism

1. Attainment of Nirvana (release from rebirth) through TriRatna (three jewels) consisting of (i) right faith (ii) right knowledge and (iii) right conduct.
2. Belief in ahimsa in word, thought or deed towards all living beings.
3. Belief in karma through denying the existence of God and dismissal of rituals.

Both Buddhism and Jainism declined with the rise of the Rajputs as a military force. Muslim invasions in the 11th and 12th centuries also led to further disintegration.

Five types of knowledge were there in Jainism

(i) Mati Jnana: Perception through activity of sense organs, including the mind.
(ii) Shruta Jnana: knowledge revealed by scriptures.
(iii) Avadhi Jnana: Clairvoyant perception
(iv) Manahparyaya Jnana: Telephathic knowledge
(v) Keval Jnana: Temporal knowledge

Mahavira rejected the authority of the Vedas and Objected to the Vedic rituals.

He supported a very sacred and ethical code of life.

In Jainism, even the practice of agriculture was termed as sinful as it is the reason of injury to the earth, worms and animals.

Spread of Jainism

'Sangha' was organized by Mahavira to spread his teachings.

Both men and women were admitted in the Sangha, which consisted of both monks and lay followers.

Jainism was rapidly spread out because of the devoted efforts of the members of the Sangha.

Jainism spread prominently in Western India and Karnataka.

Prominent rulers were Chandragupta Maurya, Kharavela of Kalinga and the royal dynasties of South India such as the Gangas, the Kadambas, the Chalukyas and the Rashtrakutas who patronized Jainsim.

Sects of Jainism

There was serious famine in the Ganges Valley in 298 BC.

Many Jain monks along with Chandragupta Maurya and Bhadrabahu came to Shravanbelgola in Karnataka.

A monk named Sthulabahu was the leader of the group of monks who stayed back in Magadha.

He changed the code of conduct for the monks.

This led to the division of Jainism into two sects: Svetambaras (White-clad) (Sky – Clad or naked and Digambaras).

Svetambaras were led by Sthulabahu and Digambaras were led by Bhadrabahu.

Jain Architecture

- *Temples*: Girnas and Palitana (Gujarat), Pavapuri temple, Rajagriha temple (Bihar)
- *Dilwara Temple*: Vimalavashi temple, Tejapala temple (Mount Abu, Rajasthan)
- *Statue of Gomteshwara*: Shravanbelagola (Karnatka)
- *Caves*: Hathigumpha, Baghagumpha etc, Udaigiri and Khandagiri (Orissa) – Kharavela.

Magadh Empire

Period   (6th century–4th century BC)

Extent   From a small kingdom it became a major power in north India, embracing districts of Patna and Gaya in Bihar. Its capital was Pataliputra.

Bimbisara	545–493 BC
Haryanka Kings	462–430/413 BC
Shishunaga Dynasty	430/413–364 BC
The Nanda	364/345–324 BC

Notable Rulers of Magadha

1. *Haryanka Dynasty*: It was originally founded in 566 BC by the grandfather of Bimbisara, but the actual foundation was laid by Bimbisara and Ajatashatru, who annexed the neighbouring territories.
2. *Shishunaga Dynasty*: The Haryanka Dynasty was overthrown by Shishunaga in 413 BC and Vatsa, Avanti and Kosala were annexed to Magadha.
3. *Nanda Dynasty*: Founded by Mahapadma, the Nanda dynasty was ruling Magadha when Alexander invaded India. The dynasty had a vast and powerful army and were described as the first empire builders of India.

Alexander's Invasion (Greek Invasion)

Alexander, the son of Phillip of Macedonia (Greece) invaded India in 326 BC. His major battle was with Porus, the king of Punjab on the banks of river Jhelum. Alexander emerged victorious. It was the result of Alexander's invasion that the link between India and the West-countries was initiated.

India's political condition on the eve of Alexander's Invasion

Macedonian Prince, Alexander invaded India after two centuries of the Persian invasion. There was a large number of many small kingdoms in northwestern India on the eve of his invasion. The major rulers were Ambhi of Taxila, the ruler of Abhisara. The ruler of Abhisara and Porus ruled the region between the river Jhelum and Chenab. Nysa was one of the most important republican states. The northwestern India was the most disunited part of the country as their rulers were fighting with each other. They never fought collectively against their common enemy.

Causes of the Invasion

Alexander became the king of Macedonia after the death of his father, Philip in 334 B.C. He defeated Darius III in the battle of Arbela in 330 B.C. and won entire Persia. According to the Greek author Herodotus, Alexander was attracted to India by its fabulous wealth. One of the major reasons of his invasion on India was his interest in geographical enquiry and love for natural history.

Battle of Hydaspes

Alexander crossed the Hindukush mountains and spent almost ten months in fighting with the tribes. He crossed the river Indus in February 326 B.C. The ruler of Taxila, Ambhi received him with great warmth. After receiving a message from Alexander, Porus refused to submit and decided to fight against Alexander. Alexnder marched from Taxil to the banks of the river Hydaspes (Jhelum). He crossed the river and the famous battle of Hydaspes was fought between him and Porus on the Plains of karri which was a well – contested battle. Porus lost the battle inspite of a strong army. Alexander was very much impressed by the courage of Porus. He treated Porus generously and reinstated him on his throne. After this battle, Alexander wanted to proceed further eastwards towards the Gangetic vally. He could not proceed as his soldiers refuse to fight. After that, Alexander decided to return and made arrangements to look after his conquered territories in India. He divided his areas into three provinces from the Indus to the Beas and put them under his governors. He started his retreat in October 326 B.C. On his way, he fell seriously ill at Babylon and died in 323 B.C.

Effects of Alexander's invasion

Alexander's invasion encouraged political unification of north India under the Mauryas and the system of small independent states came to an end. Alexander's invasion had paved the way for direct contact between India and Greece. His invasion had opened many routes to India.

Also, his naval explorations increased the existing facilities for trade between India and West Asia. This invasion made possible the formation of Indo – Bacterian and Indo – Parthian states which influenced Indian architecture, coinage, astronomy etc. Alexander's invasion in 326 BC, is the first authentic and trust worthy date in early Indian history.

Mauryan Empire (321–289 BC)

Chandragupta Maurya and Bindusara

Founded by Chandragupta Maurya when he overthrew the Nandas. His son Bindusara (298–273 BC) succeeded him and annexed the south up to Mysore. He was the first Indian King who could be called a national ruler and who set up an administration with an autocratic and central-based system. *Kautilya* (*Chanakya*) a minister of Chandragupta, wrote the *Arthashastra*, a treatise on statecraft. Megasthenes was a Greek Ambassador to Chandragupta's court who wrote the *Indica* detailing the Mauryan dynasty.

Chandragupta	324/321–297 BC
Bindusara	297–273 BC
Ashoka	268–232 BC

Sources of Mauryan History

Literary Sources

Kautilyas's Arthashastra

Kautilya wrote Arthashastra in Sanskrit who was a contemporary of Chandragupta Maurya.

Arthashastra is the most important literary source for the history of the Mauryas.

Its manuscript was first discovered by R. Shama Sastri in 1904.

It contains 15 books and 180 Chapters and also divided into three parts.

The information regarding the king and his council and the departments of the government was contained in the first part.

The second part deal with Civil and criminal law and the third part with diplomacy and war.

Kautilya was also known as 'Indian Machiavelli.

Vishakhadatta's Mudrarakshasa:

Mudrarakshasa is a drama written in Sanskrit by Vishakhadatta.

It is written during the Gupta period but described the overthrown of Nandas by Chandraguta with the help of Kautilya.

It also shows the socio – economic condition of that time under the Mauryas.

Megasthenes' Indiaca:

Megasthenes who was the Greek ambassador in Chandragupta's court, wrote a book named 'Indica'.

Indica' which is survived only fragments, gives details about Mauryan's city administration and military organization.

His account of social life of that time is noteworthy.

Other Literature:

The Puranas and the Buddhist literature such as Jatakas provide information on the Mauryas apart from these three important works.

Dipavamsa and Mahavamsa, the Ceylonese Chronicles also throw light on the role of Asoka in spreading Buddhism in Sri Lanka.

2. Archaeological sources

Edicts of Asoka:

Ashokan inscription are written in Pali language and in some places Prakrit was used.

Ashikan inscription were found in kharoshti script in northwestern India

There are fourteen Major Rock Edicts.

There are Minor Rock Edicts and Minor Pillar Edicts also.

These Ashokan edicts deal with Ashoka's Dhamma and also instructions given to his officials.

The XIII Rock Edict gives details about Ashokas' ware with Kalinga.

The Pillar Edict VII gives a summary of his efforts to promote the Dhamma within his kingdom.

The inscriptions of Asoka were first deciphered by James Princep in 1837.

These inscriptions are the most important sources for the study of Ashoka and the Mauryan Empire.

Ashoka, the Great (273–231 bc)

Ashoka was the grandson of Chandragupta and son of Bindusara and is regarded as one of the greatest kings of all times. He was the first ruler to maintain direct contact with the people and he ruled for over 40 years. He acceded to the throne in 273 bc but the formal consecration took place 4 years later in 268 bc. Therefore, there is a controversy regarding the first four years of his rule. During his first 13 years, he carried on the traditional policy of expansion within India and friendly relations with foreign powers. In the 13th year of his reign, he conquered Kalinga.

1. *The Kalinga War*: In 265 bc Ashoka invaded Kalinga (Orissa) and occupied it after widespread destruction and bloodshed. This lead to the conversion of Ashoka and he became a Buddhist. His occupation with Buddhism weakened and his administration led to the decline of the Mauryan empire.

Five Provinces comprising the Mauryan Empire with their respective capitals were:
- Uttarapatha: (North): Taxila.
- Dakshinapatha: (South): Suvarnagiri.
- Avantipatha: (West): Ujjain.
- Prachyapatha: (East): Toshali (Kalinga).
- Central Province: (Magadh): Pataliputra.
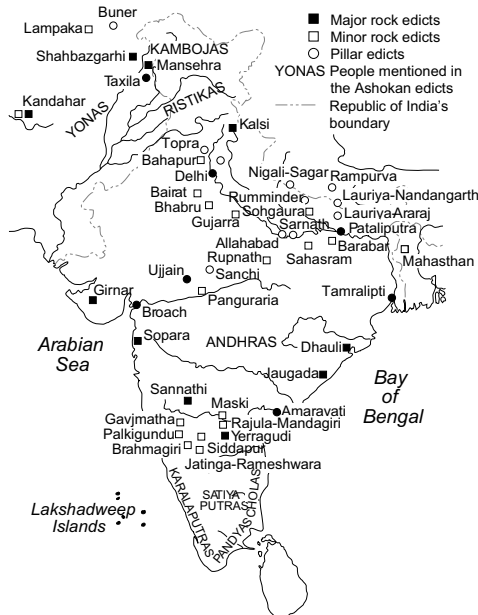
Map 2.3 Edicts of Ashoka Empire

This map is a sketch only, drawn not to scale, presented for reference and to aid understanding of concept discussed.

Chronological Order of Ashoka's edicts/inscriptions arranged in 8 groups;
- Two minor rock edicts (258 to 257 BC);
- Babru edicts (257 BC);
- 14 rock edicts (257 to 256 BC);
- Kalinga inscriptions (256 BC);
- Barabar rock edicts in caves near Gaya (250 BC);
- Tarai's two minor pillar edicts (249 BC);
- 7 pillar edicts (243 BC);
- 4 minor pillar edicts (232 BC).

Gupta Dynasty (AD 320–550)

The Gupta dynasty is called the *Golden Age* or the *Classical Age of ancient India*. During this period foreign rule was completely reversed and peace and prosperity prevailed. Kalidasa—poet and dramatist, Aryabhatta, Varahmihira and Brahmagupta—the great mathematician and astronomer, Dhanvantari—the great physician, all lived during this period.

The following were the important rulers of Gupta Dynasty:

1. *Chandragupta I*: (AD 319–335/336)
2. *Samudragupta*: (AD 350–370)
3. *Chandragupta II*: (AD 376–413/415) (also described as Vikramaditya) During his rule, India was visited by Chinese traveller Fahien (AD 399–411)

The Gupta Dynasty is called the *Golden Age of Sanskrit* language and the Classical Age of ancient India because of the following:
- There was political unity: foreign rule was completely removed and peace and prosperity prevailed;
- The enlightened character of government, that is, taxes were light, punishment was mild, etc;
- The revival of Hinduism, while there was tolerance of all other religions;
- Use of Sanskrit developed and art and literature flourished during the period;
- The great personages who lived during this period including: Kalidasa, poet and dramatist known as the *Shakespeare of India*—Aryabhatta, Varahamihira and Brahmagupta, the great mathematicians and astronomers—Kumarila Bhatta and Shankaracharya, the great preachers of Hinduism and Dhanwantri, the great physician;
- Fa-hien, a Chinese pilgrim who visited India (AD 399 to 414) during Vikramaditya's reign and gave an excellent account of the Gupta Dynasty and prosperity of the country.

Table 2.1   Nine Gems in the Court of Chandragupta II

S. No.	Name of Person	Contribution in the Field of	Works that Made them Famous
1	Kshapanaka	Astrology	*Jyothisyashastra*
2	Dhanvantri	Medicine	*Ayurveda* (Book of Medicine)
3	Kalidasa	Drama and Poetry	*Shakuntala*, *Meghaduta*, etc.
4	Amarasimha	Lexicography	*Amarakosha* (Glossary)
5	Varahamihira	Astrology	*Brihadsamhita*
6	Vararuchi	Grammar	*Vyakarana* (Sanskrit)
7	Sanku	Architecture	*Shilpashastra*

(*Continued*)

S. No.	Name of Person	Contribution in the Field of	Works that Made them Famous
8	Vetalabhatta	Magic	*Mantrashastra*
9	Harisen	Poet	—

Fahien's Visit: Fahien, the most famous Chinese pilgrim, visited India during the reign of Chandragupta II.

He spent six out of nine years stay in India in the Gupta empire. He reached India through land route via Khotan, Kashgar, Gandhara and Punjab. He visited many places like Peshawar Matura, Kanauj, Svavasti, Kapilavastu, Kusinagara, Pataliputra, kasi and Bodh Gaya. The main purpose of his visit was to see the land of the Buddha and to collect Buddhist manuscripts from India. Fahien threw a light on the religious, social and economic condition of the Gupta empire. According to his accounts, Buddhism was in a flourishing condition in the northwestern India but in a state of neglect in the Gangetic valley. He refered to the Gangetic Valley as the "land of Bradhmanism". His accounts mentioned that the economic condition of the empire was prosperous. He never mentioned the name of Chandragupta II as he was not interested in Political affairs. As his interest was primarily religion, he assessed everything from the Buddhist angle.

Successors of Chandragupta II: The Successor of Chandragupta II was his son, Kumaragupta. There was a general peace and prosperity in his reign. He issued many coins and also performed ashvamedha sacrifice. He laid the foundation of Nalanda university which gained the popularity at the inter national level.A powerful wealthy tribe called Pushyamitras' defeated the Gupta army at the end of his reign. Kumaragupta's successor Skandagupta faced the Hun invasion. Skandagupta fought successfully against the Huns and saved his empire. After Skandagupta's death, many of his successors like Purugupta, Narsimhagupta, Buddhagupta and Baladitya could not save the Gupta empire from the Huns.

Literature during Gupta Period: The Sanskrit became the most prominent language during the Gupta period and so many works were written in classical Sanskrit in the form of epic lyrics, drama and prose. Samudragupta patronized a number of scholars including Harisena. Kalidasa was one of the major ratnas among the celebrated Navratnas in the court of Chandragupta II. His classic drama in Sanskrit Shakuntala' is considered as one among the 'hundred best books of the World'. Visakadatta, an important author of this period, wrote two Sanskrit dramas – Mudrarakshasa and Devichandraguptam. Sudraka was a renowned poet of the Gupta age and wrote Mrichchakatika. Bharavi's kritarjuniya, Dandin's kavyadarsa and Dasakumaracharita, Subhandhu's Vasavadatta, Vishnu Sharma's Panchtantra were the masterpieces of the Gupta age. The Buddhist author Amarasimha compiled a lexicon called Amarakosa.

Economy during Gupta Period: Land was under the control of the state and it is mentioned in the Pahadpur Copper Plate inscription of Buddhagupta. Land survey was also done in the Gupta period and is mentioned in Poona plates of Prabhavati Gupta. Land was classified into five groups under the Guptas: 1. Kshetra Bhoomi (cultivable land), 2. Vastu Bhoomi (Habitable land), 3. Khila (Waste Land), 4. Charagah Bhoomi (Pasture

Land), and 5. Aparahata Bhoomi (Forest land). 'Pustapala' maintained all records of land transactions in the district. There was a marked decline in the long distance trade in the Gupta period.

There was heavy reliance of Indian merchants on the South – East Asian trade as the trade with roman empire declined after 3rd Century AD. Tamralipti, Ghantashala and Kandura were the Eastern Coastal Ports which handled the North-Indian trade with South–East Asia. Western Coastal ports like Bharoach, Chaul, kalian and Cambay handled the trade with the Mediterranean and west Asia.

Development of Science during Gupta Period: There was a great progress in the field of astronomy, astrology, mathematics and medicine. Aryabhatta, a mathematician and astronomer, wrote a book named 'Aryabhatiya' in 499 AD which deals with mathematics and astronomy. Varahmihira composed 'Pancha Siddhantika,' the five astronomical systems. Varahmihira's Brihadsamhita is a great work in Sanskrit literature which deals with a variety of subjects like astonomy, astrology, geography, architecture, animals, weather, marriage and omens. He wrote a book on astrology named Brihadjataka. Vagbhatta, a great medicine scholar, lived during the Gupta age. He wrote a book named 'Ashtangasamgraha' which was a summary of the eight branches of medicine.

Fact Bytes: Gupta Period

➤ The reunification of North India under the Imperial Guptas in AD 320 and the reign of Harshavardhana of Kanauj comprised India's classical age. ➤ The Guptas established their base of imperial power in Magadha, where they controlled rich veins of iron from the Barabar Hills. ➤ The peak of Gupta power and cultural glory was attained during the reign of Chandragupta II. ➤ Numismatic evidence attests to the final defeat of the Shakas by the Guptas after which the Gupta Empire had direct control over the ports of the Arabian Sea and the riches of Western trade. ➤ Kalidasa's Abhijnana Sakuntalam was a major literary work of this period. ➤ During the Gupta era, Hindu, Buddhist and Jain faiths received royal support. ➤ The Gupta era also marked the apogee of cave art and sculpture. ➤ Commerce and Buddhism stimulated Indian intercourse with China and south-east Asia at this time. ➤ The Gupta Empire was supported primarily by the land revenue 'share' (tax) provided by India's peasant villages from every harvest. ➤ For half a century after the collapse of the Gupta Empire, North India reverted to the political fragmentation before the Guptas. ➤ Yoga, one of the six schools of classical Hindu philosophy that emerged in this era, continues to be studied to this day. ➤ The political system of South India should not be thought of as a group of competing, centrally developed bureaucratic states, as was the case in the North.

Gupta Administration

As per the information gathered from the inscriptions, kings in Gupta empire assumed titles like Maharajadhiraja, Parameswara, Samrat, Chakravartin and Paramabhattaraka. Administration had a council which consisted of a chief minister, a Senapati or Commander – in – chief the army and other important officials to assist the ruler. Sandivigraha, a high official probably the minister for foreign affairs, was mentioned in the Gupta inscriptions. Kumaramatyas and Ayuktas helped the king to maintain the

close contact with the provincial administration. In Gupta empire, provinces were known as Bhuktis and provincial governors as Uparikas. Bhuktis (Provinces) were subdivided into Vishyas or districts and governed by Vishyapatis. The officers who looked after the city administration in Gupta Empire were called the Nagara Sreshts. 'Gramikas' had the control over the villages in the district. Fahien, in his accounts, considers the Gupta administration as mild and benevolent. According to Fahien, People enjoyed a great extent of personal freedom and no state interference was there in individual's life. Fahien also stated that:

- Imposing a fine was a common punishment as there were no severe punishments.
- There was no spy system.
- There was no fear of thieves and the roads were safe for travelers.
- The crimes were very negligible.
- The Gupta administration was more liberal than that of the Mauryas.

Social Life: The Caste system became very rigid during the Gupta period. The Practice of untouchability had begun during this period. The Brahmins were at the top of the society. According to Fahien, Chandalas were segregated from the society and were in miserable condition. Women were also in bad condition during the Gupta Period. They could not study the religious texts like the puranas. The practice of 'Swyamvara' was given up and the Manusmriti suggested the early marriage for girls.

Brahmanism became supreme and had two branches during the Gupta period – Vaishnavism and Saivism. The Gupta kings who followed Vaishnavism performed Asvamedha sacrifices. The progress of Brahmanism became the Cause of neglection of Buddhism and Jainism. Religious literatures like the Puranas were composed during this period. According to Fahien, Buddhist scholars like Vasubandhu were also patronized by Gupta kings. Jainism was flourished in western and southern India and the great Jain council was held at valbhi during this period.

Art and Architecture: The Gupta period has an important place in the history of Indian art and architecture. Both the Nagara and Dravidian style of art were evolved during this period. The temple at Deogarh near Jhansi and the sculptures in the temple at Garhwas near Allahabad remain significant specimen of the Gupta art. The beautiful statue of standing Buddha at Mathura reveals a little Greek style. The another unique piece of Gupta art was the Buddha statue which was unearthed at sarnath. Skandagupta's monolithic pillar at the Bhitari is also a great specimen of the Gupta Art. There was a remarkable progress in the field of metallurgy during the Gupta period. The copper statue of Buddha which was discovered at Sultanganj and now kept at Birmingham museum, was about seven and a half feet in height and nearly a ton in weight. The iron pillar at Mehrauli (Delhi) of the Gupta age is still free from rust, in spite of complete exposure to sun and rain for so many centuries. The Painting of the Gupta period are found at Bagh Caves near Gwalior. Ajanta's mural paintings depict the life of Buddha as shown in the Jataka stories. There was a great influence of the Ajanta style on the paintings found at Sigiriya in Sri Lanka. The development in the field of coinage was also very significant in the Gupta period. There were eighty types of gold coins issued by Samudragupta. Chandragupta II and his successors had also issued gold, silver and copper coins of different varieties. There

were three categories of the architecture in the Gupta period: *Rock cut Caves*: Ajanta and Ellora (Maharashtra), Bagh (M.P.) *Stupas*: Ratnagiri (Orissa), Mirpur khas (Sindh), Dhammekh (Sarnath). *Structural temples*: Siva temple of Bhumra (Nagod, MP), Parvati temple of Nanchana – Kuthwa (Panna, M.P.), Laxman temple of Sirpur (Raipur, M.P.), Dasavatara temple of Deogarh (Jhansi, UP), Shiva temple of khoh (Satna, MP), Krishna brick temple of Bhittargaon (Kanpur UP).

Harshavardhana (AD 606–647)

Harshavardhana was the last Hindu king of northern India. He established a strong empire conquering Bengal, Malwa, eastern Rajasthan and the entire Gangetic plain up to Assam. Hieun Tsang was a Chinese traveller who stayed in India during this period (between AD 635–643) and wrote a detailed account of India. Banabhatta, one of the court poets of Harshavardhana, wrote Harshacharita, a biography of the king.
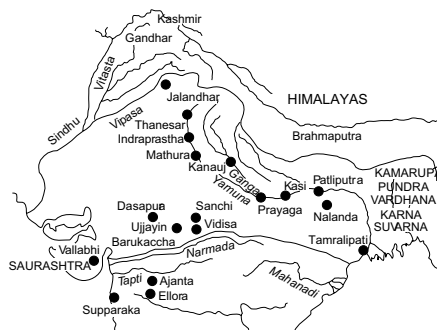
Map 2.4 Harshavardhanas Kingdom

This map is a sketch only, drawn not to scale, presented for reference and to aid understanding of concept discussed.

Harsha's Military Conquests: Harsha, in his first expedition, drove out Sasanka from Kanauj and made it his new capital. Harsha fought against Dhuruvasena II of Valabhi and defeated him. The most important campaign of Harsha was against the Western Chalukya ruler Pulakesin II. The Aihole inscription of Pulakeshin II mentions the defeat of Harsha by Pulakeshin which was also confirmed by the accounts of Hiuen Tsang. Harsh led another campaign against the ruler of Sindh. Nepal had accepted Harsh's overlordship, established his control over Kashmir and maintained cordial relations with Bhaskaravarman, the ruler of Assam. Hrasha's last military Campaign was against the kingdom of kalinga in Orissa and he succeeded in it.

Harsha's Administration: Hiuen Tsang gives a detailed account about the administration of Harsh. The king was very punctual for his duties. Taxation was light and forced labour was rare. One – Sixth of the produce was collected as land tax. Harsha's army consisted of the four divisions – food, horse, chariot and elephant. The maintenance of public records was the main feature of Harsha's administration. The archive of the Harsha period was known as Nilopiti and was under the control of Special officers.

Social and Economic life: The fourfold division of the society – Brahmin, Kshatriya, Vaishya and Shudra – was prevalent. The privileged class – Brahmins were given land grants by the kings. The Kshatriyas were the ruling class and the Vaisyas were mainly traders. According to Hiuen Tsang, The Sudras Practiced agriculture. The positions of women was not satisfactory. The institution of Swyamvara had declined: remarriage of widows was not permitted; the system of dowry and practice of Sati had become common. According to Hiuen Tsang, there were three ways of disposal of the dead: cremation, water burial and exposure in the woods. There was a decline in trade and commerce during Harsha's period. There was an adverse effect on the handicrafts industry and agriculture. There was a rise of self-sufficient village economy due to limited agricultural production by the farmers.

Cultural Progress: Hiuen Tsang describes the glory of the monastery with many storeys built by Harsha at Nalanda. He gave an account of a copper statue of Buddha with eight feet in height. There was also a mention of the brick temple of Lakshman at Sirpur during Harsha's period. Being a great patron of learning, Harsha's royal court was adorned by Banabhatta, Matanga Divakara and the famous Barthrihari, who was the poet, Philosopher and grammarian. Harsha patronized the Nalanda University by his liberal endowments.

Nalanda University: Hinayana University of Valabhi and the Mahayana University of Nalanda were mentioned by the Chinese travelers of ancient India. The term Nalanda means 'giver of knowledge.' Nalanda University was founded by kumaragupta I during the Gupta period, which was later patronized by Harsha. The University Professors were called 'Panditas', some of them were Dingnaga, Dharmapala, Sthiramati and Silabadhra. Nalanda University was a residential one and education was free including the boarding and lodging and different religious subjects like the Vedas, Hinayana doctrine, Sankhya and Yoga Philosophies were taught. General subjects like logic, grammar, astronomy, medicine and art were also in the syllabus. Admission was made by means of an enterance examination and the medium of instruction was Sanskrit.

Kanauj Assembly and Prayag Conference

Harsha organized a religious assembly at kanauj to honour the Chinese Pilgrim Hiuen Tsang towards the close of his reign which went on continuously for 23 days. Assembly was attended by 20 kings, 1000 scholars from the Nalanda University, 3000 Himayanists and Mahayanists, 3000 Brahmins and Jains. Violence broke out in this assembly and there were acts of arson. On the final day of the assembly, Hiuen Tsang was honoured with costly gifts. Hiuen Tsang also mentions in his account about Prayag conference. This conference was convened by Harsha once in five years. Harsha gave away his enormous wealth as gifts to the members of all religious sects. Harsha died in 647 AD. He did not had any heir to his throne, which was usurped after his death by his minister named Arunashava. Harsha governed his empire on the pattern of the Gupta rulers but his administration was more feudal and decentralized.

The Pallavas (AD 575–897)

Pallavas established their kingdom in Tondaimandalam with its capital at Kanchipuram. The Most widely accepted view by scholars about the origin of the Pallavas was they

were the natives of Tondaimandalam. When Tondaimandalam was conquered by the Satavahanas, the Pallavas became their feudatories.

Political History: The early Pallava rulers from 250 AD to 350 AD issued their charters in Prakrit and important among them were Sivaskandavarman and Vijayaskandavarman. The second line of pallava rulers issued their charters in Sanskrit between 350 AD and 550 AD and the important ruler was Vishnugopa. The third line rulers who ruled from 575 AD till ninth Centrury, issued their charters both in Sanskrit and Tamil and the important rulers were Simhavishnu, Nahendravarman I, NarasimhavarmanI and Narasimhavarman II.

Administration of the Pallavas: The Pallava state was divided into kottams and each kottam was administered by officers appointed by the king. The king, at the centre of administration, maintained a well – trained army. Devadhana was the land grant provided to the temple and also to the Brahmins known as Brahamadeya. Providing irrigation facilities to the lands was the main responsibility of the Central government. Land tax was the primary source of the government revenue but the Brahmadeya and Devadhana lands were exempted from tax. The village assemblies called 'Sabhas' and their committees maintained records of all village lands looked after local affairs and managed temples.

Society Under the Pallavas: The Brahmins occupied a high place in the society and were given the responsibility of looking after the temples.

   The caste system became very rigid. The Pallava period witnessed the rise of Saivism and Vaishnavism with the contribution of Saiva Nayanmars and Vaishnava Alwars which is known as the Bhakti Movements. They composed their hymns in Tamil language which showed the importance of devotion.

Education and Literature: The Ghatika at Kanchi, the Pallva's Capital, was very popular and attracted students from all parts of India and abroad. The founder of kadamba dynasty, Mayurasarman, Dinganaga, a Buddhist writer, Dharmapala, Head of the Nalanda University were associated with kanchi with one or another way. The Devaram composed by Nayanmars and the Nalayra divya prabandam composed by Alwars represent the religious literature of the Pallava period. Perundevanar who translated the Mahabharta as Bharathavenba in Tamil was patronized by Nadivarman II. Music and dance also developed during this period.

Pallava Art and Architecture: The Pallavas introduced the art of excavating temples from the rock. Dravidian style of temple architecture began with the Pallava rule. The development of temple architecture under the Pallavas can be seen in four stages.

- *First Stage*: Introduced by Mahendravarman I . Pallava temples are at Mandagappattu, Mahendravadi, Mamandur, Dalavanur, Tiruchirappalli, Vallam, Siyamangalam and Tirukalukkunram.
- *Second Stage*: Monolithic rathas and Mandapas found at Mamallapuram. Five rathas popularly called as the Panchapanadava rathas, the mandapas which were under the credit of Narsimhavarman I. Most popular mandapas are Mahishasuramardhini Mandapa, Varaha Mandapam and Tirumurthi Mandapam.

- *Third Stage*: Introduced by Rajsaimha. The kailasanath temple at kanchi and the Shore temple at Mamallapuram are the best examples of structural temples.
- *Fourth Stage*: Structural temples by later Pallavas. The Vaikundaperumal temple, Muktheswara temple and Matagenswara temples at Kanchipuram belong to this stage. The Pallavas had also contributed to the development of sculpture.

Fine Arts: The Mamandur inscription contains a note on the notation of vocal music. The Kudumiammalai inscription referred to musical notes and instruments. The Alwars and Nayanmars composed their hymns in various musical notes. The commentary called Dakshinchitra was compiled during the reign of Mahendravarman I, who had the title 'Chittirakkarapuli'.

Chalukyas (543 – 755 AD)

The western chalukyas ruled over an extensive area in the Deccan for about two centuries. History of Chalukyas, the Karnataka rulers, can be classified into three eras:

1. Early Western Era:—known as Chalukya of Badami
2. Later Western Era—the Chalukyas of Kalyani;
3. Eastern Chalukya Era—the Chalukyas of Vengi; Pulakesin I (ad 543–567); Pulakesin II (ad 610–642); Vinyaditya (ad 681–696); Vikramaditya II (ad 733–745) are its important rulers.

Pulakesin I was the founder of the Chalukya dynasty and established a small kingdom with vatapi or Badami as its capital. The most important ruler of this dynasty was Pulakesin (608 – 642 AD). One of the major achievements of Pulakesin II was the defeat of Harsha on the banks of river Narmada. The successor of Pulakesin II was Vikramaditya who consolidated the Chalukya kingdom and Plundered the Pallava Capital, Kanchi. Kirtivarman II was the last of the rulers of the Chalukyas He was defeated by Dantidurga, the founder of the Rashtrakuta dynasty.

Chalukyan Administration and Social Life: Village autonomy was absent under the Chalukyas. The Chalukyas had a powerful navy as well as a small standing army. The Badami chalukyas were Brahmanical Hindus but they were tolerant to other religions.

Vedic rites and rituals were given due importance. Many temples in honour of Vishnu, Siva and other gods were also built during this period. Jainism was steadily on the path of progress in this region. Ravikirti, the court poet of Pulakesin II who composed the Aihole inscription, was a Jain.

Art and Architecture: Chalukyas developed the Vesara style in the building of structural temples. Chalukyan temples exist at Aihole, Badami and Pattadakal. Cave temples of Chalukyas are also found in Ajanta, Ellora and Nasik. The Chalukya temples are divided into two groups – the first group is represented by the temples at Aihole and Badami and the second group is represented by the temples at Pattadakal. Among the Badami temples, the Muktheeswara temple and the Melagutti Sivalaya are the most important. The Papanatha temple, the Sangamesvara temple and the Virupaksha temple are the famous temples among the Pattadakal temples.

Rashtrakutas (755 – 975 AD)

Dantidurga of the Rashtrakuta family, a Mahasamanta under Chalukya Vikramaditya II had succeeded to capture greater portion of Deccan before 753 AD from Chalukya Vikramaditya II and his successor Kirtiverman II. Dhruva (779-793) was an important king in this linage who led successful campaigns in north India against Palas and Parthiharas. Other important rulers include—Govinda III (793-814), Amoghavarsha (814-979) and Krishna II (878-914). Dantidurga was the founder of the Rashtrakuta dynasty. Rashtrakutas were of kannada origin and their mother tongue was kannada. Dantidurga captured Malwa by defeating the Gurjarars and the Chalukya kingdom by defeating kirtivarman II. Dantidurga's successor Krishna I was also a great conqueror who defeated the Gangas and the eastern Chalukyas of Vengi. The next important king of Rashtrakutas was Govinda III who achieved victories over north Indian kingdoms. His successor Amoghavarsha I ruled for a period of 64 years and his reign was popular for the cultural development. He himself wrote the famous Kannada work, Kavirajamarga. He had built the Rashtrakuta capital, the city of Malkhed or Manyakheda.

Krishna III (936 – 986 AD), a successor of Amoghavarsha I, marched against the cholas and defeated them at Takkolam and also captured Tanjore. He built several temples including the Krishneswara temple at Rameswaram.

Administration: The Rashtrakuta Empire was divided into Several provinces called Rashtras, which were further divided into Vishayas or districts governed by Vishayapatis. The next subdivision was 'Bhukti' consisting of 50 to 70 villages under the control of Bhogapatis. The village administration was carried on by the village headman.

Society and Economy: Vaishnavism and Saivism flourished during the period of Rashtrakutas. Buddhism and Jainism were also progressed in this period. Almost one–third of the population of the Deccan were Jains. The Prosperous Buddhist settlements were kanheri, Sholapur and Dharwar. The Rashtrakuta kings promoted the Arab trade as there was an active commerce between the Deccan and the Arabs.

Cultural Contributions: The Rashtrakutas widely patronized the Sanskrit literature and there were many scholars in the Rashtrakuta court.

Writer/Poet	Work
Trivikrama	Nalachampu
Halayudha	Kavirahasya
Jinasena	Parsvabhudaya
Gunabhadra	Adipurana
Sakatayana	Amogavritti
Viracharya	Ganitasaram
Amoghvarsha	Kavirajamarga
Pampa	Vikramasenavijaya
Ponna	Santipurana

Art and Architecture: Rashtrakuta's art and architecture were seen at Ellora and Elephanta. The Kailasa temple, at Ellora, was excavated during the reign of Krishna I which consists of four parts – the main shrine, the entrance gateway, an intermediate shrine for Nandi and Mandapa surrounding the courtyard. Elephanta is an island near Mumbai which was originally called Sripuri. The Portugeese after seeing the large figure of an elephant named it Elephanta. At the entrance to the Sanctum there are huge figures of dwara-Palakas. In the walls, there are niches containing the images of Shiva in various forms – Nataraja, Gangadhara, Ardhanareesvara and Somaskanda. The three aspects of Shiva as Creator, Preserver and Destroyer are represented in Elphanta.

Sangam Age

According to Tamil legends, three Sangams (Academy of Tamil Poets) were existed in Tamil nadu popularly called Muchchangam. The ruler of Panyas gave the Patronage to these Sangams. The first Sangam which was held at then Madurai was attended by Gods and legendary sages. The second Sangam was held at kapadapuram but all the literary works had perished except Tolkappiyam. The third Sangam at Madurai was founded by Mudathirumaran.

Sangam Literature: The Sangam literature includes Tolkappiyam, Ettutogai, Pattuppattu, Pathinenkilkanakku and the two epics – Silappathigaram and Manimegalai. Tolkappiyam is the earliest of the Tamil literature which was authored by Tolkappiyar. A work on Tamil grammar, Tolkappiyam also provides information on the political and socio-economic conditions of the Sangam period. The Ettutogai or Eight Anthologies consists of eight works – Aingurunooru, Narrinai, Aganaooru, Purananooru, Kuruntogai, Kalittogai, Paripadal and Padirruppattu.

Both Ettuto gai and Pattu ppattu were divided into two main groups – Aham (love) and Puran (Valour). Silappathigaram written by Elango Adigal and Manimegalai by Sittalai Sattanar provide important information on the Sangam polity and society. Pathinenkilkanakku contain eighteen works which deal with ethics and morals.

Other Sources: The Greek authors like Megasthenes, Starbo, Pliny and Ptolemy mentioned the commercial contacts between the west and south India. The Ashokan inscriptions mention the Chera, Chola and Pandy rulers on the south of the Mauryan empire. The Hathigumpha inscriptions of Kharavela of kalinga mentions about Tamil kingdoms. The excavations at Arikkamedu, Poompuhar, kodumanal and other places also reveal the overseas commercial activities of the Timils. The most probable date of the Sangam literature has been fixed between the 3rd Century B.C. to 3rd Century A.D. on the basis of literary, archaeological and numismatic evidences.

Political History
Cheras
The Capital of the Cheras was Vanji and their Significant seaports were Tondi and Musiri. Three generations of Chera rulers were mentioned in the Pugalur inscription of the first century A.D. Perum Sorru Udhiyan Cheralathan, Imayavaramban Nedum Cheralathan and Cheran Senguttuvan were the famous rulers of this dynasty. Cheran Senguttuvan's expedition to the Himalayas, along with his military achievements, was remarkable.

He gave severe defeats to many north Indian monarchs. He introduced the Patlini cult or the worship of Kannagi the goddess of chastity as the Tamilnadu

Cholas

The Chola kingdom of the Sangam period extended from modern Tiruchi district to Southern Andhra Pradesh. Uraiyur was their first capital which was famous for cotton trade. And then shifted to Puhar, the main port of the cholas. The most famous king of the Sangam Cholas was karikala.

Karikala's early life and his military conquests were portrayed in Pattinappalai. The rulers of Cheras, Pandyas and eleven minor chief tains were defeated by karikala in the battle of Venni. Trade and Commerce flourished during karikala's reign.He was responsible for the reclamation of forest lands and brought them under cultivation, thus adding prosperity to the people. Karikala also built kallanai (embankment) across the river Kaveri and also constructed many irrigation tanks. Elara, the earliest chola king, conquered Sri Lanka and ruled over it for nearly 50 years.

Pandyas

The Present day southern Tamilnadu was ruled over by the Pandyas. The Capital of the Pandyas was Madurai. Nediyon, Palyagasalai Mudukudumi Peruvaludhi and Mudathirumaran were the earliest rulers of the Pandyan dynasty. There were two Neduncheliyans of which the first one was known as Aryappadai kadantha Neduncheliyan (Who won over the Aryan forces). He was responsible for the execution of kovalam for which kannagi burnt Madurai. The second one was Talaiyalanganattu Cheruvenra Neduncheliyan (who one the battle at Talaiyalanganam).

He was praised by Nakkirar and Mangudi Maruthanar. Maduraikkanji written by Mangudi Maruthanar describes the socio-economic condition of the Pandyas including the flourishing seaport of Korkai.The last famous Pandyan king was Uggira Peruvaludhi. During the Sangam age, the Pandyan rule began to decline due to the invasion of the kalabhars.

Sangam Polity: Hereditary monarchy was the form of government during the Sangam period. The chera kings assumed titles like Vanavaramban, Vanavan, Kuttuva Irumporai and Villavar. The Chola kings assumed titles like Senni, Valavan and Killi.The Pandya rulers also assumed titles like Thennavar and Minavar. Each of the Sangam dynasties had a royal emblem – Carp for the Pandyas, tiger for the Cholas and bow for the Cheras. The king was assisted by a large body of officials who were divided into five councils. Five councils were: Ministers (amaichar), Priests (anthanar), Military Commanders (Senapathi), Envoys (thuthar) and Spies (Orrar). Each ruler had a regular army and their respective Kodimaram (tutelary tree). The Chief source of state income was the land revenue. Custom duty was imposed on foreign trade. The Pattinappalai refers to the custom officials employed in the seaport of Puhar. Booty captured in wars was also a major income to the royal treasury. Roads and highways were well maintained and guarded day and night to prevent robbery and smuggling.

Sangam Society: Hereditary monarchy was the form of government during the Sangam Period. The Chera kings assumed titles like Vanavaramban, Vanavan, Kuttuvan, Irumporai and villavar. The Chola kings assumed titles like Senni, Valavan and killi.

The Pandya rulers also assumed titles like Thennavar and Minavar. Each of the Sangam dynasties had a royal emblem – carp for the Pandyas, tiger for the Cholas and bow for the Cheras. The king was assisted by a large body of officials who were divided into five councils. Land was divided in five parts according to Tolkappiyam _ Kurinji (hilly tracks), Mullai (Pastoral), Marudam (agricultural), Neydal (Coastal) and Palai (Desert).

Part of Land	Chief Deity	Chief occupation
Kurinji	Murugan	Hunting, Honey Collection
Mullai	Mayon (Vishnu)	Cattle rearing, Dairy Products
Marudam	Indira	Agriculture
Neydal	Varunan	Fishing Salt Manufacturing
Palai	Korravai	Robbery

Reference of four castes was also there in Tolkappiyam – arasar, anthanar, Vanigar and Vellalar. The ruling class was called arasar. Anthanars played an important role in the Sangam polity and religion. Vanigars carried on trade and commerce whereas the vellalars were agriculturists. Parthavar, panar, Eyinar, Kadambar, Maravar and Pulaiyar were the other tribal groups found in the Sangam society. Ancient primitive tribes like Thodas, Irulas Nagas and Vedars also lived in this period.

Religion

The Chief deity of the Sangam period was Seyon or Muragan who is hailed as Tamil God. Murugan was honoured with six abodes known as Arupadai Veedu. Mayon (Vishnu), Vendan (Indiran), Varunan and Korravai were the other gods worshipped during the Sangam period. The Hero stone or Nadu kal worship was significant in the Sangam period.

Position of Women: Women poets like Avvaiyar, Nachchellaiyar and Kakkaipadiniyar flourished in this period and contributed to Tamil literature. Karpu or Chaste life was considered the highest virtue of women. Love marriage was a common practice. The life of widows was miserable and the practice of sati was also prevalent in the higher strata of society.

Fine Arts: Poetry, Music and dancing were popular among the people of the Sangam age. The royal courts were crowded with singing bards called Panar and Viraliyar who were experts in folk songs and folk dances. A variety of Yazhs and drums are referred to in the Sangam literature. Dancing was performed by kanigaiyar. Koothu was the most popular entertainment of the people.

Economy of the Sangam Age: Agriculture was the chief occupation (common crops: Rice but Ragi, sugarcane, cotton, pepper, ginger, turmeric, cinnamon and a variety of fruits were also grown). Jack fruit and pepper were famous in Chera period whereas Paddy was the chief crop in Chola and Pandya age. The handicrafts of the Sangam period which include weaving, metal works, carpentry, ship building, making of ornaments using beads, stones and ivory were very popular. Internal and external trade was well organized and briskly carried on in the Sangam Age. Internal trade was mostly based on the barter system. External trade was carried between South India and the Greek

kingdoms. The port city of Puhar become an emporium of foreign trade. Other ports of commercial activities include Tondi, Musiri, Korkai, Arikkamedu and Mrakkanam. The Main exports of the Sangam age were cotton fabrics, spices like Pepper, ginger, Cardamom, cinnamon, turmeric, ivory products, pearls and precious stones. Gold, horses and sweet wine were the chief imports.

End of the Sangam Age: Sangam period slowly declined towards the end of the 3rd century A.D. The Kalabhars occupied the Tamil country for about 2-1/2 centuries. Jainism and Buddhism became prominent during this period. The Pallavas in the northern Tamil Nadu and Pandyas in southern Tamil Nadu drove the Kalabhars out of Tamil country and established their rule.

> **Ancient/Medevial Eras—**Buddha Samvat: 544 BC; Mahavira Samvat: 528 BC; Vikram Samvat: 57 BC; (Chandragupta); Saka Samvat: AD 78 (Vikramaditya); Gupta Samvat: AD 319 (Chandragupta I); Valabhi Samvat: AD 319; Kalchuri Samvat: AD 248 (Isvarsena); Harsha Samvat: AD 606 (Harshavardhan); Hijarai Samvat: AD 622 (Prophet Muhammad); Laxman Samvat: AD 1119 (Laxmansena of Bengal); Ilahi Samvat: AD 1584 (Solar calendar of Akbar).

CHOLAS (AD 850—1279)

The cholas became feudatories in Uraiyur after the decline of the Sangam Period. Vijayalaya was the founder of the Chola dynasty.

His son Aditya and Parantaka I were the early Chola rulers. Their power reached at peak of glory under Rajaraja I and his son Rajendra I. Rajaraja I (985 – 1014 A.D) gave a severe defeat to Chera, Pandya and Kalyani rulers and won the conquests of Gangavadi, Tadigaipadi and Nolambapadi located in Mysore region. He assumed many titles like Mummidi Chola, Jayankonda and Sivapadasekara. He built the famous Rajasrajeswara temple or Brihadeeswara temple at Tanjore in 1010 AD and also helped in the construction of a Buddhist monastery at Nagapattinam. Rajendra I (1012 – 1044 AD) conquered Bengal, Burma, Orissa and Andaman & Nicobar Islands. Rajendra I also acquired a number of titles like Mudikondan, Gangaikondan, Kadaram kondan and Pandita Cholan. He was also a staunch follower of Shiva and built a temple for Shiva at the new capital Gangaikondacholapuram. Rajendra III was the last chola king who was defeated by Jatavarman Sundarapandya II.

Administration

Central Government

The king was at the top of the administration whose authority is revealed by the big capital cities like Tanjore and *Gangaikondacholapuram*, the large royal courts and extensive grants to the temples. There was a vast administrative machinery comprising various officials called perundanam and Sirudanam.

Revenue

The land revenue department under the Cholas was called as puravuvarithinaikkalam. Besides land revenue, there were tolls and customs on goods taken from one place to

another, various kinds of professional taxes, dues levied on ceremonial occasions like marriages and judicial fines. The residential portion of the village was called *ur nattam*. The main items of government expenditure were the king and his court, army and navy, roads irrigation tanks and canals.

Military Administration:

The Chola army was consisted of elephants, cavalry, infantry and navy. The royal troops of the Cholas were called *kaikkola perumpadai*. Within this there was a personal troop to defend the king known as *velaikkarar*. Attention was given to the training of the army and military Cantonments called kadagams existed.

The Cholas paid special attention to their navy also.

Provincial Administration

The Chola Empire was divided into mandalams and each mandalam into valanadus and nadus. Mandalams were under the royal princes or officers valanadu was under periyanattar and nadu under nattar.

In each nadu, there were a number of autonomous villages. The town was known as nagaram and it was under the administration of council called nagarattar.

Village Assemblies

Two inscriptions belonging to the period of Parantaka I found at Uttiramerur provide details of the formation and functions of village councils. The Village was divided into thirty wards and each was to nominate its members to the village council.

Socio-Economic Life: Caste system was widely prevalent during the Chola period Brahmins and kshatriyas enjoyed special privileges. The inscriptions of the Chola rule mention two major divisons among the Castes – Valangai and Idangai Castes. Women's position didn't improve and the practice of 'sati' was prevalent among the royal families. The devadasi system or dancing girls attached to temple emerged during this period. The temples remained centres of economic activity during the Chola Period.

Both agriculture and industry flourished. Silk weaving industry at kanchi also flourished. Commercial contacts between the Cholas empire and China, Sumatra, Java and Arabia were extensively prevalent. Arabian horses were imported in large numbers to strengthen the cavalry.

Education and Literature: The inscription at Ennayiram, Thirumukkudal and Thirubhuvanai provide details of the colleges existed in these places. Subjects like mathematics and medicine were taught in these institutions apart from the Vedas and Epics.

The Ramayana composed by Kamban and the Periyapuranam or Tiruttondarpuranam by Sekkilar are the two master pieces of this period. The Moovarula written by Ottakuthar depicts the life of three chola kings. The works on Tamil grammar like kalladam by Kalladanar, yapperungalam by Amirthasagarar, a Jain, Nannul by Pavanandhi and Virasoliyam by Buddhamitra were the products of the Chola age.

Art and Architecture: The Chief feature of the Chola temple is the Vimana. The big temple at Tanjore built by Rajaraja I is a master piece of South Indian art and architecture.

Another notable contribution of the Cholas is the Siva temple at Gangaikondacholapuram built by Rajendra I. The Airavathesvara temple at Darasuram in Tanjore district and the Kampaharesvara temple at Tribhuvanam are examples of later Chola temples. The Chola paintings were also found on the walls of Narthamalai and Tanjore temples.

Rajputs (AD 650–1200)

After Harshavardhana, the Rajputs emerged as a powerful force in Western and Central India. Out of the political disarray prevalent in North India the Rajputs chalked out the small kingdoms of Gujarat and Malwa. From the eighth to twelfth century they struggled to keep themselves independent. But as they grew bigger, the infightings made them brittle, they fell prey to the rising domination of the Muslim invaders. Among them the Gujara of Pratihara, the Gahadwals of Kanauj, the Kalachuris of Chedi, the Chauhans of Ajmer, the Solankis of Gujarat and the Guhilotas of Mewar are important.

Prithviraj Chauhan was a brave ruler who ruled over Delhi and Agra. Jai Chand Rathor was the last Rajput king who was defeated and killed by Muhammad Ghori. The kingdom of Delhi fell to Ghori.

Other Dynasties

1. *The Andhras*: Also known as the *Shathavahanas*, are considered to be among the earliest rulers of the Deccan. They gained independence after the death of Ashoka. Simukha—founder of this dynasty has a mention in Jain texts. Shathakarni I (ruled 184–130 BC), Pulumayi II (AD 130–145) and last king Yagnashathakarni (AD 175–225) were its important rulers. 'Krishna' was among their earliest rulers who was contemporary of Ashoka.
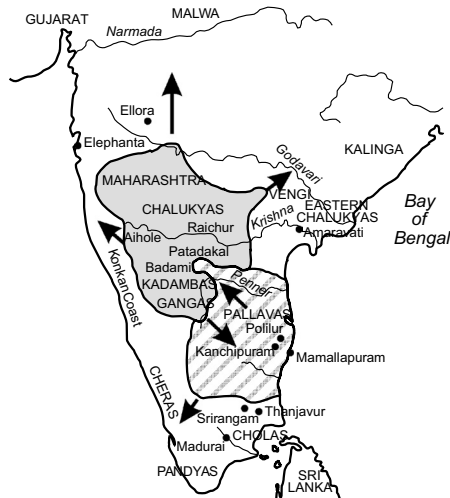
Map 2.5   Various Kingdoms Ruling South India

This map is a sketch only, drawn not to scale, presented for reference and to aid understanding of concept discussed.

2. *The Yadavas* (AD 1191–1318): They ruled from Devagiri—Singhana (AD 1210–1247) and Ramchandra (AD 1271–1309) were the two important rulers.

3. *Hindu Kingdom of Vijaynagar (1336–1646)*: The five sons of south Indian Sangama dynasty of whom Harihar and Bukka were among its founders. Krishnadeva Raja (AD 1505–29) was its most illustrious ruler. The kingdom lay in Deccan, to the south of Bahami kingdom. They protected the Hindu way of life and checked the Mohammedan advance. Battle of Talikota (1564–1565) between Muslim ruler of Deccan and Vijaynagar ruler Ramaraja is important because it marked the gradual collapse of this mighty empire.

4. *Gujara-Pratiharas*: A branch of Pratiharas founded by Brahmana Harichandra of Jodhpur State, Rajasthan, which belonged to Gujarata or Gurjara.
   Important Rulers: Nagabhatta I, Vatsaraja (AD 783), Nagabhatta II, Ramabhadra, Bhoja (AD 836–885), Mahendrapala (AD 885–995).

5. *Palas*: Gopala, founder of Pala dynasty, reigned in the third quarter of eighth century comprising regions of Gauda, Vanga, Radha and Magadha.
   Important Rulers: Dharampala (770–810), Devapala (810–850), Vigrahapala (850–854) and Narayanapala (854–908).
   The rule of Pala dynasty came to an end about in the middle to the twelfth century.

6. *Senas of Bengal*: Originally inhabitants of Dakshinapatha and came into prominence in AD 1095 when Vijayasena ascended the throne after wresting Ganda from the last Pala king Mandanpala.
   Other Important Rulers: Ballasena (1158–87), Lakshmanasena (1187–1205) and Visvarupasena.
   Muhammad-bin-Bhakhtyal-Khalji defeated Lakshhmanasena and captured Nadia and later conquered North Bengal to establish Muslim rule in Radha and Ganda. By mid-thirteenth century, the Senas were overthrown by the Deva dynasty reigning in Samantata to the east of the Brahmaputra.

MEDIEVAL INDIA

This includes the Muslim Period (997–1707) which started with the raids by Mahmud of Ghazni and led to the establishment of the Sultanate of Delhi.

Sultanate of Delhi (1206–1526)

Muhammad Ghori's conquests became the nucleus of a new political entity in India—The Sultanate of Delhi–and the beginning of Muslim rule in India. This can be divided into five distinct periods, they are:

1. The Slave Dynasty (1206–90)
2. The Khilji Dynasty (1290–1320)
3. The Tughlak Dynasty (1320–1414)
4. The Sayyid Dynasty (1414–51)
5. The Lodhi Dynasty (1451–1526)

```
                    (1) Qutab-ud-din Aibak
                            d. 1210
              (Slave of Mu'iz-ud-din Muhammad Ghori)
                              │
                              ▼
              Daughter = (2) Shams-ud-din Ilutmish
                                   d. 1 May 1236
                                      (Slave)
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Figure 2.1 content represented below:

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┌──────────────┬──────────────┬──────────────────────────────┐
│ (3) Rukn-ud-din      (5) Mu-iz-ud-din       Daughter = (8) Ghiyas-ud-din
│    Feroz Shah           Bahram Shah                      Balban
│ deposed and killed    d. 15 May 1242                   d. 1287
│  9 November 1236           ▼                            (Slave)
│                     (7) Nasir-ud-din
│                          Mahmud
│                     18 February 1266
Nasir-ud-din   (4) Razia
  Mahmud       deposed 1240
  (Bengal)     24 October 1240                Prince
                                             Muhammad
(6) Ala-ud-din Masud Shah
    deposed 10 June 1246               Daughter   =   Nasir-ud-din
                                                          Mahmud
                                                       Bughra Khan
                                                        (Bengal)
                                              (9) Mu'iz-ud-din
                                                   Kaiqubad
                                                Killed June 1290
                                              (10) Kayumars
                                              deposed June 1290
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Figure 2.1 The Slave Dynasty

Slave Dynasty
Founded by Qutub-ud-din Aibak (1206–10), it included the following famous rulers:

1. Shamas-ud-din Iltutmish (1210–36)
2. Razia Sultan (1236–39), the first and only Muslim lady who ever ruled India
3. Nasir-ud-din Mahmud (1246–66)
4. Balban (1266–87)

Khilji Dynasty
Founded by Sultan Jalal-ud-din Khilji (1290–96) who brought under his sway all the Rajput kingdoms. Alaud-din Khilji (1296–1316) was the nephew of Sultan Jalal-ud-din, whom he killed and succeeded in 1296. Khusro Khan in 1320, killed Qutub-ud-din Mubarak Shah, the successor of Ala-ud-din Khilji and ended the Khilji dynasty.

Tughlak Dynasty
Founded by Ghiasuddin Tughlak (1320–25). Other important rulers of the Tughlak Dynasty were: (1) Mohammed-bin Tughlaq (1325–51) who introduced token coins of brass and copper and (2) Firoz Shah Tughlak (1351–88). *Ibn Batuta* was an African

Qaim Khan
(Tulak Khan of Qunduz)

Khiljis of Malwa

(1) Jalal-ud-din
Feroz Shah
d. 1296

Masud
(Shihab-ud-din)

(2) Rukn-ud-din
Ibrahim
deposed 1296

(3) Ala-ud-din
Sikander Sani
d. 1316

Prince Khizr Khan

(4) Shihab-ud-din
Umar
1316

(5) Qutub-ud-din
Mubarak
1320
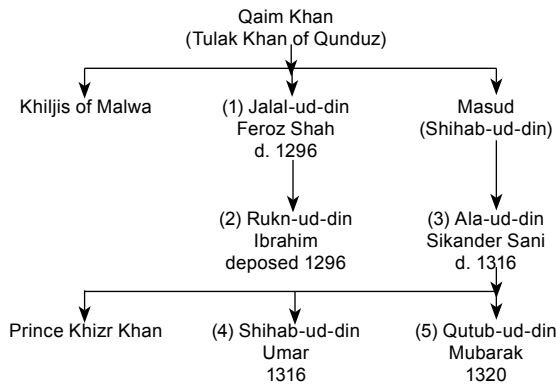
Figure 2.2 The Khilji Dynasty

(1) Ghyas-ud-din
Tughlaq
d. 1325

Rajab
Sipah Salah

=

Bhatti
Princess

(3) Feroz Shah
d. 1388

(2) Jauna
Muhammad Bin Tughluq
d. 1351

Fath Khan

Zafar Khan

(6) Nasir-ud-din
d. 1394

(5) Abu Baqr
deposed 1390

(4) Ghiyas-ud-din
Tughlaq II
deposed and killed 1389

(8) Nusrat Shah
disputed succession
set up 1395, d. 1398 or 1399

(7) Ala-ud-din Sikandar
(Humayun Khan)
d. 1394

(9) Mahmud Shah
d. 1413
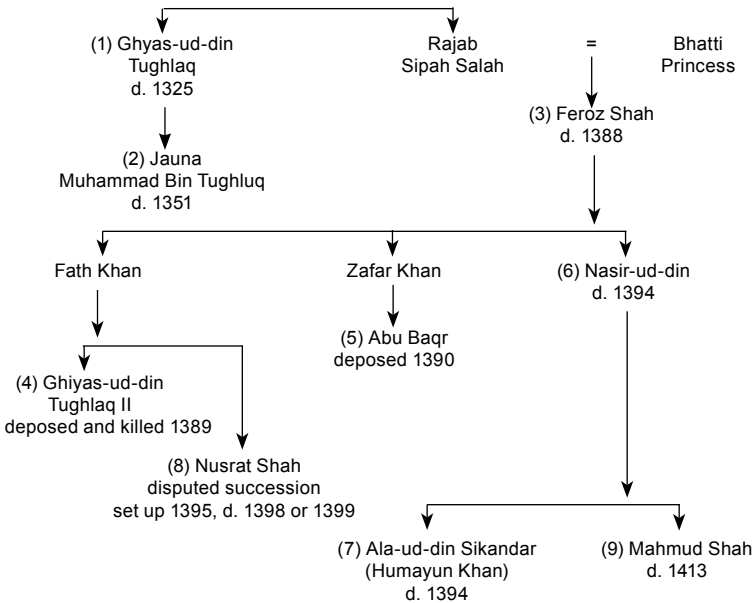
Figure 2.3 The Tughlaq Dynasty

traveller who visted India in 1333. He was appointed as the Chief Qazi of Delhi by the Sultan. Timur, a Turk, invaded India in 1398 and ended the Tughlak Dynasty.

Sayyid Dynasty

Timur's nominee Khizr Khan (1414–21) captured Delhi and was proclaimed the new Sultan who ruled for about 7 years. The last Sayyid King Alam Shah (1443–1451) abdicated in favour of Bahlol Lodhi.

Table 2.2 Invasions by Mongolian Emperors During the Delhi Sultanate

Year	Regime of Sultan	Events
1221	Iltutmish	Chengiz Khan came up to the banks of the river Indus
1279	Balban	Prince Muhammad of Multan, Bughra Khan from Samana and Malik Mubarak of Delhi came together to defeat the Mongols
1285	Balban	Timur Lane invaded India. Prince Muhammad was killed in the battle and was decorated with the *Khan-i-Shahid* title
1292	Jalal-ud-din Khilji	Abdullah came to the northern part of India. About 4000 Mongols were converted to Islam and became the famous 'New Mussalman'
1296–99	Ala-ud-din Khilji	Zafar Khan defeated the Mongols of Jalandhar and Saldi, their leader, was taken to prison
1299	Qutlugh Khwaja	Zafar Khan was defeated and killed in battle
1304	Ala-ud-din Khilji	Ali Beg and Khwaja Tash were defeated
1329	Muhammad-bin-Tughlaq	Tazmashirin Khan was able to reach near Delhi but was defeated by Muhammad-bin-Tughlaq

Lodhi Dynasty
Founded by Bahlol Lodhi (1451–88), one of the Afghan Sardars who established himself in Punjab after the invasion of Timur. Sikander Lodhi (1489–1517) and Ibrahim Lodhi (1517–26) were the famous rulers of the Lodhi Dynasty.

• **First Battle of Panipat (1526)**   The first battle of Panipat was fought in 1526 between Ibrahim Lodhi–the ruler of Delhi and Babur–the ruler of Kabul. Babur invaded India and established the Mughal Dynasty.

Decline of Delhi Sultanate
The main causes of the downfall of the Delhi sultanate were (i) Despotic and military type of governments that did not have the confidence of the people, (ii) Degeneration of the Delhi Sultans, (iii) The sultanate became too vast and could not be controlled effectively, (iv) Financial instability, (v) The number of slaves increased to 180,000 in Firoz Shah's time, which was a burden on the treasury.

Mughal Dynasty
Period   1526–40 and 1555–1857
Famous Rulers
1. *Babur (1526–30)*: Is said to have founded the Mughal empire. He defeated Ibrahim Lodhi in the First Battle of Panipat in 1526 and became the emperor of Delhi in 1527 after defeating Afghans in the Battle of Gorge.
2. *Humayun (1530–40)*: Was the son of Babur and ascended the throne in 1530.

3. *Sher Shah Suri (1540–45)*: An Afghan, who ruled the country for a brief period after defeating Humayun. He introduced a brilliant administration, land revenue policy and several other measures to improve the economy. He issued the coin called 'Rupia' and built the Grand Trunk Road (GT Road) linking Peshawar to Calcutta.
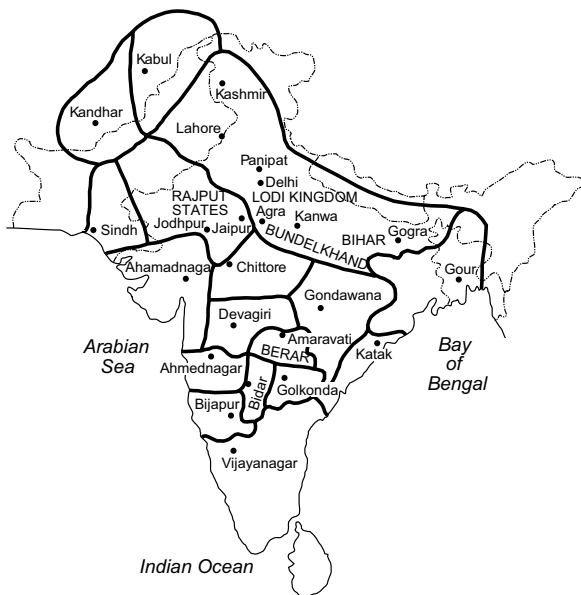
Map 2.6   Babur's Kingdom

This map is a sketch only, drawn not to scale, presented for reference and to aid understanding of concept discussed.

4. *Akbar (1556–1605)*: The eldest son of Humayun who is said to be the real founder of Mughal empire because Babur and Humayun could not consolidate the empire as Akbar successfully did. He was the first ruler who divorced religion from politics and his attitude towards Hindus was very conciliatory.

- **Second Battle of Panipat (1556)**   The second battle of Panipat fought between Hemu, the Hindu leader and Akbar's regent Bairam Khan. Hemu was defeated on 5 November 1556, captured and slain by Bairam Khan. This ended the Mughal-Afghan contest for the throne of Delhi in favour of the Mughals and enabled Akbar to reoccupy Delhi and Agra.
- **Battle of Haldighati (1576)**   This battle was fought in 1576 near Gogundo (Haldighati) between Rana Pratap Singh of Mewar and the Mughal Army led by Man Singh of Amber. Rana Pratap Singh was defeated but he continued the struggle and did not submit.

5. *Jahangir (1605–27)*: Salim, son of Akbar ascended the throne after Akbar's death in 1605. He is known for his strict administration of justice. He married Mehr-un-nisa in 1611, who later on was given the title of 'Nur Jahan'.

Map 2.7   Akbar's Kingdom

This map is a sketch only, drawn not to scale, presented for reference and to aid understanding of concept discussed.

6. *Shahjahan (1628–58)*: Son of Jahangir, ascended the throne after his father's death. Three years after his accession, his beloved wife Mumtaz Mahal died in 1631 and to perpetuate her memory he built the Taj Mahal at Agra. He is known for the promotion of art, culture and architechure. The Red Fort and Jama Masjid are some of the magnificent structures built by him. Shahjahan's failing health set off the war of succession among his four sons. His third son, Aurangzeb, crowned himself emperor in 1658 and Shahjahan was imprisoned by him till he died in captivity in 1666.

7. *Aurangzeb (1659–1707)*: The son of Shahjahan who ruled for 50 years. He was a Muslim fanatic who demolished several Hindu Temples and banned all religious festivals. He executed Guru Teg Bahadur (the 9th Guru of Sikhs) when he refused to embrace Islam.

Decline of Mughal Empire

In 1739, during the reign of Mohammed Shah, a Persian king, Nadir Shah, invaded India and broke up the Mughal empire. He plundered Delhi and took the Kohinoor diamond with him to Afghanistan.

Vijayanagar Empire

Founded in 1336 by Harihara I (1336–56) as a result of the political and cultural movement against the Tughlaq authority in south India.

Genealogically the Vijayanagar empire is classified as:

1. *Sangam Dynasty*: (1336–1485 ad) [Harihara I (1336–56), Bukka I (1356–77), Harihara II (1377–1404), Bukka II (1404–06), Devaraya I (1406–22), Vira Vijaya (1422), Devaraya II (1422–46), Mallikarjuna (1446–65), Virupaksha (1465–85), Prauda Deva (1485)].

2. *Saluva Dynasty*: (1485–1505 ad) [Saluva Narasimha (1485–90), Timmaraya (1490–91), Immadi Narasimha (1491–1505)].

Map 2.8 Successor Provinces of the Mughal Empire during 1930s

This map is a sketch only, drawn not to scale, presented for reference and to aid understanding of concept discussed.

3. *Tuluva Dynasty*: (1505–70) [Vir Narasimha (1505–09), Krishnadeva Raya (1509–29), Achyta Raya (1529–42), Venkta I (1542–43), Sadasiva (1543–70).

4. *Aravidu Dynasty*: (1570–1652) [Tirumala (1570–72), Sri Ranga (1572–85), Venkata II (1585–1614), Sri ranga II (1614), Ramadeva (1614–30), Ventata III (1630–42), Sri Ranga III (1642–52).

Vijayanagar-Bahamni conflict is one of the most important struggles for the Vijayanagar rulers. It started on a large scale in 1367, during the reign of Bukka-I. The clash of interest had mainly three points: (i) the Tungabhadra doab; (ii) Krishna-Godavari delta; and (iii) the Marathwada country.

Empire of Vijayanagar (named after its capital Vijayanagar, 'City of Victory', in Karnataka) expanded rapidly towards Madurai in the south and Goa in the west and exerted intermittent control over the east coast and the extreme south-west. Vijayanagar rulers closely followed Chola precedents, especially in collecting agricultural and trade revenues, in giving encouragement to commercial guilds and in honouring temples with lavish endowments.

Political rivalry between the Bahmani and the Vijayanagar rulers involved control over the Krishna– Tunghabadhra river basin, which shifted hands depending on whose military was superior at any given time. The Vijayanagar rulers' capacity for gaining victory over their enemies was contingent on ensuring a constant supply of horses—initially through Arab traders but later through the Portuguese—and maintaining internal roads and communication networks.

The city of Vijayanagar itself contained numerous temples with rich ornamentation, especially the gateways, and a cluster of shrines for the deities. Most prominent among

the temples was the one dedicated to Virupaksha, a manifestation of Shiva, the patron deity of the Vijayanagar rulers. (The first Vijayanagar ruler, Harihara I, was a Hindu who converted to Islam and then reconverted back to Hinduism for political expediency). The important temples of Vijaynagar style are Vithalswami and Hazara temples at Hampi. It was the Vijaynagar rulers who initiated the practice of inscribing the stories of Ramayana and Mahabharata on the walls of these temples.

The Vijayanagar empire crumbled at the Battle of Talikota where the first rulers of Bahamni Sultanate combined forces and attacked Vijayanagar in 1565 AD. The later rulers that controlled the Vijayanagar empire belonged to Aravidy Dynasty and asserted lesser impression on the history of the region.

Sikhs and Marathas

The Sikhs

In the 15th century, the Sikhs grew into a strong community.

Aurangzeb captured Guru Teg Bahadur, the 9th guru of Sikhs in 1675 and executed him when he refused to embrace Islam. The Sikhs resented the Mughals for their religious intolerance. Guru Gobind Singh, son of Guru Teg Bahadur, organized his followers into a military force called Khalsa to avenge the murder of his father. Guru Gobind Singh, however, was murdered in 1708 by an Afghan in the Deccan. Banda Bahadur, the militant successor of Guru Gobind Singh, continued the war against Mughals but he too was murdered. The Afghan defeat of the Maratha armies accelerated the breakaway of Punjab from Delhi and helped in founding the Sikh overlordship in the north-west.

The Sikh Khalsa (army of the pure) rose up against the economic and political repressions in Punjab towards the end of Aurangzeb's rule. The Sikh Khalsa (army of the pure) rose up against the economic and political repressions in Punjab towards the end of Aurangzeb's rule. Guerrilla fighters took advantage of the political instability created by the Persian and Afghan onslaught against Delhi, enriching themselves and expanding the territorial control.

By the 1770s, Sikh hegemony extended from the Indus in the west to the Yamuna in the east, from Multan in the south to Jammu in the north. But the Sikhs, like the Marathas, were a loose, disunited and quarrelsome conglomerate of 12 kin-groups.

Guru Gobind Singh (1666–1708)

The most militarily efficient of the Sikh Gurus was the tenth and the last Guru Gobind Singh. During the reign of Aurangzeb, who fanatically tried to subdue non-Muslim practices, the Sikhs were ill-treated viciously. The Mughals and the Muslim historians considered Gobind Singh no more than a warlord having no religious credentials. He was a powerful military general who had a vision of transforming the Sikh society into a war like society. Gobind Singh created the fourth doctrine, the last and most important one of Sikhism, the doctrine of Khalsa or the 'brotherhood' of Sikhs.

Each Sikh male wore symbolic clothing and accoutrements to make manifest his membership in the community; these include uncut hair and a steel dagger. Following the creation of the khalsa, the political and military might of the Sikhs increased greatly. The Sikh military brotherhood was the most powerful combating unit that the British

depended on against the Mughal Empire in its final days. Gobind Singh announced himself to be the last Guru.

After his death, religious authority has rested in the scriptures known as Guru Granth Sahib. Akbar considered the Sikhs a religious community which deserved royal support. Jahangir believed they were a rising political unit that may threaten his empire. Aurangzeb thought that the Sikhs were dangerous heretics who had to be routed out at any cost. The successors of Aurangzeb regarded the Sikhs a major military force tearing the Mughal Empire apart.

Amritsar, Golden Temple and Adi Granth

Most of the Sikh rituals and customs were established by the first four Gurus. It was the fourth Sikh Guru Ram Das (1574–1581) who founded the city of Amritsar. It became the most important place of Sikh pilgrimage. Even today it is the most important place for Sikhs. The central Sikh temple, the Golden Temple, is located here. However, the fifth Guru Arjan Dev is regarded as the most important Sikh Guru. He assembled the verses of the first four Gurus including Guru Nanak. He assembled their verses in an anthology known as Adi Granth. It became the revered scriptures of the Sikh community. He was the first Sikh Guru to stand against the Mughals. When Prince Khusrau revolted against his father, Jahangir, he requested Arjan Dev for his help. Jahangir did not like the steady growth of the Sikh community and increasing influence of Arjan Dev in the region. Therefore, he arrested him in 1606. He was tortured to death. The death of the Guru at the hands of the Mughals forced the Sikhs to convert themselves into a warrior community. Arjan Dev was succeeded by Guru Hargobind (1606–1644). He built the Sikh community into a military might. He raised martyrdom to an ideal of the religion; this was not just dying for the religion, but being killed fighting for the community. The Sikh community began to resist the Mughal authority and a number of battles were fought between them.

Ranjit Singh (1780–1839)

Ranjit Singh was an individual with modern vision and leadership.

He achieved supremacy over the other kingroups and established his kingdom in which Sikhs, Hindus and Muslims lived together in comparative equality and increasing prosperity. He was the son of Mahan Singh, a head of Sukher-chakiyamisle (a small Jagir or regency of Punjab). Punjab was divided into twelve such jagirs at that time. He lost his father when he was 12 and since then he took interest in the political affairs of the Regency, which his mother administered through a Council. He took charge of the government at the age of 17 years. Ranjit Singh employed European officers and introduced strict military discipline into his army before expanding into Afghanistan, Kashmir and Ladakh. While other kingdoms in the regions were fighting with each other, Ranjit Singh succeeded in establishing an empire. The rest of the Sikh jagirs could not tolerate Ranjit Singh's rise to power and formed another confederacy under Gulab Singh to attack Ranjit Singh.

At the Battle of Chasnin, Ranjit Singh defeated his rivals and killed Gulab Singh, thus emerging as a powerful leader of the whole Sikh community.

He entered into First Treaty of Amritsar in 1809 with the East Indian Company regarding rights over the Satluj area. Ranjit Singh was an able administrator and he was

able to not only maintain, but also to expand his empire through battle and well thought out strategic treaties with the Afghanis and the English.

Both the British and the Afghanis were envious of Ranjit Singh's growing power but could not afford to wage a war against the Sikhs because of strategic reasons. After the death of Ranjit Singh in 1839, succession wars for the throne led Sikh Empire to its downfall. Sikh officials started flirting with the British regions (given to the British as per the Treaties of Amritsar) which resulted in the First Anglo-Sikh War in 1846.

The war ended with the defeat of the Sikhs and the Treaty of Lahore (1846) effected the downsizing of Sikh forces in the region to maintain British superiority. The British awarded Gulab Singh, the mediator in Anglo-Sikh treaties, ownership of Kashmir for a mere sum of 10,000 rupees.

Dilip Singh

Dilip Singh, the youngest son of Ranjit Singh, was made the ruler of Punjab and Rani Jindan, queen of Ranjit Singh, was deported to Chunar. As the British atrocities rose, the Second Anglo-Sikh War (1849) became inevitable. But the British defeated the Sikhs at Bilianwala and Lord Dalhousie annexed Punjab into the British Empire. Raja Dalip Singh and Rani Jindal were sent away to London on fixed annual pensions.

The Jats

The Jats formed a substantial portion of the population in the rural regions of Haryana, Punjab, the western regions of the Ganga Doab and eastern regions of Rajputana. They were often used as mercenary soldiers by both the Hindu as well as the Muslim rulers. Some of the ambitious Jat Zamindars of the Agra region tried to establish an independent principality. It brought them into direct conflict with the Mughals, the Rajputs and the Afghans. The prominent Jat uprisings during the seventeenth century were conducted under the leadership of Gokla in 1669 and the under the leadership of Rajarama and Rama Chera, the Zamindars of Sinsani and Soghar in 1685. The Mughal governor Hasan Ali Khan subdued the Gokla uprising and the Sinsani uprising was subdued by Raja Bishan Singh Kachwaha of Amber. Churaman (1720) a nephew of Rajarama, defeated the Mughals in 1704 and captured Sinsani.

However, later he surrendered before Bahadur Shah and received an imperial mark (mansab) from him. He rendered his services to Bahadur Shah in a campaign against Banda Bahadur. After the defeat of Bahadur Shah in 1912, he increased his force in the region. He was defeated in 1716 when Farrukhsiyar gave the responsibility to Jai Singh Sawai of Amber to lead a campaign against the Jats. Badan Singh (1722–1756), a nephew of Churaman, styled himself as a feudatory of Jai Singh, adopting the humble title of Thakur. He is considered as the real founder of the Jat state of Bharatpur, Deeg and Kumher.

Suraj Mal (1756–1765)

The Jat kingdom attained its zenith under Suraj Mal, the adopted son and successor of Badan Singh, who had gradually relegated to him the direction of state affairs. Suraj Mal had remarkable talents for war and diplomacy, and successfully welded the scattered Jat zamindars near Agra into a powerful state. Though internally it remained a tribal confederacy, and no new principles of administration were enunciated, the rise of a Jat

state had a definite impact on the state system of north India, and affected land holding and social developments over a large area, especially under the reign of Suraj Mal. The diplomatic relations with the Ahmed Shah Abdali, Rohilla Afgans and Marathas during 1757 to 1760 kept Suraj Mal relinquishing many of his interests in the Doab region,

After the defeat of the Marathas and subsequent withdrawal of Ahmed Shah Abdali from the region, Suraj Mal regained control with the help of unscathed army and load of treasures. He started his expeditions over Agra, Mewar, Delhi into the districts of Gurgaon and Rohtak, thoroughly stripping the forts of their valuables. These expansionist activities brought him to a clash with Najibuddaulah, the vice-regent of Delhi. In 1763, Suraj Mal was ambushed by the Pathans near Delhi on the banks of river Hindan and shot dead.

The Marathas (1649–1748)

Marathas became powerful after the departure of Nadir Shah.

Shivaji played a pivotal role in liberating India from Muslim rule.

It was he who initiated the strategy of guerilla warfare. The first major threat to Mughal imperial power came from a confederacy known as the Marathas. Located in the mountainous regions of the Deccan, the Marathas were mainly drawn from the lowest caste of society, but they became a powerfully militant community under their ruler, King Shivaji, who died in 1680. Under his leadership, the Marathas managed to carve out their own kingdom in 1646.

Aurangzeb, the last great conqueror of the Mughal rulers, defeated the Marathas and annexed their territories, but the Marathas never put down their arms. They could never be defeated by the Mughals because they adopted guerrilla warfare tactics and took to hiding and living in the forests. By 1740, the Marathas controlled more territory than the Mughals. In the late eighteenth century, the kingdom of Mysore and the Maratha confederacy were the major obstacles in the British attempt to control the economy of India.

The British, under General Wellesley, defeated the Maratha chieftains, Scindia and Holkar, but the Maratha chieftains continued to rebel all throughout the early decades of the nineteenth century. The British, under General Wellesley, defeated the Maratha chieftains, Scindia and Holkar, but the Maratha chieftains continued to rebel all throughout the early decades of the nineteenth century. Shivaji was the most powerful among the Maratha rulers. He conquered the forts of Torna, Rajgarh, Purandhar, etc. and became an independent ruler.

Shivaji Bhonsle (1627–1680)

Shivaji was a resolute and ferocious fighter and is regarded as the founder of the Maratha nation. He took advantage of the deteriorating condition of the Mughal rule and established his own principality near Pune, which was later made the Maratha capital. Using guerrilla war technique, he was able to sustain and expand his army. He soon had money, arms and horses.

Shivaji conducted a series of successful campaigns in the 1660s against the Mughals. In 1674, he adopted the title of Chhatrapati, 'Lord of the Universe'.

Shivaji's war cries were swaraj and goraksha. Aurangzeb persistently chased Shivaji's successors between 1681 and 1705, but finally he had to retreat to the north as his treasury was being depleted. In 1717, a Mughal envoy entered into a treaty with the Marathas authenticating their claim to rule the Deccan. The Marathas soon annexed Malwa from Mughal control and thereafter moved into Orissa and Bengal.

Later South India also came under their control. Though the Marathas had great military prowess and leadership, they were not efficient enough to administer the state or to bring socio-economic reform.

Following a policy of plunders and indiscriminate raids, they annoyed the peasant class. They were respected for stirring the Maharashtrian pride rather than for attracting loyalty to an all-India confederacy

They were left alone prior to the attacks of Afghan forces led by **Ahmad Shah Abdali**. Abdali defeated them on the battlefield at Panipat, in1761.

The Marathas became powerful after the departure of Nadir Shah, under the leadership of the Peshwas—Balaji Vishwanath, Bajirao I and Balaji.

They conquered the Deccan kingdoms and aspired to bring Delhi and Punjab under their control. They entered into an alliance with the Delhi court against Najib-ud-daulah.

In 1757, they captured Delhi and in 1758 conquered Punjab by defeating Timar Shah (Abdali's son). The **Third Battle of Panipat**, fought between Ahmed Shah Abdali and the Marathas in 1761, ended the Maratha power.

War with Shivaji   Shivaji was the most powerful Maratha king and an arch enemy of Aurangzeb. When Aurangzeb could not eliminate him, he conspired with Jai Singh of Amber, a Rajput, to eliminate Shivaji. In 1665, on an assurance given by Jai Singh, Shivaji visited Aurangzeb's court. Shivaji was imprisoned by Aurangzeb but he managed to escape and in 1674 proclaimed himself as an independent monarch. He died in 1680 and was succeeded by his son Sambhaji, who was executed by Aurangzeb. Sambhaji was succeeded by his brother Rajaram and after his death in 1700, his widow Tarabai carried on the movement.

Rise of Autonomous States

With the declining poser of the Mughal empire in the eighteenth century, there emerged various autonomous states in India.

Some of the important ones are listed here:

1. Bengal under Murshid Quli Khan
2. Oudh (Awadh) under Sadat Khan Barhan-ul Mulk
3. Hyderabad under Nizam-ul-mul Asaf Jah
4. Carnatic under Saadatullah Khan
5. Mysore under Hyder Ali
6. Jats under Churaman and Surajmal
7. Sikhs under Ranjit Singh

MODERN INDIA

Portuguese traders were the first to discover a sea-route to India free from Turkish threat in 1498. They were followed by the Dutch in 1595 and the English in 1600 and finally the French in 1664 who also came to India for trade.

Portuguese   In 1498, it was Vasco-da Gama a Portuguese sailor who first discovered a sea-route to India via the Cape of Good Hope. He arrived at Calicut on 27 May 1498. The Portuguese soon established political power along the west coast of India. He was succeeded by Captain General Alfonso de Albuquerque who conquered Goa in 1510.
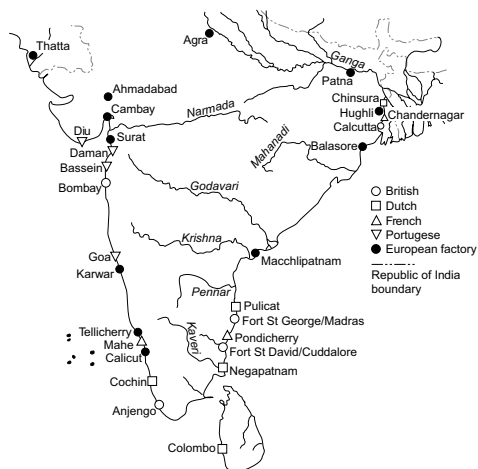
Map 2.9   Location of Various Colonies in India

This map is a sketch only, drawn not to scale, presented for reference and to aid understanding of concept discussed.

Dutch   The first fleet of the Dutch reached India in 1595 and Dutch East India Company was formed in 1602, but their influence soon vanished. In 1605 they established their first factory in Masulipattam, followed by more factories in Pulicat (1610), Surat (1616), Bimilpatam (1641), Karikal (1645), Chinsura (1653), Kasimbazar (1658), Baranagore (1658), Patna and Balasore (both 1658) and Cochin (1663). Till 1690, Pulicat was their chief trade centre and afterwards it shifted to Negapatnam. The Anglo-Dutch rivalry was at its peak during late 17th and early 18th century till the Dutch collapsed with their defeat by the English in the battle of Bedera in 1759.

English   The English East India Company was formed in 1600 through a Charter signed by Queen Elizabeth I granting permission to trade with India. Captain Hawkins paid a visit to the court of Jahangir in 1608 but failed to secure trading rights. However, in 1613, on Sir Thomas Roe's visit they were permitted to establish their first factory at Surat. Gradually the Company established its trading centres at Bombay, Calcutta and Madras. The English established their settlements/factories in Masulipattam (1611), Agra, Ahmedabad, Baroda, Broach (all 1619), Armagaon near Pulicat (1626), Hariharpur and

Balasore (1633), Patna, Dacca, Kasimbazar in Bengal and Bihar (1835), Madras (1639) to establish Fort St George, Hugli (1651), a network of settlements in Bihar, Bengal and Orissa (1658), Bombay (1668), Sutanuti (1690), Kalikota and Govindpur (1698). Sutanuti, Kalikota and Govindpur were later joined together in to a new city 'Calcutta' and the factory at Sutanati was fortified in 1700 and named 'Fort William'. During 1686, the English declared war against Mugal Emperor Aurangzeb in which the English lost all control of its settlement and factories in India to Mughals in 1688–89. In 1690, the surrendering British were pardoned by Mughal Emperor. In 1691, the English were granted 'farman' by Aurangzeb which exempted the British Company from payment of customs duties in Bengal. Faruk Siyar granted British another 'farman' in 1717, thus extended the privilege to British in Gujarat and Deccan.

French   The French came to India in 1664 and set up centres near Madras and Chandernagore on the Hooghly, West Bengal, to trade with India. They also established naval bases in the islands of Bourbon and Mauritius in the Indian Ocean. They flourished initially till 1706, but afterwards decline occurred till 1720. It was under governors Le Noir and Dumas that the French regrouped in India. However, during 1742 the French governor Joseph François Dupleix started repulsing the English power which resulted in 'Carnatic Wars' and finally resulting in French defeat.

Danish   In 1616, the East India Company, Denmark reached Indian coasts and established settlements in Tranqubar in Tamil Nadu (1620) and Serampore in Bengal (1676). However, due to rising presence of the British they had to sell all their settlements to the British during 1845.

East India Company and British Rule

On arriving in India the East India Company had to face Dutch and French opposition as they were the main contestants for political supremacy over India. But the British were successful in destabilizing them and soon the Company's functions expanded into political ambition.

Robert Clive   He led the English forces to capture Arcot and other regions. He was instrumental in laying the foundation of the British empire in India. In the Carnatic Wars between the French and the English the latter finally defeated the French in the Battle of Wandiwash to gain control over South India.

English Conquest of Bengal   Nawab Alivardi Khan was an independent ruler of Bengal between 1740–56. He in fact extended protection to the European merchants in carrying on their trade. Alivardi Khan nominated his grandson (daughter's son) Siraj-ud-Daula as his heir since he had no son. He died in April 1756. In the meantime the Company constructed fortifications at Calcutta and violated the terms under which they were allowed to trade. Siraj-ud-Daula took prompt action and occupied an English factory at Kasimbazar and later captured Calcutta in June 1756.

Black-hole Tragedy   English prisoners were said to have been crowded into a small chamber with inadequate air ventilation on a very hot summer night (20 June 1756). on a hot summer night of 20 June 1756. As a result several English prisoners died of suffocation and wounds.

In December 1756, Colonel Clive and Admiral Watson reached Bengal from Madras and captured Calcutta.

Mir Jafar, brother-in-law of Alivardi Khan, had a secret pact with Clive who promised him the same state of Bengal. Mir Jafar nevertheless also assured his support to Siraj-ud-Daula against the English.

- **Battle of Plassey (1757)** Robert Clive led the Company's forces against Siraj-ud-Daula's army on 23 June 1757 and defeated them with the help of his conspiracy with Mir Jafar. This proved to be the first step towards territorial supremacy and paved the way for the British conquest of Bengal and eventually the whole country.

  The Nawab was captured and executed and Mir Jafar was installed as the Nawab of Bengal. He ceded Zamindari rights to Twenty four Parganas and got ₹1,67,00,000 as compensation. This was the first British acquisition of Indian territory.

- **Battle of Buxar (1764)** At the instigation of Mir Qasim, successor of Mir Zafar, this battle was fought by Nawab Shuja-ud-Daula of Awadh and Shah Alam II (Mughal) on one side and the English forces led by Clive on the other side. Clive's forces were victorious resulting in the capture of Bihar and Bengal.

Map 2.10 The British in Bengal during 1756–1765

This map is a sketch only, drawn not to scale, presented for reference and to aid understanding of concept discussed.

The Carnatic Wars

First Carnatic War (AD 1746–48) The French and the British companies clashed at Carnatic. Duplcix was then the chief official of the French Company at Pondicherry. The French opened hostilities by sacking Fort St George and expelled all Englishmen. The Nawab of Carnatic sent an army but was defeated.

Second Carnatic War (AD 1749–54) The British were able to consolidate themselves by taking hold of Bengal, Bihar and Orissa. The second battle between the French and the British took place in 1760 in which the French were defeated. It ended with the Treaty of Paris in 1763 which foiled the dreams of the French to have an empire in India.

War with Marathas The First Anglo-Maratha war (AD 1775–82) took place during the governor-generalship of Warren Hastings. The war ended with the Treaty of Salbai, 1782 and status quo restored.

Mysore War   Mysore was a powerful state under Haider Ali. In 1769 the first Anglo-Mysore war was fought in which the British forces were defeated. Haider Ali occupied almost the whole of Carnatic. However, in 1781, Haider Ali was defeated at Porto Novo and saved Madras. After Haider Ali, the war was carried on by Tipu Sultan. A peace treaty was then signed. However, in 1789 another war was launched and Tipu Sultan was defeated in 1792.

First Governor   In 1758, Robert Clive was appointed the first Governor of Bengal by the East India Company. Clive remained in England from 1760–65 and on his return in 1765, the emperor ceded to the Company the Diwani of Bengal, Bihar and Orissa.

Notable Rules in India (1720–1949)

Saadat Khan Burhan-ul-Mulk (1722–39)—Awadh; Safdar Jung (1739–54)—Awadh; Shuja-ud-daulah (1754–75)—Awadh; Asaf-ud-daulah (1775–97)—Awadh; Wazir Ali (1797–98)—Awadh; Nizam-ul-Mulk Asaf Jah (1724–48)—Hyderabad; Nasir Jung (48–50)—Hyderabad; Muzaffar Jung (1750–51)—Hyderabad; Salabat Jung (1751–60)—Hyderabad; Nizam Ali (1760–1803)—Hyderabad; Sikandar Jah (1803–29)—Hyderabad; Nasir-ud-daulah (1829–57)—Hyderabad; Afjal-ud-daulah (1857–69)—Hyderabad; Mahabat Ali Khan (1869–1911)—Hyderabad; Osman Ali Khan (1911–49)—Hyderabad; Hyder Ali (1761–82)—Mysore; Tipu Sultan (1782–99)—Mysore; Ranjit Singh (1792–1839)—Punjab.

Nawabs of Bengal (1717–72)

Murshid Quli Khan (1717–27); Suja-ud-din (1727–39); Sarfraz Khan (1739–40); Alivardi Khan (1740–56); Siraj-ud-daulah (1756–57); Mir Jafar (1757–60); Mir Qasim (1760–63); Mir Jafar (1763–65); Najm-ud-daulah (1765–72).

British Rule

Governor-generals of India and Reforms

Warren Hastings (1772–85)   Warren Hastings succeeded Clive in 1772 and became the first Governor-General of India. He introduced several reforms, established civil and criminal courts and courts of appeal. He passed The Regulating Act, 1773 giving a legalized working constitution to the Company's dominion in India. It envisaged a Council of Ministers headed by the Governor-General.

The Pitt's India Act, 1784 was passed by the British Parliament to put the Company's affairs in permanent centralized control of the British Parliament.

Governors Between Clive and Hastings

John Zephaniah Holwell succeeed Robert Clive as Governor of Bengal in 1760. But he was replaced with **Henry Vansittart** in the same year. **Vansittart** officiated as Governor till 1765, till the return of **Robert Clive** for his second term as governor. But as Clive's health deteriorated in 1765, he was succeeded by **Harry Verelst** (1767–69) and then **John Cartier** (1769–72) before Warren Hastings was sent to India in 1772.

Lord Cornwallis (1786–93) Lord Cornwallis succeeded Hastings in 1787. He introduced a new revenue system under the Permanent Settlement of Bengal in 1793 with a view to stabilize land revenue and create a loyal contented class of Zamindars. This abolished periodic auction of Zamindari rights and established permanent Zamindari rights to collect land revenue from the tenants and payment of a fixed amount to the Government treasury every year.

Lord Wellesley (1798–1805) During the governor-generalship of Lord Wellesley, the Fourth Mysore War (1799) was fought. This was the last Mysore war. Tipu Sultan, after regaining lost strength, set out again on his plan to oust the British from India with the help of Napolean and the Persian king. Lord Wellesley visualizing danger, sought an alliance with the Nizam and the Marathas and defeated Tipu Sultan in 1799 who died valiantly fighting the British.

Besides war, Wellesley depended on a systems of subsidiary alliances to expand British territories whereby the ruler of an aligning state was compelled to accept permanent stationing of a British force within his territory and pay subsidy for its maintenance. Sometimes a territory was added in lieu of payment. A ruler also had to accept a British resident. They were not allowed to employ any European without British approval nor negotiate with any Indian ruler without consulting the Governor-General. Thus, subsidiary allied lost sovereignty in external matters, while the British resident interfered in internal administration, thus the rulers lost control over their territories.

Lord Hastings (1813–23) Under the governorship of Lord Hastings Nepal, was defeated in 1814, resulting in Nepal ceding Garhwal and Kumaon to the British. In 1818, the Marathas made a last attempt to regain their independence. This led to the third Anglo-Maratha war in which the Marathas were completely crushed.

During Hastings' tenure various reforms were initiated such as the Ryotwari settlement according to which direct settlement was made between the government and the Ryots (cultivators). The revenue was fixed for a period not exceeding 30 years on the basis of quality of soil. Half the net value of the crop was to be given to the Government. During this period special attention was paid to education, building of roads, bridges and canals.

Lord William Bentinck (1828–35) He was famous for the social reforms he introduced, such as abolition of Sati (1829), suppression of Thuggee, suppression of female infanticide and human sacrifices. English was introduced as a medium of higher education on the advice of his council member, Thomas Babington Macaulay. Lord Bentinck also made a pact with Maharaja Ranjit Singh, the ruler of Punjab. By the Charter Act 1833, the Company ceased to be a trading company and became an administrative power. He also adopted some corrective measures in the civil services. However, it was Cornwallis who founded the British Civil Service in India.

Raja Ram Mohan Roy and Brahmo Samaj Ram Mohan Roy lived during the nineteenth century. He was a religious and social reformer and founder of the Brahmo Samaj (1829).

Through this society, he abolished idol worship, caste system and several complicated rites and rituals. His earliest brush with social reform came when he wrote an article in a Bengali magazine condemning idol worship. He joined the East India Company in 1805, and during his 10 years of service, he was exposed to the Western culture and Christianity. He retired in 1815, settled in Kolkata and became an social activist. He was instrumental in getting an ordinance prohibiting Sati passed in 1828, during Bentinck's tenure.

Understanding the need of learning English language and Western sciences, he toiled hard to create opportunities for Indians.

In 1823, he agitated against the government, protesting the imposition of a ban on printing presses and newspapers. He started his own paper called 'Lotus of Enlightenment' (*Sambad Kaumudi*).

He was conferred with the title 'Raja' and sent to England on pension by the Mughal emperor, Akbar II, in 1831 as an ambassador from his court. He died in Bristol in 1833. Brahmo Samaj was later renamed as Adi Brahmo Samaj under the leadership of Devendranath Tagore, and Sadharan Brahmo Samaj, under the leadership of Keshab Chandra Sen, in 1836.

Sir Charles Metacalfe (1836–44)   He was notable for removing restrictions on the press and media.

Lord Hardinge (1844–48)   During his period the First Sikh War (1845) was fought between the Sikhs and the British. The Sikhs were defeated and were brought under British control.

Lord Dalhousie (1848–56)   Lord Dalhousie succeeded Lord Hardinge in 1848. During his period, the Second Sikh War (1849) was fought, in which the Sikhs were defeated again and the Dalhousie was successful in annexing the whole of Punjab to the British administration.

The Doctrine of Lapse was introduced by Lord Dalhousie, whereby in the absence of a natural heir, the sovereignty of Indian states was to lapse to the British and such rulers were not permitted to adopt a son to inherit their kingdoms.

Reforms   The first railway line between Bombay and Thane was opened in 1853 and in the same year Calcutta and Agra were connected by telegraph. Other reforms include setting up of P.W.D. and passing of the Widow Remarriage Act, (1856).

Ramakrishna and Vivekananda   Ramakrishna Paramahansa (1836–86) a priest at a temple in Dakshineshwar near Calcutta emphasized that there are many roads to God and salvation and that service to man was service to God. His great disciple, Swami Vivekananda (1863–1902) popularized his religious message and founded Ramakrishna Mission in 1896.

Sir Syed Ahmed Khan and the Muslim Movements   In India two major reform movements brightened spiritual reawakening among the Muslims – the Aligarh

Movement, which started in Arabia with the Wahabi Movement, and the Deoband Movement, which started at Deoband in Saharanpur District, Uttar Pradesh. The Aligarh Movement can be classified into four different movements, which were named after their leaders: (i) Shah Abdul Aziz (Delhi), (ii) Sir Syed Ahmed Khan (Bareilly), (iii) Sheikh Karamat Ali (Jaunpur) and (iv) Hazi Sheriatullah (Faridpur). Among them Sir Syed Ahmed Khan (1817–1898) is of prime significance. He stressed upon English education among Muslims. In 1875, he opened the Anglo-Oriental College in Aligarh. The **Deoband Movement** began in 1867, with an aim of uniting all Muslims, to preach the basic principles of Islam and the philosophy of Shavaliulla (a great theologist) and to educate Muslims. The prominent leaders of this movement were Rashid Ahmed Ganguli (1882–1905) and Muhammad Qasim Nanautavi (1837–1880).

The important difference between the Aligarh and the Deoband movements is that the Deoband agitation patronized the Congress agitation, but the Aligarh Movement stayed away from the national agitation and argued that the Muslims have to cooperate with the English in their own interest.

Swami Dayananda Saraswati and the Arya Samaj   The Arya Samaj was founded in 1875 by Swami Dayananda Saraswati in order to reform Hindu religion in North India.

He was born in Tankargaon in Gujarat. His early name was Mula Shankar and he became an atheist after a series of deaths in his family. He believed that there was only one God and that God should be worshipped in spirit and not in the form of idols and images. He also wrote *Satyarth Prakash*. The Arya Samaj mooted a slogan 'Go back to the Vedas' and emphasized that the Hindu religion can be improved if it relied solely upon the principles of the Vedas. He established the Arya Samaj in Mumbai and Lahore that later attracted many followers from all over India. The Arya Samaj believed in celibacy, asceticism, a casteless society and social service. It introduced several reforms to eradicate untouchability, child marriage and illiteracy. Lala Lajpat Rai and Swami Sharadananda contributed to Arya Samaj towards the end.

INDIAN FREEDOM STRUGGLE

First War of Independence

Also called the *Sepoy Mutiny* or the *Revolt of 1857*. On 29 March 1857, during the vice-royalty of Lord Canning, an Indian sepoy of the 34th regiment, Mangal Pandey, killed two British officers on parade at Barrackpore. The Indian soldiers present on parade refused to obey orders to arrest Mangal Pandey. However, he was later arrested, tried and hanged. The news spread like wild fire to all cantonments in the country and very soon a countrywide sepoy revolt broke out from Lucknow, Ambala, Burhanpur and Meerut.

Table 2.3   Popular Movements and Revolts Up to 1857

Year	Movement/Mutiny
1828	Ahoms Revolt against the Company for non-fulfilment of pledges after the Burmese War
1829	1st Kol Rising against dismantling of forts of independent Kol tribes
1831	Kol Rising of Chhotanagpur against the transfer of land from heads of kol tribesmen to outsiders
1833	Khasi Rising in the hilly region of Jaintia and Garo Hills. The revolt was lead by Tirath Singh, the ruler of Nunklow and resented by Khasis in the region
1838	Farazi Movement under the leadership of Titu Mir—it later merged into the Wahabi Movement
1839	2nd Kol rising
1844	3rd Kol rising
1844	Surat Salt Agitation against raised salt duty
1844	Mutiny of the 34th Native Infantry
1844	Kolhapur and Savantvadi Revolts
1849	Mutiny of the 22nd Native Infantry
1850	Mutiny of the 66th Native Infantry
1852	Mutiny of the 37th Native Infantry
1855	Santhal rebellion in the Rajmahal hills region of Bihar
1857	Revolt of sepoys of 3rd Cavalry at Meerut and later mutinies in Punjab, Mathura, Lucknow, Bareilly, Shahjahanpur, Kanpur, Banaras, Jhansi, Allahabad and many other places in North India

On 10 May 1857, soldiers at Meerut refused to touch the new Enfield rifle cartridges which were said to have a greased cover made of animal fat. The soldiers along with other groups of civilians, went on a rampage, broke open jails, murdered Europeans and marched to Delhi. The appearance of the marching soldiers next morning in Delhi was a signal to the local soldiers, who in turn, also revolted, beseiged the city and proclaimed the 80 year old Bahadur Shah Zafar as the Emperor of India.

Spread of the Revolt

The rebellion soon engulfed much of North India, including Awadh and various areas that were once under the control of Maratha princes. The capture of Delhi and the proclamation of Bahadur Shah as the Emperor of Hindustan (*Shahenshah-e-Hindustan*) gave a positive meaning to the revolt and provided a rallying point for the rebels by recalling the past glory of the imperial city. The revolt at Meerut and the capture of Delhi were the precursors to a widespread mutiny by the sepoys and rebellion almost all over North India, as well as in central and western parts of the country. The south remained quiet and Punjab and Bengal were marginally affected. Isolated mutinies also occurred at military posts in the centre of the subcontinent. The Revolt of 1857, an unsuccessful but heroic effort to eliminate foreign

rule, had begun. The civil war inflicted havoc on both the Indians and the British as each vented its fury on the other. The last major sepoy rebels surrendered on 21 June 1858, at Gwalior (Madhya Pradesh), one of the principal centres of the revolt. A final battle was fought at Sirwa Pass on 21 May 1859 and the defeated rebels fled to Nepal.

Significance of the Revolt

The important element in the revolt lays in Hindu–Muslim unity. People exhibited patriotic sentiment without the touch of communal feelings. All rebels, irrespective of their religion, recognized Bahadur Shah as their emperor. It no doubt began as a mutiny of soldiers but soon turned into a revolt against the British rule in general.

Failure of the Revolt

The rebels dealt with a powerful blow when the British captured Delhi on 20 September 1857 and imprisoned Emperor Bahadur Shah. The British military then dealt with the rebels in each centre, by term. The Rani of Jhansi died fighting on 17 June 1858. Nana Saheb refused to give in and finally escaped to Nepal in January 1859, hoping to renew the struggle. Kunwar Singh died in May 1858, trying to escape from the British and Tatya Tope, who successfully carried out guerrilla warfare against the British until April 1859, was betrayed by a fellow rebel and was captured and put to death by the British, thus reestablishing British authority over India.

Causes of Failure of the Mutiny

1. Disunity of Indians and poor organization.
2. Lack of complete nationalism—Scindia, Holkars, the Nizam and others actively helped the British.
3. Lack of coordination between sepoys, peasants, zamindars and other classes.
4. All participants had different motives for participating in the revolt.

Name of the Movement & its Course of the Movement and Consequence

Chuars [Nanbhum and Barabhum (West Bengal) in the years 1768, 1832]:   Defiance of the British authority by huars; suppression of the revolt by the British through use of force as well as conciliatory measures.

Bhils [Khandesh (Maharashtra) in the years1818, 1848]:   Beginning of revolt of Bhils with the British occupation of khandesh and their defiance of the British for 30 years; fi nal suppression through military operations combined with conciliatory measures.

Hos [Singhbhum and Chota Nagpur in the years 1820, 1822, 1832]:   Occupation of Singbhum by the British and revolt of the Hos, its suppression after extensive military operations; their revolt again in 1832.

Kolis [Sahyadri Hills (Gujarat and Maharashtra) in the years 1824, 1828, 1839, and 1844–1848]:   Repeated revolts of Kolis and their final suppression after the capture of all their leaders.

Khasis [Khasi Hills (Assam and Meghalaya) during1829–1832]:   Tirut Singh and Bar Manik (Chiefs of Nounklow and Molim, respectively) were important leaders; Unsuccessful attempts of the Khasis to drive away the British from their territory.

Singphos [Assam during 1830–1839]   Suppression of 1830 revolt by Captain Neufville; murder of Colonel White (British political Agent of Assam) by Singhphos in 1839 but ultimately defeated by the British.

Kols [Chota Nagpur (Jharkhand) during 1831–1832]:   Under the leadership of Buddoo Bhagat; Suppression of the revolt after extensive military operations by the British and death.

Koyas [Rampa Region (Chodavarn in Andhra Pradesh) in the years 1840, 1845, 1848, 1861–1862, 1879–1880]:   Under the leadership of Alluri Sitaramaraju; Repeated revolts of the koyas the major ones being the 1879–1880 and 1922–1924 revolts; capture and execution of Raju by the British in May 1924.

Khonds [Khondmals (Orissa) during 1846–1848]:   Under the leadership of Chakra Bisayi; the first two revolts led by Bisayi were suppressed with great difficulty by the British.

Santhals [Rajmahal Hills (Bihar) during 1855–1856]:   Under the leadership of Sidhu and Kanhu; Revolt of Santhals and establishment of their own government (July 1855); defeat of the British under Major Burrough by Santhals transfer of the disturbed area to the military and final suppression of the revolt by the end of 1856; creation of separate district of Santhal Paragans to prevent Santhals from revolting again in future.

Naikdas [Panch Mahals (Gujarat) during 1858–1859, and 1868]:   Under the leadership of Rupsing and Joria Bhagat; Revolt of Naikdas under Rupsingh in 1858 and conclusion of peace between the British and Rupsing in 1859; their revolt again in 1868 and establishment of a kingdom with Joria as the spiritual head and Rupsing as temporal head; suppression of the revolt after the capture and execution of Rupsing and Joria

Kacha Nagas Mundas [Cacher (Assam) Chota Nagpur during the year 1882, and 1899 –1900]:   Under the leadership of Sambhudan Birsa Munda; foundation of a new religious sect by Birsa, with Singh Bonga as the only true God. The British feared over Birsa's preachings among Mundas and arrest and imprisonment of Birsa. Release of Birsa and revival of his doctrine; revolt of Mundas and their attack on churches and police stations (1899); defeat of Mundas by the British (Jan 1900), and capture of Birsa (he died of cholera in jail in June 1900)

Bhils [Banswara and Dungapur (southern Rajasthan)]:   Under the leadership of Govind Guru; It began as a purification movement but later developed into a political movement; failure of their attempts to set up a Bhil Raj due to the British armed intervention.

Oraons [Chotanagpur in the year 1913]:   Under the leadership of Jatra Bhagat

Thadoe Kukis [Manipur during 1914–1915]:   Under the leaders like Jadonang and Rani Gaidinliu.

British Rule After the Revolt

Government of India Act 1858   Queen Victoria issued a proclamation on 1 November 1858 placing India under the direct governance of the Crown. The proclamation was called the *Magna Carta of Indian Liberty.*

Indian National Congress
The Indian National Congress was formed in 1885 by A. O. Hume, an Englishman and a retired civil servant, in association with various national leaders. He called for a

conference in Pune in December 1885. The conference received the unanimous support of all Indian leaders who decided to rename the Indian National Union as Indian National Congress (INC).

The first session of the Congress was held in Bombay under the presidentship of W. C. Banerjee. With the foundation of the Indian National Congress, the struggle for India's independence was launched.

Noteable Movements

Nair Movement—during 1891–1919 in Travancore [notable leader: C. V. Raman Pillai and K. Ramakrishna Pillai]

Nadar Movement—during 1910 in Tamil Nadu [notable leader: NA]

Justice Movement—during 1915–1916 in South India [notable leader: C. N. Mudaliyar, T. M. Nair and P. T. Chetti]

Self Respect Movement—during 1925 in Tamil Nadu [notable leader: E. V. Ramaswami Naicker (Periyar)]

Ezhava Movement—during 928 in Kerala [notable leader: Nanu Asan (Narayan Guru)]

Satyashodhak Movement—during in 1872 [notable leader: Maharashtra Jyotiba Phule]

Mahar Movement—during 1920 in Maharashtra [notable leader: B. R. Ambedkar]

Kaivartas—during 1897 in Midnapur (Bengal) [notable leader: NA]

Namshudras—during 1901 in Faridpur (Bengal) [notable leader: NA]

Indigo Movement—during 1859–1860 in Bengal [notable leader: Dina Bandhu Mitra]

Pabna Movement—during 1872–1885 in East Bengal [notable leader: Keshab Chandra Roy and Sambhunath Pal]

Deccan Riots—during 1875 in Maharashtra [notable leader: NA]

Punjab Peasant Movement —during 1890–1900 in Punjab [notable leader: NA]

Champaran Movement—during 1917 in Bihar [notable leader: Gandhi, Rajendra Prasad, A. N. Sinha, J. B. Kriplani, Mazhar-ul Haq and Mahadev Desai]

Moderate Period (1885–1905)

At first, the Congress was a moderate, constitutional movement. In its early days, the party confined itself to an annual debate where political issues were discussed. It asked the government to remedy complaints, but had no constitutional role. However, some Congress members were also members of the Legislative Assembly, which advised the viceroy and the executive committee on the drafting of new laws. The cause of the Indian National Congress spread rapidly among middle-class Indians. With the founding of the Indian National Congress, the struggle for India's independence was launched in small, hesitant and mild but organized manner. The first two decades of the Indian National Congress are described in history as one with moderate demands and a sense of confidence in British justice and generosity. Its aim was not to be aggressive in attaining independence lest the British should suppress them. This resulted in the Indian Council Act in 1892 which allowed some members to be indirectly elected by Indians but kept the official majority intact.

Partition of Bengal

To destroy the political influence of the educated middle class, the partition of Bengal came into effect on 16 October 1905 by a royal proclamation, reducing the province of Bengal

in size, by creating a new province of East Bengal, which later became East Pakistan and the present day Bangladesh.

Swadeshi Movement (1905)

On 7 August 1905, the Indian National Congress adopted a resolution to boycott British goods. Bonfires of foreign goods were conducted on a large scale in all the major cities.

Muslim League (1906)

In 1906, an all India Muslim League was set up under the leadership of Aga Khan, Nawab Salimullah of Dacca and Nawab Mohsinul-Mulk. It supported the partition of Bengal. This led to communal differences between Hindus and Muslims.

Terrorist Movement

The terrorist movement in India started after many Indian leaders including **Lala Lajpat Rai** and **Sardar Ajit Singh** were deported to Mandalay in 1907, without a trial. This agitated young leaders such as **Barindra Kumar Ghosh** and **Bhupendra Nath Dutt** in Calcutta and they plotted to blow up the train in which the Lt. Governor of Bengal Presidency, Sir A. Frazer, was travelling. Later, the terrorist movement gained popularity and the programme of political assassination and armed dacoity with a view to secure money for their cause gathered momentum. The terrorists argued that the unmitigated evil, that was the British rule could be eliminated from India only by violence and no amount of arguments and moral persuasion was useful. The main centres of their activities were Bengal, Punjab and Maharashtra.

The Gadar Movement   In 1907, **Lala Hardyal** came under the influence of the revolutionaries working in Oxford and started a weekly paper called Gadar. His subsequent associations with more leaders culminated into the formation of the Gadar Party in 1913, in North America. The Gadar movement planned to (a) temper the loyalty of the Indian troops, (b) assassinate the British officials, (c) court foreign enemies to Britain and (d) form secret societies and propagate seditious literature.

The Gadar movement's anti-British sentiment was intensified because of the **Komagata Maru episode**. To challenge the discriminatory immigration law of Canada, Gadar activists hired a Japanese ship called *Komagata Maru* and took 500 passengers from India to Canada. The passengers, who were mainly Sikh were led by **Baba Gurdip Singh** and had the full support of Lala Hardyal.

When the ship reached Vancouver on 22 May 1914, it was denied to berth; the ship waited in vain for more than 2 months before returning to Kolkata on 26 September 1914. The police rounded up the passengers despite stiff resistance. The death toll that day reached 22, with many wounded passengers also. Most of the captured passengers were sent to jail. The Gadar movement got a fillip because of this incident.

Surat Session: Split in Congress (1907)

Confrontation at the Session   The Indian National Congress split into two groups—the extremists and the moderates—at the Surat session in 1907 held on the banks of the Tapti river. The extremists were led by Lokmanya Tilak, Lajpat Rai and Bipin Chandra Pal and the moderates were led by Gopal Krishna Gokhale. At the Surat session, the moderate

and extremist delegates of the Congress met in an atmosphere surcharged with excitement and anger.

OTHER REVOLUTIONARY EVENTS

- Murder of W. C. Rand and Lt. Ayerst by **Chapekar brothers** at Poona in 1897.
- Formation of the **India House in London** (1905) by **Shyamji Krishna Verma and V. D. Savarkar**.
- Establishment of the **India House in New York** by **Barkatullah and S. L. Joshi**.
- Attempted murder of **Lt. Governor Fuller** of East Bengal by **Barindra Kumar Ghosh** and **Bhupendranath Dutta** in 1906.
- The **Kennedy murder** in 1908, in which two English ladies were killed when **Khudi Ram Bose** attempted to kill Magistrate Kingsford of Muzaffarabad who escaped unhurt.
- **Madan Lal Dhingra** murdered Curzon-Willie, an offi cial in the British India Offi ce at London.
- Attempted assassination of Lord Hardinge when he was approaching Delhi in 1912. **Rash Bihari Bose** and **Sachin Chandra Sanyal** missed their target.
- Formation of the **Berlin Committee in Germany** (1914) by **Virendranath Chattopadhayaya, Dr Avinash Chandra Bhattacharya** and other prominent activists who formed the **Anushilan** and **Yugantar** groups in India.
- 'Bagha Jatin', **Jatin Mukherji**, carried out the **Plan of Bengal** in 1915, which aimed at disrupting the rail and communication network in Bengal and seizing Fort William. The plan failed because of the lack of coordination and the death of 'Bagha Jatin' in 1915.
- Formation of the **Indian Independence Committee** in 1915 under the **Zimmerman Plan** organised by the German offi cials at Berlin. The committee included **Virendranath Chatopadhyay, Lala Har Dayal** and **Bhupendranath Dutta**.
- Appointment of the **Provisional Government of Free India** with **Raja Mahendra Pratap** as the President and **Barkatullah** as the Prime Minister, with support from Germany, Afghanistan and the Sultan of Turkey. However, the Czar of Russia did not approve of the government because of the defeat of Germany in the World War.
- In 1915, revolutionaries looted a train which carried government cash at a place called **Kakori** (between Lucknow and Shahjahanpur). The involved activists were arrested and sentenced to death by the British. Among them were **Bhupendra Sanyal, S. N. Biswas, Ashfaqullah Khan** and **Thakur Singh**.
- **Chandrashekar Azad** joined hands with **Bhagat Singh** and formed the **Hindustan Socialist Republican Party in** 1928. It had two faces—the public face headed by Bhagat Singh, and a secret face, called Hindustan Socialist Republic Army, headed by Azad. It was the first organization which envisioned free India to be secular. Its activists took note of the changing political structure of the nation. _ Bhagat Singh, Azad and Rajguru avenged the death of Lala Lajpat Rai by killing **General Saunders** in 1928.

- Bombing of the Central Legislative Assembly by Bhagat Singh and his associates in 1929.
- Attempted bombing of the train in which Lord Irwin and his family was travelling in 1929 at Delhi.
- Issuing of an independence proclamation in the name of **Indian Republic Army** under the leadership of **Surya Sen** in 1930, when revolutionaries captured the **Chittagong Armoury**. Surya Sen was arrested in 1933, and executed.
- Execution of Bhagat Singh, Rajguru and Sukhdev on 23 March 1931, and the death of Chandrashekar Azad in a shooting episode in Allahabad 1931.
- Assassination of the **magistrate of Tippera** in Bengal, by the school going **Shanti** and **Suniti** in 1932.
- Formation of the **Indian Independence League** by **Ras Bihari Bose** in 1942, in Japan.
- Formation of the **All India Central Revolutionay Committee** in Russia by **M. N. Roy** and other activists.
- **Other Prominent Revolutionaries who Operated Outside India**—P. M. Bapat; **Madam Bhikaji Cama**, a Parsee lady who was connected with the Parsi Indian Society established by S. R. Rana under the inspiration of **Shyamji Krishna Verma**, who unfurled the first tricolour flag at the International Socialist Congress (Germany), designed by Hem Chand Das in 1907; Sardar Sohan Singh, M. P. T. Acharya; Gyan Chand Verma; Obeidullah Sindhi, the translator of V. D. Savarkar's book, *Indian War of Independence* in Tamil; V. V. S. Iyer and Harish Chandra.

Minto–Morley Reforms (1909)

Minto–Morley Reforms were introduced when Lord Minto was the Governor-General of India. They envisaged a separate electorate for Muslims. The government thereby sought to create a rift between the Hindus and Muslims.

Indian National Congress Before World War I

However, certain changes at the turn of the century resulted in changing the mood of the Congress. The most important among them was the change in the attitude of the British. Some of the repressive and oppressive measures of the British promoted the growth of extremism within the Congress. Extremist leaders such as Bipin Chandra Pal, Bal Gangadhar Tilak and Lala Lajpat Rai called on the people to show courage and self-reliance in the cause of India's nationalism. The partition of Bengal in 1905 raised the political temper of the country. The Congress started getting polarized into the moderates and the extremists. This era of militant nationalism prevailed within and without the Congress during 1906–19. The 1906 session of Congress, declared 'Dominion Status' to be the political goal of the Congress and four resolutions on boycott, swadeshi, swaraj and national education were adopted.

Home Rule Movement (1915–16)

Dr Annie Besant, inspired by the Irish rebellion, started a Home Rule Movement in India in September 1916. The movement spread rapidly and branches of the Home Rule League were established all over India. Bal Gangadhar Tilak wholeheartedly supported the movement. He joined forces with Dr Besant and persuaded the Muslim League to support the programme as well.

Indian National Congress During World War I

The Congress reunited in support of the British during World War I but was disappointed soon after the war when the Britain restricted political activity in India. Under the leadership of Mahatma Gandhi the Congress demanded *purna swaraj* (complete independence) and waged periodic campaigns of non-violent civil disobedience. Although leaders of the organization were imprisoned several times, Britain made some concessions in the 1930s.

Lucknow Pact (1916)

The Lucknow Pact of 1916 was an important step in achieving Hindu-Muslim unity. Both the Congress and Muslim League held sessions at Lucknow, where anti-British feelings were generated among the Muslims. This weakened the British attitude and in 1916 a British policy was announced whereby associations of Indians were increased and gradual development of local self-government introduced.

August Declaration of 1917

During World War I, the British claimed that they stood for the protection of democracy around the world. Thus Indians, who fought for them in this war, demanded that democracy should also be introduced in their country. In his famous August Declaration presented before the House of Commons on 20 August 1917, Montague, the Secretary of State for Indian Affairs, said that in order to satisfy the local demands, his government was interested in giving more representation to the natives in India. New reforms would be introduced in the country to meet this objective. The control over the Indian government would be transferred gradually to the Indian people. This was the result of the Hindu-Muslim unity exhibited by the Lucknow Pact.

Gandhian Era (1918–47)

Mahatma Gandhi dominated the Indian political scene from 1918–47. Mahatma Gandhi provided the leadership of the highest order and his philosophy of non-violent *Satyagraha* became the most potent weapon to drive out the British from the Indian soil.

Montague–Chelmsford Reforms

Lord Montague came to India and stayed for six months. During this period he held meetings with different government and non-government people. Finally, in co-operation with Governor-General Lord Chelmsford, Montague presented a report on the constitutional reforms for India in 1918. The report was discussed and approved by the British Parliament and then became the Government of India Act of 1919. This act is commonly known as the *Montague–Chelmsford Reforms.*

Rowlatt Act 1919

During the vice-royalty of Lord Chelmsford, a sedition committee was appointed by the government. The Rowlatt Act 1919 gave unbridled powers to the government to arrest and imprison suspects without trial. Gandhiji decided to fight against this act and he gave a call for *Satyagraha.*

Jallianwala Bagh Massacre (13 April 1919)

Dr Kitchlu and Dr Satyapal were arrested on 10 April 1919 under the above Act which caused serious unrest in Punjab. A public meeting was held on 13 April 1919 in Jallianwala Bagh in Amritsar where thousands of people including women and children assembled.

Before the meeting could start General Dyre, ordered indiscriminate heavy firing on the crowd and hundreds of people were killed and more than 1200 people wounded. It was a turning point in the Indo-British relations and gave strength to Gandhiji's mission.

Khilafat Movement (1920)

During the First World War the safety and welfare of Turkey was threatened by the British, weakening Sultan of Turkey and Caliph's position. The Caliph was looked upon by the Muslims as their religious head. The two brothers Mohammed Ali and Shaukat Ali launched an anti-British movement in 1920 calling it the *Khilafat Movement*. Maulana Abul Kalam Azad also led the movement and it was supported by Gandhi as well as Congress which paved the way for Hindu-Muslim unity.

Non-cooperation Movement (1920)

Hindu-Muslim unity encouraged Gandhi to launch his non-violent, non-cooperation movement. The movement envisaged: surrender of titles, resignation from nominated offices, refusal to attend government work, boycott of foreign goods, etc.

Significance of the Movement This was the first truly nationalist movement of India which brought together almost all working strata of society such as peasants, teachers, students, women and merchants. It acquired a real mass base as it gained momentum and spread across the length and breadth of the country. The Congress also got a facelift with this movement, it gained recognition as an organization for action instead of a mere deliberative assembly. The development of national unity and willingness of people to make sacrifices for the cause of national independence also emerged from this movement.

Phases of Movement

Phase I (Jan–Mar 1921): Educational boycott and boycott of law courts were carried out.

Phase II (Apr–Jun 1921): Operation Tilak Swaraj Fund was organized throughout India.

Phase III (July–Sep 1921): Picketing of shops selling foreign cloth and boycott of foreign cloth.

Phase IV (Nov 1921–Feb 1922): Kisan movement and many local movements were carried out during this phase.

Chauri–Chaura Incident (1922)

As the movement was going on successfully, suddenly a mob of countrymen at Chauri–Chaura near Gorakhpur, clashed with the police and burnt the police-station, killing 22 policemen. This compelled Gandhi to call off the non-cooperation movement on 12 February 1922.

Swaraj Party (1923)

Gandhiji's decision to call off the agitation caused frustration in the masses. Leaders like Motilal Nehru, C. R. Das and N. C. Kelkar organized the Swaraj Party. They emphasised the need for entering into legislative councils by contesting elections.

Simon Commission (1927)

The British Government appointed the Simon Commission in November 1927 to review and report as to what extent a representative government could be introduced in India. As

all members of this Commission were Europeans, Indian leaders decided to boycott the Commission and wherever the Commission went, there were slogans 'Simon go back'. While leading a demonstration at Lahore, Lala Lajpat Rai was severely beaten in a police lathi charge and he succumbed to his injuries.

Lahore Session (1929)

In December 1929 at Lahore the Indian National Congress under the presidentship of Jawahar Lal Nehru declared *Poorna Swaraj* (complete independence) to be the goal of the national movement. It was Gandhi who was the decisive voice in investing Jawaharlal Nehru with the office of President in what was to be a critical year of mass struggle.

Dandi March (1930)

Mahatma Gandhiji started his famous march, called the *Dandi March* or *Salt Satyagraha*, from Sabarmati Ashram on 12 March 1930. He headed towards the small village of Dandi to break the Salt Law. The movement became so powerful that it sparked off patriotism even among the Indian soldiers. Soon thereafter, repressive measures such as mass arrests, lathi-charge and other repressive measures followed and about 1,00,000 people went to jail.

Civil Disobedience Movement (1930)

Gandhi launched another civil disobedience movement towards achieving the goal of complete independence. In the beginning he served 11–point ultimatum to the authorities which was mainly about the common grievances of the people of India but did not include the demand for complete independence. The 11 demands had two demands of the peasant (abolition of salt tax to eradicate the government's salt monopoly and reduction in the land revenue by per cent); three demands of the middle class (coastal shipping to be reserved for Indians, adequate protection to the domestic textile industry of India and checking the deteriorating rupee–sterling exchange ratio); the rest were common grievences (modifications in the working of the Central Intelligence Departments, release of political prisoners, complete prohibition of intoxicants, 50 per cent reduction in military expenditure, 50 per cent cut in civil administration expenditure and changes in the Arms Act thus allowing citizens to bear arms for self-protection).

Government of India Act 1935

The Government of India Act, 1935 was passed on the basis of Simon Commission report. It provided for a federal type of government.

Second World War and the Indian Political Situation

Just before World War II broke out, the Congress declared its unwillingness to associate itself with the British government. It also clearly informed the government that India should not be pushed to war without the consent of the Indian people. The British government also made no clear statement concerning its war and peace aims as applicable to India. The British Prime Minister stated that the British were in the war to maintain the world safe for democracy and uphold the right of every nation to self-determination. On 3 September 1939, Britain declared war against Germany. The Governor-General to India, Lord Linlithgow, began dispatching Indian troops to the battle field, without consulting Indian leaders. The Governor-General also declared emergency in India under Article 93 of the Act of 1935 to curb internal disorder. The Congress told the British government

that if it is fighting Germany for the maintenance and extension of democracy, then it must first extend full democracy to India. On 10 October 1939, the Congress pressed the government to free India after the war. The Viceroy, on 17 October 1939, made an official statement, declaring the British Government's promise to issue dominion status to India and to reconsider the Act of 1935 after the war.

Indian National Congress During World War II

During World War II, the Congress was suppressed when it refused to support Britain. It had, however, proved the strength of its popular support and Britain granted (1947) independence to India following the war. The predominantly Hindu Congress reluctantly accepted the creation of Pakistan as a separate Muslim nation.

Resignation of Congress Ministers (1939)

The national reaction to the declaration to the Governor- General's statement was hostile. The Indians wanted complete independence and were not satisfied with the promise of mere dominion status. On 22 October 1939, the Congress ministers resigned from their offices in the eight Provinces. It lost its important bargaining position at an important juncture and it was never able to retrieve that position. However, the Muslim League provocatively declared 22 December 1939, as a 'Day of Deliverance' from the oppressions of the 'Congress Raj'.

The Individual Civil Disobedience

The political crisis in India was deepening and the Congressmen looked upon Gandhi to lead them. Gandhi did not want to do anything that would bring political disorder in the country in the critical war situation. He resorted to a novel form of Satyagraha, the individual satyagraha, which kept the torch of nationalism burning.

It had a symbolic character against the attitude of the government. It drew the attention of the world at large to the right to self-determination. Lord Linlithgow described the August Movement of 1942 as the most serious revolt after the Sepoy mutiny. In November 1940, the individual Satyagraha started and **Vinoba Bhave** became the first satyagrahi and Jawaharlal Nehru the second. They were followed by more than 30,000 individuals who courted imprisonment in this movement. This movement continued during 1940–1941, and almost the entire Congress leadership was in prison.

Demand for Pakistan (1940)

In its Lahore session held in March 1940 and with Jinnah as its leader, the Muslim League raised a demand for Pakistan as a separate country for Muslims.

Cripps Mission

The important points made by the Cripps Mission were as follows:

1. General elections in the provinces would be arranged as soon as the war ended.
2. A new Indian dominion, associated with the United Kingdom, would be created.
3. Those provinces not joining the dominion could form their own separate union.
4. Minorities were to be protected.

However, both the Congress and the Muslim League rejected these proposals. Jinnah opposed the plan, as it did not concede Pakistan.

Quit India Movement (1942–45)

On 8 August 1942, the Congress passed a resolution known as the *Quit India* resolution. Gandhiji asked the British to quit India and gave a call for 'Do or die' to his countrymen.

Gandhi's Fast (1943)

Mahatma Gandhi undertook a 21-day fast in jail. His condition deteriorated after 13 days and all hopes of his survival were given up. However, he survived and completed the 21-day fast. This was his answer to the government which had been constantly exhorting him to condemn the violence of the people in the Quit India Movement. Gandhi not only refused to condemn people resorting to violence but unequivocally held the government responsible for it. The popular response to the news of the fast was immediate and overwhelming. All over the country, there were demonstrations and strikes. The fast had done exactly what it had intended to. Public morale was raised, the anti-British feeling heightened and an opportunity was provided for political activity.

Significance

The Quit India movement marked a new high in terms of popular participation in the national movement and sympathy with the national cause. As earlier, students were at the forefront of the struggle. Women, especially school girls, played a vital role. Aruna Asaf Ali, Sucheta Kripalani and Usha Mehta were among the important members of the small groups participating in the agitation. The great significance of this historic movement was that it placed the demand for independence on the immediate agenda of the national movement. After Quit India there could be no retreat. Any future negotiations with the British government could only be on the manner of transfer of power. Independence was no longer a matter of bargain now.

Azad Hind Fauj (Indian National Army, INA)

Origin and Purpose   Subhas Chandra Bose, popularly known as 'Netaji' was not convinced by the policy of the Congress to acquire freedom. He was an extremist and felt that it was impossible to compel the British to leave India without force.

In 1942, Netaji formed the Azad Hind Fauj (Indian National Army) in Singapore and gave his famous call *Dilli chalo*. He started a military campaign for the independence of India. Indian residents of south-east Asia and Indian soldiers and officers captured by the Japanese forces in Malaya, Singapore and Burma joined the INA in large numbers.

Rise and Decline   Subhas Chandra Bose set up the headquarter of the INA in two places—Rangoon and in Singapore—Recruits were sought from civilians, funds were gathered and even a women's regiment called the *Rani Jhansi regiment* was formed. One INA battalion also accompanied the Japanese Army to the Indo-Burma front to participate in the Imphal campaign. But with the defeat of Japan in 1944–45, the INA also died out. Bose is said to have been killed in an air crash on his way to Tokyo in August 1945.

Achievements of the INA   The achievements of the INA fell much short of its targets but it acquired a great significance in the history of India. It created a design of communal harmony in India. India's freedom struggle which was till now a territorial struggle against the ruling government became an international issue. The Indian Army also started thinking of independent India and showed little will to fight for the

British crown. It also gave Congress the knowledge that its non-violent methods to gain independence may not be adequate. Overall, the INA helped expedite the process of Indian independence.

Cabinet Mission Plan (1946)   The struggle for freedom entered a decisive phase in 1945–46. The Cabinet Mission visited India and met the representatives of different political parties. The Mission envisaged the establishment of a Constituent Assembly to frame the Constitution, as well as an interim government.

Formation of the Constituent Assembly (1946)   The Constituent Assembly met in December 1946 and Dr Rajendra Prasad was elected its President. The Muslim League did not join the Assembly.

Mountbatten Plan (1947)   Lord Mountbatten announced his plan on 3 June 1947 to break the deadlock created by the refusal of the Muslim League to join the Constituent Assembly. He laid down detailed principles for the partition of the country. Both the Congress and the Muslim League accepted the plan which resulted in the birth of Pakistan.

Partition of India (1947)   In accordance with the Indian Independence Act 1947, which was based on the Mountbatten Plan, India was partitioned on 15 August 1947 into India and Pakistan. Lord Mountbatten was appointed the Governor-General of free India and M. A. Jinnah, the first Governor-General of Pakistan.

India After Independence   After Lord Mountbatten, Sir C. Rajagopalachari became the first and the only Indian Governor-General of India in 1948. Pt Jawaharlal Nehru took over as the first Prime Minister.

Mahatma Gandhi undertook a fast for the sake of Muslim rights. On 30 January 1948 he was assassinated by Nathuram Vinayak Godse in a Birla House prayer meeting in Delhi.

On 26 November 1949, the Constitutent Assembly passed the new Constitution of India. On 26 January 1950 India was proclaimed a republic. Dr Rajendra Prasad took over as the first President, Dr S. Radhakrishnan as the Vice-President and Pt Jawaharalal Nehru as the first Prime Minister of India.

Table 2.4   Summary: Freedom Movement

S. No.	Event	Year	Significance
1.	Sepoy Mutiny	1857	First War of Independence due to dissatisfaction of the Indian soldiers
2.	Indian National Congress	1880	Initiated by A. O. Hume; first president, W. C. Bannerjee
3.	Swadeshi Movement	1905	Boycott of foreign goods
4.	Home Rule Movement	1916	Led by Dr Annie Besant
5.	Lucknow Pact	1916	Hindu-Muslim unity which weakened the British
6.	Khilafat Movement	1920	Mohd. Ali and Shaukat Ali led the movement for restoration of Khilafats, alienating Muslims from the British

S. No.	Event	Year	Significance
7.	Chauri-Chaura incident	1922	Mob clashed with police, killing 22 policemen. Gandhiji called off the civil disobedience movement.
8.	Non-cooperation Movement	1920–22	With Gandhiji's support of the Khilafat movement, Hindus and Muslims launched the non-cooperation movement
9.	Swaraj Party	1923	Gandhiji's decision to call off the civil disobedience movement, led to the formation of the Swaraj party initiated by Motilal Nehru.
10.	Dandi March	1930	Gandhiji launched the movement to break the salt law
11.	Civil Disobedience	1930	Non-violent non-cooperation movement led by Gandhiji
12.	Quit India Movement	1942	Led by Gandhiji, asking the British to leave India
13.	Direct Action Campaign	1946	Launched by Muslim League, resulted in heavy riots

Table 2.5 Reforms/Acts/Events During British Period

Sl. No.	Nomenclature of the Reforms/Acts	Year	During the term of	Significance
1.	Prohibition of Sati and Female infanticide	1829	Lord William Bentinck	Supported by Raja Ram Mohan Roy
2.	Doctrine of Lapse	1848–56	Lord Dalhousie	Adoption of sons by rulers in the absence of their natural heirs was banned
3.	Indian Legislative Councils Act 1861	1861	Lord Canning	Envisaged association of Indians with the administration at higher level.
4.	Ilbert Bill	1883	Lord Ripon	To bring Indian and European magistracy on equal footing
5.	Indian Councils Act 1892	1892	Lord Lansdown	Membership of the central legislative councils was enlarged
6.	Morley–Minto Reforms	1909	Lord Minto II	Separate electorates to widen the gulf between Hindus and Muslims
7.	Indian Councils Act 1909	1909	Lord Minto II	(See Morley–Minto reforms)
8.	Dyarchy	1919	Lord Chelmsford	Meaning dual system of Government (see Rowlatt Act)
9.	Jallianwala Bagh Massacre	1919	Lord Chelmsford	Massacre at Jallianwala Bagh in Amritsar by General Dyer
10.	Rowlatt Act	1919	Lord Chelmsford	Extraordinary powers were given to government to suppress the freedom struggle with General Dyer as the Commandant
11.	Simon Commission	1928	Lord Irwin	To report working of the reforms; recommended dyarchy in provinces, India to be constituted as a federation and Indianization of armed forces

(*Continued*)

Sl. No.	Nomenclature of the Reforms/Acts	Year	During the term of	Significance
12.	Gandhi–Irwin Pact	1931	Lord Irwin	Congress called off the agitation and agreed to participate in the Second Round Table Conference
13.	Communal Award	1932	Lord Wellingdon	Envisaged communal representation for depressed classes besides Hindus, Muslims and Sikhs
14.	Govt of India Act	1935	Lord Wellingdon	Provided for a federal type of constitution
15.	Cripps Mission	1942	Lord Linlithgow	Proposed Dominion status for India after Second World II
16.	INA Trial	1945	Lord Wavell	INA prisoners of war were tried at Red Fort Delhi and Jawaharlal Nehru defended them
17.	Wavell Plan	1945	Lord Wavell	Envisaged constitution of executive council in such a way as to give representation to all major communities in India
18.	Cabinet Mission Plan	1946	Lord Wavell	Envisaged establishment of Constituent Assembly to frame the Constitution
19.	Indian Independence Act	1947	Lord Mountbatten	India partitioned and attained independence

Table 2.6 Social and Cultural Awakening—Socio-Religious Movements

Year	Place	Name of the Organization	Founder
1815	Calcutta	Atmiya Samaj	Ram Mohan Roy
1828	Calcutta	Brahmo Samaj	Ram Mohan Roy
1829	Calcutta	Dharma Sabha	Radhakanta Dev
1839	Calcutta	Tattvabodhini Sabha	Debendranath Tagore
1840	Punjab	Nirankaris	Dayal Das, Darbara Singh, Rattan Chand, etc.
1844	Surat	Manav Dharma Sabha	Durgaram Manchharam
1849	Bombay	Parmahansa Mandli	Dadoba Panderung
1857	Punjab	Namdharis	Ram Singh
1861	Agra	Radha Sowami Satsang	Tulsi Ram
1866	Calcutta	Brahmo Samaj of India	Keshab Chandra Sen
1866	Deoband	Dar-ul-Ulum	Maulana Hussain Ahmed
1867	Bombay	Prarthna Samaj	Dr Atmaram Pandurung
1875	Bombay	Arya Samaj	Swami Dayanand Saraswati
1875	New York (USA)	Theosophical Society	Madame HP Blavastky and Col. H. S. Olcott
1878	Calcutta	Sudharam Brahmo Samaj	Anand Mohan Bose
1884	Pune (Poona)	Deccan Education Society	G. G. Agarkar
1886	Aligarh	Muhammadan Educational Conference	Sir Syed Ahmad Khan

(Continued)

Year	Place	Name of the Organization	Founder
1887	Bombay	Indian National Conference	M. G. Ranade, Badruddin Tayabji
1887	Lahore	Deva Samaj	Shivnarayan Agnihotri
1894	Lucknow	Nadwah-ul-Ulama	Maulana Shibli Numani
1897	Belur	Ramakrishna Mission	Swami Vivekanand
1905	Bombay	Servents of Indian Society	Gopalakrishan Gokhale
1909	Pune (Poona)	Poona Seva Sadan	Ramabai Ranade and G. K. Devadhar
1911	Bombay	Social Service League	N. M. Joshi
1914	Allahabad	Seva Samiti	H. N. Kunzru

Important Years in Indian History

BC (Important periods of early ancient history)

400,000–200,000	Traces of human activity in the form of cave painting and stone implements found in India go back to the second Interglacial period.
40,000–3000	Evidence of domesticated animals, wheel-turned pottery and use of copper and bronze.
7000–2000	The period of transition from Hunter-Gatherers of Palaeolithic and Mesolithic Ages to Food production: Neolithic, Neolothic–Chalcolithic and Chalcolithic Villages.

The Antecedents

2600–1900	Indus Valley Civilization (3000–1500 BC in some sources)
1500–500	Vedic age. Neolithic and Chalcolithic cultures in various locations. Increased iron usage.
800–400	Urbanization of Ganges valley. PGW (Painted Grey Ware) pottery in northern India.

Formation of States and Emergence of Empire

700–500	Period of 16 Mahajanapadas and rise of Magadha
563	Birth of Gautam Buddha (576 BC in some sources)
527	Birth of Mahavir
327–26	Alexander's invasion of India. It opened a land route between India and Europe
313	Accession of Chandragupta Maurya according to Jain traditions
305	Defeat of Seleucus at the hands of Chandragupta Maurya
273–31	Ashoka's reign
265	Conquest of Kalinga
145–01	Region of Elara, the Chola King of Sri Lanka
58	Beginning of Vikrami era

AD

78	Beginning of Saka era
120	Accession of Kanishka

Emergence of the Classical Pattern

200	Decline of Kushan, Satavahana and Saka power.
320	Commencement of Gupta era, the golden age of Hindu India

380	Accession of Vikramaditya
405–11	Visit of Chinese traveller Fa-hien
415	Accession of Kumara Gupta I
455	Accession of Skanda Gupta
606–47	Harshavardhan's reign

Formation of Regional States

712	First invasion in Sind by Arabs
836	Accession of King Bhoja of Kannauj
985	Accession of Rajaraja, the Chola ruler
998	Accession of Sultan Mahmud
1001	First invasion of India by Mahmud Ghazni who defeated Jaipal, ruler of Punjab
1025	Destruction of Somnath Temple by Mahmud Ghazni
1191	First Battle of Tarain
1192	Second Battle of Tarain

Realignment of Kingdoms in Pre-Mughal India

1206	Accession of Qutub-ud-din Aibak to the throne of Delhi
1210	Death of Qutub-ud-din Aibak
1221	Changez Khan invaded India (Mongol invasion)
1236	Accession of Razia Sultan to the throne of Delhi
1240	Razia Sultan dies
1296	Accession of Ala-ud-din Khilji
1316	Ala-ud-din Khilji dies
1325	Accession of Muhammad-bin Tughlaq
1327	Shifting of Capital from Delhi to Daulatabad in Deccan by the Tughlaqs
1336	Founding of Vijayanagar empire in the South
1351	Accession of Feroze Shah
1398	Invasion of India by Timur Lang
1469	Birth of Guru Nanak
1494	Accession of Babur in Farghana
1497–98	First voyage of Vasco da Gama to India (discovery of a sea route to India via the Cape of Good Hope)
1526	First Battle of Panipat; Babur defeated Ibrahim Lodhi; foundation of Mughal rule by Babur
1527	Battle of Khanwah; Babur defeated Rana Sanga
1530	Death of Babur and accession of Humayun
1540	Battle of Kannauj
1540	Sher Shah Suri defeated Humayun and became India's emperor
1555	Humayun recaptured the throne of Delhi
1556	Second Battle of Panipat
1565	Battle of Talikota
1576	Battle of Haldighati; Rana Pratap was defeated by Akbar
1582	Din-e-Illahi founded by Akbar
1597	Death of Rana Pratap

1600	East India Company established
1605	Death of Akbar and accession of Jahangir
1606	Execution of Guru Arjun Dev
1611	Jahangir marries Nur Jahan
1616	Sir Thomas Roe visits Jahangir
1627	Birth of Shivaji and death of Jahangir
1628	Shahjahan becomes emperor of India
1631	Death of Mumtaz Mahal
1634	The British permitted to trade in India (in Bengal)
1659	Accession of Aurangzeb, Shahjahan imprisoned
1665	Shivaji imprisoned by Aurangzeb
1666	Death of Shahjahan
1675	Execution of Teg Bahadur, the ninth Guru of Sikhs
1680	Death of Shivaji
1707	Death of Aurangzeb
1708	Death of Guru Gobind Singh
1739	Nadir Shah invades India
1757	Battle of Plassey, establishment of British political rule in India at the hands of Lord Clive
1761	Third Battle of Panipat; Shah Alam II becomes India's emperor

Rise and Consolidation of British Power in India

1764	Battle of Buxar
1765	Clive appointed Company's Governor in India
1767–69	First Mysore War
1770	The Great Bengal Famine
1780	Birth of Maharaja Ranjit Singh
1780–84	Second Mysore War
1784	Pitt's India Act
1790–92	Third Mysore War
1793	The Permanent Settlement of Bengal
1799	Fourth Mysore War—Death of Tipu Sultan
1802	Treaty of Bassein
1809	Treaty of Amritsar
1829	Practice of Sati Prohibited
1830	Raja Ram Mohan Roy, founder of Brahmo Samaj, visited England
1833	Death of Raja Ram Mohan Roy
1839	Death of Maharaja Ranjit Singh
1839–42	First Afghan War
1845–46	First Anglo-Sikh War
1848–49	Second Anglo-Sikh War
1849	Annexation of Punjab by Dalhousie
1852	Second Anglo-Burmese War
1853	First Railway line opened between Bombay and Thane and a Telegraph line in Calcutta
1857	The Sepoy Mutiny or First War of Independence

India Under the British Crown: Freedom Movement

1861	Birth of Rabindranath Tagore
1869	Birth of Mahatma Gandhi
1885	Foundation of Indian National Congress
1889	Birth of Jawaharlal Nehru
1897	Birth of Subhas Chandra Bose
1904	Tibet Expedition
1905	First partition of Bengal under Lord Curzon
1906	Foundation of Muslim League
1911	Delhi Darbar; King and Queen visit India; Delhi becomes the capital of India
1914	World War I begins
1916	Lucknow Pact signed by Muslim League and Congress
1918	World War I ends
1919	Montague–Chelmsford Reforms introduced, Jallianwala Bagh massacre at Amritsar
1920	Khilafat Movement launched
1927	Boycott of Simon Commission, broadcasting started in India
1928	Death of Lala Lajpat Rai (Sher-e-Punjab)
1929	resolution of complete independence passed at Lahore Congress
1930	Civil Disobedience Movement launched; Dandi March by Mahatma Gandhi (6 April 1930)
1931	Gandhi–Irwin Pact
1935	Government of India Act enacted
1937	Provincial Autonomy, Congress forms ministry
1939	World War II begins (1 September)
1941	Death of Rabindranath Tagore, escape of Subhas Chandra Bose from India
1942	Arrival of Cripps Mission in India, 'Quit India' movement launched (8 August)
1942–44	Netaji Subhash Chandra Bose forms provincial Azad Hindu Hukumat and Indian National Army; Bengal famine
1945	Trial of Indian National Army at Red Fort; Shimla Conference; World War II ends
1946	British Cabinet Mission visits India; Interim Government formed at the Centre
1947	Divison of India; India and Pakistan form separate independent dominions

IMPORTANT YEARS IN INDEPENDENT INDIA

1948	Mahatma Gandhi assassinated (30 January); integration of princely states
1949	Cease-fire in Kashmir, Indian Constitution signed and adopted (26 November)
1950	India becomes a Sovereign Democratic Republic (26 January) and Constitution of India comes into force

1951	First Five-Year Plan; First Asian Games held in Delhi
1952	First General Elections of the Lok Sabha
1953	Conquest of Mt Everest by Tenzing Norgay and Sir Edmund Hillary
1956	Second Five-Year Plan launched
1957	Second General Elections; decimal coinage introduced, Liberation of Goa
1962	Third General Elections in India; Chinese attack on India (20 December)
1963	Nagaland becomes the 16th Indian State
1964	Death of Pt Jawaharlal Nehru (27 May)
1965	Pakistan attacks India
1966	Tashkent Pact; Death of Lal Bahadur Shastri; Indira Gandhi elected Prime Minister of India
1967	Fourth General Elections; Dr Zakir Hussain elected the third president of India
1969	V. V. Giri elected President of India; Nationalization of the leading banks by Presidential ordinance
1970	Meghalaya designated as autonomous state.
1971	Himachal Pradesh becomes a State; Indo-Pak War; Bangladesh is born
1972	Shimla agreement; Death of C. Rajagopalachari
1973	Mysore State renamed Karnataka
1974	India tests a nuclear device; Fakhruddin Ali Ahmed elected as fifth President; Sikkim becomes an 'associate State' of India
1975	India launches 'Aryabhata'; Sikkim becomes 22nd State of the Indian Union; State of Emergency is declared
1976	India and China establish diplomatic relations
1977	Sixth General Elections; Janata Party gets majority in Lok Sabha; Neelam Sanjiva Reddy elected sixth President of India
1979	Morarji Desai resigns as Prime Minister; Charan Singh becomes Prime Minister; Charan Singh resigns (20 August): Sixth Lok Sabha dissolved
1980	Seventh General Elections; Congress I comes to power; Indira Gandhi sworn in as Prime Minister
1981	Sanjay Gandhi dies in an air crash; India launches SLV-3 into space carrying Rohini satellite
1982	Longest bridge in Asia opened (2 March); Acharya J. B. Kripalani dies (19 March); INSAT1A launched; Giani Zail Singh elected President of India (15 July); Over 500 persons killed in Gujarat cyclone (5 November); Acharya Vinoba Bhave dies (15 November); IX Asian Games inaugurated (19 November)
1983	CHOGM held in New Delhi
1984	Operation Blue Star in Punjab; Rakesh Sharma goes into space; Indira Gandhi assassinated; Rajiv Gandhi becomes PM of India
1985	Rajiv-Longowal accord signed; Sant H. S. Longowal killed; elections in Punjab; Assam accord; Fourth Five-Year Plan launched
1986	Mizoram accord
1987	R. Venkataraman elected President; Shankar Dayal Sharma elected Vice-President of India, Bofors gun and Fairfax controversies

1988	Operation Black Thunder in Punjab; Accord to quell insurgency in Tripura
1989	Ram Shilanyas Puja at Ayodhya; India's first IRBM 'Agni' successfully launched from Orissa (22 May); Trishul Missile test fired (5 June); Second successful launch of Prithvi (27 September); Rajiv Government loses poll and resigns (29 November); Jawahar Rozgar Yojna launched (29 November); National Front Leader V. P. Singh sworn in as seventh PM, New cabinet sworn in (2 December), Ninth Lok Sabha constituted
1990	Last of IPKF return home (25 March); Indian Airlines A-320 Airbus Crash (14 February); Janata Dal splits; BJP withdraws support to the Government; Advani takes out Rath Yatra and is arrested; Mandal Report implementation announced by V. P. Singh; Violence in Ayodhya due to Ram Janam Bhoomi-Babri Masjid dispute
1991	Gulf War breaks out (17 January); Rajiv Gandhi assassinated (21 May); 10th Lok Sabha constituted (20 June); P. V. Narasimha Rao becomes Prime Minister
1992	India establishes full diplomatic ties with Israel (29 January); Bharat Ratna and Oscar winner Satyajit Ray dies (23 April); S. D. Sharma elected President (25 July); INS Shakti-first indigeneously built submarine was launched on 7 February
1993	Ordinance to acquire 67.33 acres in Ayodhya (7 January); Massive security fails in BJP rally; Series explosions of bombing leaves 300 dead in Bombay; Insat-2B becomes fully operational; Earthquake in Maharashtra
1994	Government monopoly over civil aviation ends; Storm over GATT treaty; Plague outbreak; Sushmita Sen—Miss Universe; Aishwarya Rai—Miss World
1995	Mayawati First Dalit Chief Minister of UP; BJP comes to power in Maharashtra and Gujarat, Janata Dal in Karnataka and Congress in Orissa; Indian National Congress (T) formed; President's Rule in UP after fall of Mayawati; INSAT 2C and IRSI-C launched
1996	Hawala takes toll of several Union Ministers and opposition leaders; PSLV-D3 launched on 21 March with IRSP-3 ushering new era in Indian space programme; Eleventh Lok Sabha Elections held in April–BJP emerges as the single largest party
1997	On 15 August, India celeberated its 50th year of Independence
1998	Death of Mother Teressa; Atal Behari Vajpayee becames Indian Prime Minister; India explodes its second nuclear device (Pokhran II)
1999	Indian Airlines plane IC-814 hijacked by terrorists and taken to Kandahar, Afghanistan, on 24 December 1999. Three militants released by Indian govt. for the freedom of hostages kept as passengers. In June 1999, Flt Lt K. Nachiketa, the captured Indian pilot, released by Pakistan after eight days of captivity. 'Operation Vijay' launched by Indian Army to flush out Pakistani infiltrators inside LoC in the Kargil sector of J&K, India wins battle.
2000	US President Bill Clinton visits India during March 2000. Three new states Chhatisgarh, Uttaranchal and Jharkhand created; India's population crossed one billion mark.

2001	'Agra Summit' between India and Pakistan in July 2001; Worst natural calamity of India: Gujarat Earthquake in Jan 2001; 'Tehelka. Com' screened video tapes which opened the murky world of arms deal and its kickbacks to Indian Army officials, ministers and politicians in March 2001; 6th census of India (since Independence) concluded in March 2001.
	Enron bids farewell to Indian energy sector in August 2001; GSLV launched successfully in April 2001 and PSLV-C3 launch conducted in October 2001.
2002	71-year old missile scientist, Avul Pakir Jainulabdeen Abdul Kalam, is elected President of India; One of the most horrific communal riots in recent history, the Godhra Incident, happens on 27 February 2002 in Gujarat; National Water Policy announced in April, which aims at integrating water resources development and management for optimal and sustainable utilisation.
2003	Formation of Strategic Forces Command (SFC) and the Nuclear Command Authority (NCA) by India; Air Marshal Teja Mohan Asthana named first commander-in-chief of the SFC; Advanced multipurpose satellite, INSAT-3A is successfully launched into space from Kourou of French Guyana; CBI forms an Economic Intelligence Wing to tackle white-collar crime in June; India's advanced communication satellite INSAT-3E is launched by an European rocket from the spaceport of Kourou in French Guyana in December.
2004	NDA government ousted by the Congress and its allies in the General Election; Congress President Ms Sonia Gandhi opts against becoming prime minister of India despite being in a strong position; Congress and its allies forms government at the centre under the Prime Ministership of Dr Manmohan Singh. On 26 December 2004, Tsunami in the Indian Ocean hit South India along with many south-east-Asian nations. More than 11,000 deaths reported in India alone.
2005	Monsoon rains in late July and early August 2005 caused devastating landslides and floods that killed about 900 people in and around Bombay. An earthquake with a magnitude of 7.6 struck Pakistani-controlled Kashmir on 8 October 2005. More than 81,000 people were killed and 2.5 million left homeless. India suffered about 13,000 casualties.
	Indo-US reached an agreement in July 2005 that would allow India to seek outside help in developing its civilian nuclear power program while maintaining its nuclear weapons. In addition, India would submit the civilian program, but not its weapons program, to inspections. The accord departs from an 'atoms for peace' program that dates to the Eisenhower, administration, which bans countries with nuclear weapons from buying nuclear fuel and equipment from foreign countries. The US allowed American companies to provide India with several types of modern combat weapons, including F-15 and F-18 fighter jets. The announcement was seen as an attempt to balance the US offer to sell Pakistan about two dozen F-16s.
2006	In March 2006, President Bush and Prime Minister Singh agreed to a controversial nuclear deal that permitted the sale of US nuclear technology to India despite the fact that India has never signed the international

	Nuclear Non-proliferation agreement. Since 1998, the US has imposed sanctions on India for undertaking nuclear tests. Critics of the deal, which must be approved by Congress, contend that allowing India to circumvent the international treaty will make it more difficult to negotiate and rein in North Korea's and Iran's nuclear ambitions.
2007	Tata emerges as the world's fifth largest steel maker after the acquisition of British steel maker Corus.
	Sensex regains the 14 K peak by gaining more than 72 points on sustained buying by foreign and domestic funds in banking, auto and technology sector stocks.
2008	Gujjar community protested for ST quota. Protests took place at different districts of Rajasthan and led to invoking of National Security Act in 15 districts of Rajasthan.
	India and Russia sign an agreement on a joint lunar mission Chandranarayan-2.
	Indian navy became first to ski the North Pole.
	India celebrates 60th Republic Day.
2009	In the general elections to the 15th Lok Sabha, UPA outshined other alliances and Dr Manmohan Singh was re-elected as the Prime Minister of India.
	Blasts in Assam state claim many lives.
2010	Women's Reservation Bill was passed by Rajya Sabha on 9 March 2010 to reserve 33 per cent of all seats.
	On 22 May 2010, 158 passengers of a Boeing 737 plane of Air India died in a tragic air crash.
	A Bhartiya Janta Party leader was killed by Maoists in Dantewada district of Chattisgarh. 76 security personnel also lost their lives in the incident.
	12th Commonwealth Games 2010 held in Delhi (3–14 October 2010)
2011	The Indian Cricket team bagged ICC World Cup Trophy, 2011. The first world cup that team India won was in 1983.
	India witnessed the 2G spectrum scam that was revealed when airwaves for 3G services were auctioned and the loss incurred came to light as the 2G spectrum was made available at lower prices.
	The Lokpal bill was envisaged to be a ministerial probity. The provisions of different bills empowered the Lokpal to investigate corruption cases against political persons at the central level. It was supported by many people and several eminent persons such as Gandhian rights activist, Anna Hazare and yoga guru Swami Ramdev.
2012	On 12 January 2012, India touched a mile stone of being polio-free for one whole year.
	2G-scam, Supreme Court cancels 122 2G-licences on 3 February 2012.
	Vodafone Group Plc. won ₹11,000 crore legal battle against India's tax office in a Supreme Court ruling dated 20 January 2012.
	Samajwadi Party returns to power in Uttar Pradesh
	Bihar turns 100 years old. It was carved out of Bengal Presidency in 1912 by the British

2013	Resignation of Ashwani Kumar, the Law Minister.
	Resignation of Pawan Bansal, the Railway Minister.
	Narendra Modi, the Chief Minister of Gujarat, appointed the chairman of BJP Election Campaign Committee for 2014 general elections.
	The Bodh Gaya temple complex in Bihar was rocked by a series of explosions in July.
	Union Cabinet approves draft AP Reorganization Bill, 2013.
	Nirbhaya Bill: President of India gave his assent to the Criminal Law (Amendment) Bill-2013, the Anti-rape Bill, that provides for life term and even death sentence for rape convicts besides stringent punishment for offences like acid attacks, stalking and voyeurism.
	Pranab Mukherjee accorded his assent to bring against the backdrop of the country-wide outrage over Delhi gang-rape case, and it will now be called the Criminal Law (Amendment) Act, 2013.
	Lokpal Bill, the Lokpal Act, 2013 or the Lokpal and Lokayuktas Act 2013, is an anti-corruption Act of Indian Parliament. It was enacted by Rajya Sabha on 17 December 2013; and by Lok Sabha on 18 December 2013; and finally assented to and signed by the President Pranab Mukherjee on 1 January 2014. It was commenced on 16 January 2014.
2014	After BJP's landslide victory in the 2014 General Elections in India, Narendra Modi takes oath as the 20th Prime Minister of India on May 26, 2014.
	Union Cabinet clears AP Reorganization Bill in February 2014.
	On 2nd June 2014, Telangana becomes the 29th state of India and Shri K. Chandrashekhar Rao becomes its first Chief Minister.
2015	AAP won 57 seats out of 60 seats in Delhi assembly elections. Arvind Kejriwal was sworn-in as Delhi's Chief Minister. On January 1 Niti Aayog was established to replace Planning Commission.
2016	On Jan 1, the Delhi Government experimented with the odd-even formula to decongest roads of national capital and thereby check the uncontrolled pollution in New Delhi. Also, PAN No. became mandatory for cash transactions above ₹50,000/- in India.
	On Jan 3, 2016 Pakistan-based Jaish-e-Mohammed terrorists attacked strategic Pathankot Air Force Base in Punjab.
	In February 2016, the JNU issue rocked the nation with its student Kanhaiya Kumar arrested on sedition charges after allegations of 'anti-national' slogans against him surfaced. Mufti Muhammad Sayeed, the Chief Minister of Jammu and Kashmir, died on Feb 7, 2016.
	His daughter, Mehbooba Mufti became the first women CM of J&K in April 2016.
	In April, 2016 NIT Srinagar witnessed on-campus unrest when Kashmiri and outstation students had a confrontation after India lost WT20 semi-final match to West Indies.

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*For latest information, refer to Current Affairs Section of this book.

Hundreds of devotees died in the Paravur's Puttingal temple at Kollam in Kerala when on Apr 10, 2016 fire broke out after accidental detonation of a pile of firework.

On April 19, 2016 Dipa Kumari became the first Indian female gymnast to qualify for Rio Olympics 2016.

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3 Constitution of India

DRAFTING OF THE CONSTITUTION

The task of framing the Constitution of India was given to the Constituent Assembly, formed under the Cabinet Mission Plan of 1946.

The Constituent Assembly appointed a Drafting Committee under the Chairmanship of Dr B. R. Ambedkar, the then Law Minister.

The Constitution of India was enacted, signed and adopted by the Constituent Assembly on 26 November 1949.

Commencement of Constitution On 26 January 1950, the Constitution of India came into force. It was also on this date that India became a Republic.

Structure of the Indian Constitution

Constitution is not to be interpreted as a mere law, but as the machinery by which laws are made. A constitution is a living and organic thing, which, of all instruments, has the greatest claim to be construed broadly and liberally. The Constitution of India consists of:

1. The Preamble
2. Parts I to XXII, covering over 395 Articles
3. Schedules 1–12

Salient Features of Indian Constitution:

Written Constitution Indian constitution is well written and detailed.. The Constitution of India came into force on 26 January 1950 and since then Indians celebrate 26 January of each year as Republic Day. The Constitutions of Great Britain, Ireland, Canada and Australia were major sources for the Indian Constitution.

Rigid and Flexible Constitution In rigid constitution certain laws generally known as constitutional or fundamental laws cannot be changed in the same manner as the ordinary laws are changed. The constitutional laws are placed above the ordinary law. A special procedure has been prescribed in the Indian Constitution to amend the provisions. Some of the provisions of the Indian Constitution can be amended easily whereas the procedure is difficult for some others. Hence, our Constitution consists of features of both flexible and rigid constitution.

Federal System   Federalism is a system of government in which powers are divided and distributed between the central government and state governments. Our Constitution has the following federal features: i) Supremacy of the constitution; ii) Division of powers, and iii) Independent judiciary.

Secular State   The Indian Constitution establishes a secular state which means there will be complete freedom to follow any religion. It guarantees freedom of faith, worship and conscience. It also means equal respect for all religions. The basis of secularism is ethics and to bring about a society of equality and justice.

Parliamentary Democracy   The Constitution of India provides a parliamentary system of government. A parliamentary form of government is that in which the executive is responsible to legislature. In a parliamentary from of government, there is individual responsibility as well as collective responsibility of the members of council of ministers. The Constitution of India provides a bicameral legislature consisting of two Houses – Lok Sabha and Rajya Sabha. While Lok Sabha contains representatives directly elected by the people on the basis of Universal Adult Franchise; the Rajya Sabha mainly consists of representatives of the states.

Fundamental Rights   Part III of the Indian Constitution consists of Fundamental Right (Articles 12 to 35). These are indispensable for the growth of human personality. They not only create proper conditions for the complete development of an individual, but also help in realizing true democracy.

These rights ensure equality of all citizens in the eyes of law. These rights maintain proper balance between the individual interests and the public good. Following are the six fundamental rights classified in the Indian Constitution: (a) Right to Equality; (b) Right to Freedom; (c) Right against Exploitation; (d) Right to freedom of Religion; (e) Cultural and Educational Rights; (f) Right to Constitutional Remedies. Right to Property has been abolished by the 44th Amendment Act, 1978.

Directive Principles of State Policy   Part IV of the Indian Constitution consists of Directive Principles of Sate Policy (Articles 36 to 51). They are fundamental in the governance of the country. These principles act as a guide to the State and it is the duty of the State to apply these principles in making laws. They aim at the establishment of a welfare state in our country.

Socialist principles   Equal pay for equal work. Adequate means of livelihood for citizens, men and women equally.

Gandhian Principles   Promote cottage industry on an individual or co-operative basis in rural areas. Organisation of village *panchayats* to enable them to functions as units of self-governments. Organisation of agriculture and animal husbandary.

International Principles   Promote international peace and security. Maintain just and honourable relations between nations.

Miscellaneous Principles   Equal justice and free legal aid. It is a libero-intellectual principle.

Fundamental Duties   The 42nd Amendment Act of 1976 added Part IV A (Article 51A) in the Indian constitution containing 10 duties for the citizens of India. According to former Prime Minister of India, Indira Gandhi. The chapter on fundamental duties has been introduced not to smother rights but to establish democratic balance.

Judicial Review   The Supreme Court and the High Courts in India enjoy the power of judicial review. The power of judiciary to declare law as unconstitutional and to interpret provisions of ordinary laws enacted by legislatures is called judical review. Judiciary acts as a guardian of the constitution. Judiciary protects the right and freedoms of the Indian citizens.

Universal Adult Franchise   The Constitution of India has introduced universal adult franchise. All the adults above the age of 18 years, irrespective of their castes, colour or sex are entitled to participate in the election.

Preamble

The 42nd Amendment (1976) added the words 'Secular', 'Integrity' and 'Socialist' and now the Preamble reads as follows:

'We, the people of India, having solemnly resolved to constitute India into a Sovereign, Socialist, Secular, Democratic Republic and to secure to all its citizens: Justice, social economic and political; Liberty of thought, expression, belief, faith and worship; Equality of status and of opportunity and to promote among them all Fraternity assuring the dignity of the individual and the unity and integrity of the Nation. In our Constituent Assembly this twenty-sixth day of November, 1949, do hereby, Adopt, Enact and Give to Ourselves This Constitution'.

Significance of the Preamble

The Supreme Court of India has given many historic decisions, which highlight the importance and utility of the Preamble. The Preamble serves three purposes: (1) it indicates the source from which the Constitution derives its authority; (2) it states the objects that the Constitution seeks to establish and promote and (3) the date of its adoption. The nation turns to the various expressions contained in the Preamble for proper appreciation of the aims and aspirations embodied in the Constitution. It also aids the legal interpretation of the Constitution where the language is found to be ambiguous.

Preamble as Part of the Indian Constitution
The objectives specified in the constitution contains the basic structure of our constitution which cannot be amended. The Supreme Court, in 1973, gave a landmark verdict (Kesavananda Bharti v/s State of Kerala) stating, 'Preamble is a part of the constitution and is subject to amending power of the Parliament, as any other provisions of the constitution provided the basic structure of the constitution found in the preamble is not destroyed.' So, the Preamble is a key to unravel the minds of the makers of the constitution.

Parts and Articles of the Constitution

There are XXII parts in the Constitution total comprising of 395 Articles

Part I/Articles 1–4 (Territory of India, admission, establishment or formation of new states)

Part II/Articles 5–11 (Citizenship)

Part III/Articles 12–35 (Fundamental Rights)

Part IV/Articles 36–51 (Directive Principles of State Policy)

Interpretation of the Preamble

The Preamble may be invoked to determine the ambit of:

- the Fundamental Rights
- the Directive Principles of State Policy. It may be pressed into service to interpret constitutional provisions, whereby, the Preamble declares India to be a sovereign, socialist, secular, democratic republic.

Part IV-A/Article 51 A (Duties of a citizen of India)

Part V/Articles 52–151 (Government at the Union level)

Part VI/Articles 152–237 (Government at the State level)

Part VII/Article 238 (Repealed by 7th Amendment, 1956)

Part VIII/Articles 239–241 (Administration of Union Territories)

Part IX/Articles 242–243 O (The Panchayats)

Part IX-A/Articles 243P–243 ZG (The Muncipalities)

Part X/Articles 244–244 A (Scheduled and tribal areas)

Part XI/Articles 245–263 (Relations between the Union and States)

Part XII/Articles 264–300 A (Finance, property, contracts and suits)

Part XIII/Articles 301–307 (Trade, commerce and travel within territory of India)

Part XIV/Articles 308–323 (Services under the Union and States)

Part XIV-A/Articles 323A–323B (Deals with administrative tribunals)

Part XV/Articles 324–329A (Election and Election Commission)

Part XVI/Articles 330–342 (Special provision to certain classes SCs/STs, OBCs and Anglo Indians)

Part XVII/Articles 343–351 (Official language)

Part XVIII/Articles 352–360 (Emergency provisions)

Part XIX/Articles 361–367 (Miscellaneous provisions)

Part XX/Article 368 (Amendment of Constitution)

Part XXI/Articles 369–392 (Temporary, transitional and special provisions)

Part XXII/Articles 393–395 (Short title, commencement and repeal of the Constitution)

How Many Articles Do We Actually Count in Indian Constitution?

This is very necessary for those who are appearing for competitive examinations. Legal experts claim that in the long process of different Amendments to the constitution, many Articles/Clauses are affected, but it must be noted that 'all the Additions and Repeals' were made within the framework of original document of 395 Articles. So it may not be appropriate to regard any other figure other than 395 as the number of Articles in the Constitution. The list of some Insertions and Repeals by different Amendments may be perused to find them mostly as Clauses and it may also be noted that all of them are within the framework of 395 Articles. It may be emphasised that there is no Article which is beyond 395. All this implies that the 'Clauses' cannot be regarded as 'Articles'.

The official website (http://indiacode.nic.in/coiweb/welcome.html) lists not more than 395 Articles in the Constitution. This figure seems to be convincing, in as much as no one can find any Article which is beyond Article 395. This does not necessarily mean that the experts and other authors who have mentioned the number of Articles to be other than this are wrong. The fact is that they have made the exercise of 'adding and subtracting' the 'Insertions and Repeals' of various Articles/Clauses made by the Amendments to the Constitution. So, whenever any Amendment is made in affecting any Article/Clause, the number of Articles, according to the writers, goes on changing. So, technically speaking, 'there are 395 Articles' and there is not even a 396th Article.

Root of this confusion: Changes made by the Amendments are named 'Clauses' of some Articles and not 'Separate Articles'. For example, Article (243) deals with 'The Panchayats' and 'The Municipalities'. This Article has 15 Clauses (243-A to 243-O) in Part-1X-A dealing with 'The Panchayats' and 18 Clauses (243-P to 243-ZG) in Part-1X-B, dealing with 'The Municipalities'. In other words, Article (243) (which earlier dealt with the Territories of Part-D of the First Schedule and repealed by the Constitution (Seventh Amendment) Act, 1956, Section 29 and which was inserted by the Constitution (Seventy Third Amendment) Act, 1992. Section 2 to empower the Local Self Governments by due recognition of the Constitution, has 33 Clauses (15 Clauses of 1XA and 18 Clauses of 1XB) under it. So, there is only ONE Article to deal with the Panchayats and the Municipalities. Some writers may regard all the Clauses as Articles which makes an account of 34 (33 Clauses + the Article) Articles in the Parts of 1XA and 1XB.

Note for Students: As this is a matter of prime importance, we request our students to discuss this aspect with teachers in class. We sincerely believe that teachers will be able to understand and suggest if our point-of-view holds true or not as far as this concept is concerned. As for us, we are basing our position in this context as per the above mentioned comprehension. We will appreciate it if we are advised a more potent answer to this subject so that we can make appropriate changes in our next edition.

Schedules

Schedules can be added to the Constitution by amendment. The original Constitution only had eight Schedules. The Ninth Schedule was the first Schedule added to the original

constitution by the 1st Amendment of 1951 and the Twelfth Schedule is the latest schedule added by the 74th Amendment of 1992. The 12 Schedules in force cover the designations of the states and union territories; the emoluments for high level officials; forms of oaths; allocation of the number of seats in the Rajya Sabha (Council of States—the upper House of Parliament) per state or territory; provisions for the administration and control of Scheduled Areas and Scheduled Tribes; provisions for the administration of tribal areas in Assam, Meghalaya, Tripura, Mizoram; the Union (meaning Central Government), State and Concurrent (dual) Lists of responsibilities; the official languages; land and tenure reforms and the association of Sikkim with India.

A brief introduction to the Schedules in the Constitution follows:

First Schedule (*Articles 1 and 4*)   It deals with the territories of the 29 states and 7 union territories of the Indian Union.

Second Schedule (*Articles 59, 65, 75, 97, 125, 148, 158, 164, 186 and 221*)   Deals with salaries, allowances, etc., payable to the President of India, Governors of States, Chief Justice of India, judges of the Supreme Court and High Courts and the Comptroller and Auditor General of India. The revised salaries now are:

President of India	₹ 150,000 per month (Also, the govt allots, for the upkeep of the President, an annual budget of ₹ 22.5 crore).
Vice-President	₹ 120,000 per month
Governor of a state	₹ 110,000 per month (varies from state to state)
Chief Justice of the Supreme Court	₹ 100,000 per month
Judges of the Supreme Court	₹ 90,000 per month
Chief Justice of a High Court	₹ 90,000 per month
Judges of a High Court	₹ 80,000 per month

Third Schedule (*Articles 75, 99, 124, 148, 164, 188 and 219*)   It prescribes the various forms of oath or affirmation, which various incumbents have to take before assuming a public office.

Fourth Schedule (*Articles 4 and 80*)   Allocates seats to each state and union territory in the Rajya Sabha.

Fifth Schedule (*Article 244*)   It deals with the administration and control of the Schedules Areas and Scheduled Tribes.

Sixth Schedule (*Articles 244 and 275*)   Deals with provisions regarding administration of tribal areas in the states of Assam, Tripura, Meghalaya and Mizoram. This Schedule in the Constitution, amended in 1988 by the Act 67 of 1988, received the assent of the President on 16 December 1988 and was applied to the states of Tripura and Mizoram w.e.f. 16 December 1988.

Seventh Schedule (Article 246)   Gives three lists of powers and subjects to be looked after by the Union and the states, as follows: (1) Union List—Comprises subjects of all-India importance like Defence, International Affairs, Railways, Post and Telegraph, Income tax, etc. The Parliament has the exclusive power to legislate on these subjects. It contains 97 subjects; (2) State List—Contains subjects of local importance. Normally, the State Legislature alone legislates on these subjects. It contains 66 subjects;

(3) Concurrent List—Contains subjects on which the Parliament as well as the State Legislature enjoy authority. According to the 88th amendment, service tax is to be levied, collected and appropriated by the union and the states.

Eighth Schedule (*Articles 344 and 351*)   Gives a list of 22 regional languages recognised by the Constitution. Originally there were only 14 languages in the schedule and the 15th language 'Sindhi' was added by the 21st amendment in 1967 and three languages— Konkani, Manipuri and Nepali were added by the 71st amendment in 1992. In 2003, the 92nd amendment added four more languages to the list—'Bodo', 'Dogri', 'Maithali' and 'Santhali'. The languages are as follows:

(1) Assamese, (2) Bengali, (3) Bodo, (4) Dogri, (5) Gujarati, (6) Hindi, (7) Kannada, (8) Kashmiri, (9) Malayalam, (10) Maithali, (11) Marathi, (12) Odia, (13) Punjabi, (14) Sanskrit, (15) Sindhi, (16) Tamil, (17) Telugu, (18) Santhali, (19) Urdu, (20) Konkani, (21) Manipuri, (22) Nepali.

Ninth Schedule (*Article 31-B*)   Contains certain Acts and regulations of the State Legislature dealing with land reforms and abolition of the zamindari system. It contains 257 Acts. This Schedule was added to the Constitution in 1951 by the First Constitution (Amendment) Act.

Tenth Schedule (*Articles 102 and 191*)   Contains certain provisions regarding disqualification of members on grounds of defection.

Eleventh Schedule (*Article 243-G*)   It lists 29 subjects on which the panchayats have been given administrative control. It was added to the Constitution on 20 April 1992, by the 73rd Amendment in 1992.

Twelfth Schedule (*Article 243-W*)   It lists 18 subjects on which the municipalities are given administrative control. It was added to the Constitution on 20 April 1992 by the 74th Amendment in 1992.

Fact Bytes: Important Constitutional Doctrines

➤ **Doctrine of Double Jeopardy**: A person shall not be prosecuted and punished for the same offence more than once. [Article 20(2)]. ➤ **Doctrine of Eclipse**: The State is prohibited from making any law which contravenes any of the fundamental rights [Article 13(2)]. ➤ **Doctrine of Basic Feature of the Constitution**: This is also known as *Doctrine of Basic Structure* or *Basic Elements of the Constitution* (propounded in 1973 as tabulated in the *Kesavnanda case*): (i) Supermacy of the Constitution; (ii) Republican and democratic form of government; (iii) Secular character of the Constitution; (iv) Separation of powers and (v) Federal character of the Constitution. In the Indira Gandhi v/s Raj Narain case in 1975, the Supreme Court founded the following elements as the basic structure of the Constitution: (i) India as a soverign democratic republic; (ii) Equality of status and opportunity; (iii) Secularism and the freedom of conscience and (iv) Rule of law. Further, the 'amending power of the parliament', 'Judicial review' and 'balance between the Fundamental Rights and the Directive Principles' were added to the list of elements basic to the Indian Constitution. In a landmark ruling in January 2007, the Supreme Court of India confirmed that all laws (including those in Schedule 9) would be open to judicial review if they violate the basic structure of the Constitution. ➤ **Doctrine of Bias**: According to this, a person should not be judge in one's own case and justice should not only be done but should be seen to be done for the legitimacy of judicial

administration. ➤ **Doctrine of Harmonious Interpretation**: Where two provisions in the Constitution appear to be in conflict, the meaning that gives effect to both the provisions and ensures their smooth and harmonious operation should be accepted. ➤ **Doctrine of Liberal Interpretation**: It provides for the liberal interpretation of the Constitution. This has led to a great deal of creative jurisprudence in India. ➤ **Doctrine of Progressive Interpretation**: Constitution shall be interpreted progressively with due consideration to the dynamic nature of the socio-legal framework. ➤ **Doctrine of Ministerial Responsibility**: For every act of the State, the ministers are responsible to the people through their elected representative in the Parliament [Article 75(3)]. It is an essential indicator of the parliamentary system. ➤ **Doctrine of Pith and Substance**: If the laws made by the Parliament (under Article 249 and 250) are incoherent with the State laws, then law made by the Parliament shall remain effective (Article 251) and the State laws shall not be operative to the extent of repugnancy. ➤ **Doctrine of Pleasure:** The services of a Government employee—in defence service or a civil service—can be dispensed with/ without assigning any reasons. However, there were special constitutional safeguards in case of certain high functionaries such as Judges of Supreme Court and High Courts, the Chief Election Commissioner, Comptroller and Auditor-General, members of Public Service Commissions, etc., concerning their removal from their respective offices except in the manner laid down in relevant articles. ➤ **Doctrine of Prospective Overruling:** An interpretation of the constitution given by court or the law declared by it may not overrule the validity of the past acts if any. ➤ **Doctrine of Repugnancy:** Any jurisdictional conflict between the Union and the States concerning their legislative competence can be settled by the court ascertaining the substance of the matter relating to an item in one list or the other. ➤ **Doctrine of Severability:** In case a part of the constitutional provision is found to be invalid, then the validity of the remaining part need not be affected, provided the part can be separated from the impugned part and can stand on its own. ➤ **Doctrine of Territorial Nexus:** State law may not be considered valid outside the State unless there is an establishment of a significant territorial nexus or connection between the State making law and the subject matter of the legislation. The doctrine can be applied in cases involving sales tax, sale of goods and lotteries and prize/competition money, etc.

Citizenship

Part II (Articles 5–11)
The Constitution provides for only single citizenship and there is no separate citizenship of states except the constitution of Jammu and Kashmir. Citizenship can be acquired (Citizenship Act, 1955) by birth, descent, registration, naturalization or when India acquires new territories. Citizenship can be lost by renunciation, termination or deprivation. Parliament can, by law, deprive any person of his citizenship if it is satisfied that citizenship was acquired by fraud, false representation, or concealment of material facts.

Fundamental Rights

Part III (Articles 12–35)
Originally, seven Fundamental Rights were listed in the Constitution. However, after the 44th Amendment 1978, there are now only six Fundamental Rights, they are:

1. Right to Equality (Articles 14–18)

(I) Equality Before Law (Article 14) Article 14 of the Constitution enunciates the fundamental right of every person not to be denied 'equality before the law' and the

'equal protection of laws' within the territory of India. Actually, the protection provided by this article is not limited to citizens only but is applicable to foreigners (except enemy aliens) also. It embodies the principle contained in the Universal Declaration of Human Rights that 'All are equal before the law and are entitled without discrimination to equal protection of law'. The guiding principle underlying Article (14) is that all persons and things similarly circumstated shall be treated alike both in privileges conferred and liabilities imposed. Laws should be applied to all in the same condition (SC and Co. vs Union of India AIR 1973 SC 106). Not only should the law be non-discriminatory for persons in the same condition but the processes of implementation between them also (Indian Express Newspapers vs Union of India AIR 1986 SC 319). 'Equality before law' to some extent is analogous to the concept of 'Rule of law', by which we say that no man is above the law of the land and that every person is subject to ordinary law. But certain exceptions are recognised to the above rule of equality in the public interests, for example, the exercise and performances of the power and duties of the President of India or Governors of states. The traditional concept of equality was challenged as a new approach to the right of equality under Article (14) and was propounded when Supreme Court held that 'Equality is a dynamic concept with many aspects and dimensions and it cannot be cribbed, cabined and confined' within traditional doctrinaire limits. From a positivistic point of view, equality is antithetic to arbitrariness. In fact, equality and arbitrariness are sworn enemies; one belongs to the rule of law in a republic while the other, to the whim and caprice of an absolute monarch. Where an act is arbitrary, it is implicit that it is unequal both according to political logic and Constitutional Law and is therefore violation of Article (14)' (E. P. Royappa vs State of Tamil Nadu AIR 1974 SC 555). In later judgements of Supreme Court, a new approach to Article (14) received unanimous approval of a Constitution Bench of the Court in the following words: 'It must . . . now be taken to be well settled that what Article (14) strikes at is arbitrariness because an action that is arbitrary, must necessarily involve negation of equality'.

Prohibits Discrimination by the State on the Grounds of Religion, Race, Caste, Sex or Place of Birth (Article 15)   While Article (14) proclaims the general principle of equality before the law and equal protection of the laws, the subsequent Articles (15–18) specify some areas for application of the general principle mostly in regard to the citizens of India (State of Sikkim vs S. P. Sharma, JT (1994) 3 SC 372). Article (15) is a specific aspect of equality guaranteed by Article (14). Article (15), forbids discrimination on certain grounds. Deducing the Article (15), the Supreme Court rejected a petition that 'residence' in the state was similar to 'place of birth', and held that these two are distinct conceptions both in law and in fact.

Equality of Opportunity in Matters of Public Appointment (but Some Posts May be Reserved for Backward Classes) (Article 16)   Under Clauses (1) and (2) of Article (16), all citizens of India are guaranteed equality of opportunity in matters relating to employment or appointment to any office under the state and no citizen can be discriminated against or be ineligible for any employment on grounds of religion, caste, sex descent, place, birth or residence. The only exceptions to the above rule of equality are: (i) Residence within the state may be laid down by Parliament as a condition for specific classes of employment. (ii) The state may reserve any post of appointment in favour of any backward class of citizens, who are not adequately represented in the services under the state. (iii) The claim

of members of SCs and STs shall be taken into consideration in the matter of appointment to services and posts under the states. (iv) The claim of members of STs shall be taken into consideration in the matter of appointment to services and posts under the Union and the states.

Abolition of Untouchability (Article 17)   Article (17) abolishes 'untouchability' and forbids its practice in any form. If practiced, it shall be treated as an punishable offence in accordance with law. The objective of the article was to end the inhuman practice of treating certain fellow human beings as dirty and untouchable by reason of their birth in certain castes (Devarajiah vs Padmanna AIR 1961 Mad 35). The Supreme Court held that the fundamental right against untouchability guaranteed in the article is available against private individuals and it is the constitutional duty of the state to take necessary steps to see that this right is not violated (People's Union for Democratic Rights vs Union of India AIR 1982 SC 1473). Most importantly, it is the bounden duty of every citizen to ensure that untouchability is not practiced in any form.

The Untouchability (Offences) Act, 1955, later modified to read as the Protection of Civil Rights Act, 1955, provided for punishment of offenders.

Abolition of Titles, Excepting Military and Academic   Article (18) prohibits the State to confer title on anybody, whether an Indian citizen or a foreign national. An exemption has however been made in case of military and academic distinctions. Under Clause (2) of the article, a citizen of India has also been prohibited from accepting any title from a foreign State. Clause (3) provides that a foreigner holding any office of profit or trust under the State cannot accept anything from foreign State without permission of the President. Under Clause (4), no person holding any office of profit or trust under the state shall, without the consent of the President, accept any present, employment, or office of any kind from or under any foreign state. In 1954, the Government of India introduced decorations of four categories, namely, Bharata Ratna, Padma Vibhushan, Padma Bhushan and Padma Shri. There was an intense criticism on the introduction of these awards as it was a violation of Article (18). However, these awards are mere decorations and not titles. These are mere state recognitions of good work by the citizens in various fields of activity.

2. Right to Freedom (Article 19)

(i) *Freedom of Speech and Expression*   Generally, interpreted to include freedom of the press, can be limited 'in the interests of the sovereignty and integrity of India, the security of the State, friendly relations with foreign States, public order, decency or morality, or in relation to contempt of court, defamation or incitement to an offence'. Article 19(1)(9) guarantees to every Indian citizen the right to freedom of speech and expression. Though it does not specifically refer to the freedom of the press, this right has been held to be included in the right to freedom of speech and expression.

'Freedom of the press is the heart of social and political intercourse. It is the primary duty of the courts to uphold the freedom of the press and invalidate all laws or administrative actions which interfere with it contrary to the constitutional mandate' (Express Newspapers (P) Ltd vs Union of India, AIR 1958 SC 578; Indian Express Newspapers vs Union of India, (1985) 1 SCC 641). This means that every citizen is free to express his views, beliefs and convictions freely and without inhibitions by word of mouth, through writing, printing, picturising or in any other

manner. Thus, imposition of free censorship on a newspaper (Brij Bhushan vs Delhi, AIR 1950 SC 129) or prohibiting it from publishing its own views or those of its correspondents on a burning topic of the day would constitute a violation of the right to freedom of speech and expression (Virendra vs Punjab, AIR 1957 SC 896). The right is enjoyed by the citizens not only within the territory of India but also beyond its borders (Maneka Gandhi vs Union of India, AIR 1978 SC 597).

An Indian citizen has freedom of flying the National Flag of India, because it is interpreted as a symbol of expression and falls within the purview of Article 19(1)(a). A voter expresses himself during election and it would include casting of votes, as it is inferred that casting vote by him is his expression. 'Freedom of Expression' has the 'Right to Information' as an integral part of it. Also, voter's right to know the antecedents/assets of a candidate contesting election is derived from it. One is free, not to listen and not to be forced to listen as 'Right to Speech' implies the right to silence. Freedom of Speech is matrix, the central condition of almost every other form of freedom provided by the Constitution of India.

Limitations Upon Freedom of Speech and Expression   Reasonable limits or restrictions can be imposed on the exercise of the right to freedom of speech under Article 19(2) in the interests or on the grounds of: (i) Security of the State; (ii) Friendly relations with foregin countires; (iii) Public order; (iv) Decency and Morality; (v) Contempt of Court; (vi) Defamation; (vii) Enticement of Pence; (viii) Sovereignity and integrity of India.

(ii) *Freedom to Assemble Peacefully and Without Arms*   Article 19(1)(b) secures to all citizens of India the rights 'to assemble peaceably and without arms'. This consequently leads to the conferment of the right to hold public meetings and demonstrations and take out processions peacefully (Babulal vs State of Maharashtra AIR 1961.) Meetings, processions and demonstrations are inevitable corollaries of a democratic system. The people can be informed, educated and persuaded only through such exercises. However, under Clause (3) reasonable restrictions can be imposed on the right by the state by law 'in the interests of the sovereignty and integrity of India or public order' as may be deemed necessary from time to time.

Limitations Upon Freedom of Assembly   'Freedom of Assembly' qualifies only if the assembly is conducted peacefully, without arms and subject to such reasonable restrictions as may be imposed by the 'state' in the interest of public order.

(iii) *Freedom to Form Associations and Unions*   Article 19(1)(c) guarantees to all citizens the right to form associations and unions for pursuing lawful purposes. Under Clause (4) of the article, however, reasonable restrictions can be imposed by the state. The associations formed will include political parties, societies, clubs, companies, organisations, partnership firms, trade unions and indeed any group of persons.

Right to Strike The Supreme Court has held that even a liberal interpretation of Article 19(1)(c) cannot mean that the trade unions have guaranteed right to strike. The right to strike can be controlled by appropriate industrial legislation (All India Bank Employees Association vs The National Industrial Tribunal AIR 1962 SC 171). Similarly, nobody can be compelled to become a member of a government-sponsored union.

(iv) *Freedom of Movement Throughout India and Freedom to Reside and Settle in any Part of India* The right of every citizen of India 'to move freely throughout the territory of India' and his right 'to reside and settle in any part of the territory of India' is guaranteed under Clauses (d) and (e) of Article 19(1). However, Article 19(5) provides for imposition of reasonable restrictions on the exercise of either of these provisions. Restrictions imposed by habitual offenders have been upheld by the court 'in the interest of the general public or for the protection of interests of any Scheduled Tribe'. Also, restrictions imposed on prostitutes to carry on their trade within specified areas and to reside in or move from particular areas have been upheld valid.

(v) *Freedom to Practice any Profession, or to Carry on any Occupation, Trade or Business* Article 19(1)(g) says any citizen of India has the right to practice any profession or to carry on any occupation, trade or business. The right to carry on business also includes the right to close it anytime the owner decides. In Excel Wear vs Union of India case, the Supreme Court held that refusal or approval for closure of a business was invalid when the owner could not pay even the minimum wages to his employees.

Under Clause (6), the state has also been empowered to prescribe professional or technical qualification necessary for practicing any profession or carrying on any occupation, trade or business.

Protection in Respect of Conviction for Offences (Article 20) It has also been provided that no person can be convicted unless he has violated the law in force, nor subjected to penalty greater than permissible under the law; nor prosecuted and punished for the same offence more than once and cannot be compelled to be witness against himself (Article 20).

Protection of Life and Personal Liberty (Article 21) and Protection against Arrest and Detention in Certain Cases (Article 22) No person can be deprived of his life and personal liberty without authority of the law unless detained under the Preventive Detention Act where, no person can be detained beyond a period of three months without being advised by the prescribed authority (Articles 21 and 22). Three Rights guaranteed by Article (22): (1) Right to every person who is arrested to be informed of the cause of his arrest; (2) Right of that person to consult and to be defended by a lawyer of his choice. (3) Every person arrested and detained in custody shall be produced before the nearest magistrate within a period of 24 hours and shall be kept in continued custody only with his authority. However, two exceptions are there to the universal application of the rights guaranteed under the first two clauses of Article (22). These relate to:

- Any person who is for the time being an enemy alien.
- Any person who is arrested or detained under any law providing preventive detention.
- Preventive detention for reasons connected with the security of the state, the maintenance of public order, or the maintenance of supplies and services essential to the community, or for reasons connected to defence, foreign affairs or the security of India.

Punitive Detentions and Preventive Detention There is difference between the punitive detention and preventive detention. Punitive detention is concerned when a person is detained by way of his punishment after he is found guilty of crime as a result of a trial where he has the fullest opportunity to defend himself, while preventive detention is not by way of punishment at all, but is intended to preempt a person from indulging in any conduct injurious to the society.

What does Right to Information mean?

It includes the right to—(i) inspect works, documents, records. (ii) take notes, extracts or certified copies of documents or records. (iii) take certified samples of material. (iv) obtain information in the form of printouts, diskettes, floppies, tapes, video cassettes or in any other electronic mode or through printouts.

3. Right Against Exploitation (Articles 23–24)

It bans trafficking of human beings, forced labour and the employment of children below the age of 14 years in factories, mines, etc. It declares slavery or use of women for immoral or other purposes as a punishable offence.

This fundamental right allows our constitution to recognise the dignity of the individual and protects it against any form of exploitation, either by state or by the privileged classes in society. Articles (23) and (24) seek to provide protection against

   (i) exploitation through trafficking of human beings,
  (ii) begarand other unforced labour and
 (iii) employment of children in factories, etc.

Trafficking of human beings—women, children, etc.—and forced labour militate against human dignity which the fundamental constitutional value enshrined in the preamble.

Prohibition of Traffic in Human Beings and Forced Labour (Article 23)

Provision Against Forced Labour   Under the old *Zamindari* System, the tenants were sometimes forced to render free service to their landlords. This was called begar. Courts have held that even if some remuneration is paid, the labour may be a forced one (People's Union vs Union of India AIR 1982 SC 1473).

Provisions Against Human Traffic   Children of the prostitutes may be made to live away from them and Devadasis are also covered under the term 'traffic in human beings'. The whole idea is not to allow the state or anyone to compel a person to work against their will or to misuse the person in any way. The only exception allows the state to impose compulsory service for public purposes, for example, military service or social service which should be imposed equally on all without any discrimination of religion, race, caste or class.

Protection Against the Evil of Child Labour (Article 24)   Article (24) specifically prohibits the employment of children below the age of 14 in factories or mines or in any other hazardous jobs. This is in keeping with the human rights concepts and United Nations norms. Some laws have since been enacted by the Parliament to implement the provisions of Articles (22) and (23).

4. Right to Freedom of Religion (Articles 25–28)

Except when it is not in the interest of public order, morality, health, etc., every citizen is entitled to freedom of conscience and right to profess, practise and propagate any religion freely.

Right to Freedom of Religion   It guarantees:

The preamble expresses our republic inter alias secular. The notion of secularism in the constitution is not that of irreligion or anti-religion. It only suggests that there is no state religion, there is equivalent respect for and safety of all religions, no one is to be shown favouritism on basis of religion and each one is assured full and same freedom of religion. Articles (25–28) guarantees to all persons the right to freedom of religion in all its aspects.

Right of Conscience and Free Profession, Practice and Propagation of Religion (Article 25) Article (25) directs that all people—not just citizens, are equally allowed to liberty of conscience and the right to freely admit, practice and spread religion. However, this right to religious freedom is subject to: (i) public order, (ii) morality and (iii) health. The state would be free to control by law any secular activity associated with religious practice and to provide for social welfare and reform or the throwing open of Hindu religious institutions of a public character to all classes and sections of Hindus. The Supreme Court held that the right to propagate religion does not include any right to forcible conversions as these may disturb the public order (Stainslaus vs State of MP AIR 1977 SC 908). In the Anand Marg case, the right to perform tandav dance with lethal weapons and human skulls in public procession was held not to be an essential religious practice and banning of the procession in the interest of 'public order and mortality' was considered reasonable restriction (Jagdishwaranand vs Police Commissioner AIR 1984 SC 51). The wearing of Kirpans, however, was included in the profession of the Sikh religion and the Hindus for purpose of the article were to include Sikhs, Jains and Buddhists.

Cow slaughter on Bakrid was held not to be an essential practice of Islam and could be therefore prohibited by law in interest of public order (Mohd Hanif Quareshi vs State of Bihar AIR 1958 SC 731). Secular activities associated with religious practice which can be regulated by the state have been interpreted to mean non-essential aspects of religion or, for example, matters of secular administration of religious properties which must be handled in accordance with law (Ratilal vs State of Bombay (1954) SCR 1055).

Freedom to Manage Religious Affairs (Article 26) Article (26) which flows from Article (25) confers a fundamental right to all religious demonstrations and sections thereof to establish and uphold institutions for religious and charitable reason, to administer their own affairs in matters of religion, to hold, obtain and manage property. But, the administration of property has to be as per the law. It has been held that administration of the property of religious institutions can be regulated by law but the right of administration cannot be taken away altogether (Ratanlal vs State of Bombay (1954) SCR 1055).

Freedom Not to Pay Taxes for Religious Promotion of Any Particular Religion (Article 27) Article (27) says that no person shall be bound to pay any taxes for expenses on encouragement or preservation of any specific religion, that is, there could be no issue if the taxes were used for promotion of all religions. This is in keeping with the notion of secularism which means the same respect for all religions.

Freedom as to Attendance at Religious Instruction or Religious Worship in Certain Educational Institutions (Article 28) Article (28) forbids totally any religious education being imparted in educational institutions wholly managed by state resources. In case of other instructions acknowledged and aided by the state, there will be liberty for every person not to participate in religious education or devotion.

Therefore, our constitution not only guarantees a person's freedom of religion and conscience, but also makes sure freedom to have no religion, and it categorically stops the state from making any discrimination on grounds of religion. Article 26 provides freedom to manage religious affairs; Article 27 prohibits compulsion to pay taxes to benefit any religious denomination; and, Article 28 states that no religious instruction shall be provided in any educational institution wholly maintained out of state funds. These constitutional provisions points out to the uniqueness of Indian secularism its unbiased treatment of all religions.

5. Cultural and Educational Rights (Articles 29–30)

Every community has full freedom to run its own institutions, to preserve its own language, script and culture; to receive education (in state-owned institutions) and administer educational institutions of its choice. Under this right, minorities have been able to preserve and promote language, script and culture. They have also been able to establish and operate educational institutions and get financial aid, without any discrimination, from the state.

Protection of Interest of Minorities (Article 29)   The constitution does not anywhere define the term 'minorities'. However, Article (29) guarantees to 'every section of the citizens' residing anywhere in India and 'having a distinct language, script or culture' the right to conserve the same. No citizen can be denied admission to any educational institution maintained or aided by the state on grounds only of religion, race, caste or language. Although the marginal heading of the article uses the term 'minorities', it has not been mentioned in the text of the article and it has been held that it is equally available to any section of citizen—whether in minority or majority.

Remedies for Enforcement of Rights Conferred on Indian Citizens   The right to move to the Supreme Court by appropriate means for the enforcement of the rights conferred by this part is guaranteed. The Supreme Court shall have the power to issue directions, orders, or writs, including writs in the nature of habeas corpus, mandamus, prohibition, quo warranto and certiorari, whichever may be appropriate for the enforcement of any of the rights conferred by this article. Without prejudice to the powers conferred on the Supreme Court by Clauses (1) and (2), Parliament may by law empower any other court to exercise within the local limits of its jurisdiction all or any of the powers exercisable by the Supreme Court under Clause (2). The right guaranteed by this article shall not be suspended except as otherwise provided for by the constitution.

Right of Minorities to Establish and Administer Educational Institutions (Article 30)   Article 30(1) says that all minorities, whether religious or linguistic, shall have the right to establish and administer educational institutions of their choice. Clause 1(A) added by the 44th Amendment, in effect provides that if the property of any such institution is acquired, the compensation paid would be proper and adequate so that the right given by the articles remain meaningful. Clause (2) provides that in matter of giving aid, the state shall not discriminate against minority-managed institutions.

Nature of Minority Right   Article (30) is strictly in nature of minority right, that is, one intended to protect the rights of minorities. Autonomy of a minority institution cannot be taken away completely. It is quite wide in as much as it is not confined like Article (29) only to conservation of language, script and culture.

Article (31) was repealed from the constitution.

6. Right to Constitutional Remedies (Article 32)

The Supreme Court of India possesses and exercises the right of judicial review for the protection and enjoyment of fundamental rights.

Every citizen can move the Supreme Court or High Court or any other court for enforcement of his fundamental rights, through judicial writs of habeas corpus, mandamus, prohibition, quo warranto and certiorari and the like, under Part III. This

right, however, can be suspended during the operation of Emergency proclaimed by the President of India under Articles (353) and (359) of the Constitution.

The Article (32) is considered as the very soul of the Constitution of India. A guaranteed remedy for the enforcement of fundamental rights is provided by the Article (32) and this remedial right is itself made fundamental by being included in Part III of the Constitution. The court is constituted by the protector and guarantor of the fundamental rights. The Indian constitution by providing this right, that is, by making that remedial right itself a guaranteed fundamental right, has put the Indian constitution a leap above most of the other constitutions in the world

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Dual Citizenship 2005

Under the Citizenship Act 2003, those eligible to become citizens of India as on 26 January 1950, could apply for dual Indian citizenship. The government has extended dual citizenship to all those who were holding the Person of Indian Origin Card (PIOC) and who had migrated from India after the formation of the Indian Republic. Persons of Indian origin who were citizens of Australia, Canada, Finland, France, Greece, Ireland, Israel, Italy, Netherlands, New Zealand, Portugal, Cyprus, Sweden, Switzerland, the United Kingdom and the United States of America were eligible to apply for dual citizenship. A person who has been at any time a citizen of Pakistan, Bangladesh or any other country that the government may notify in future is not entitled to dual citizenship.

Rights to Information

What does Right to Information mean?

It includes the right to—(1) inspect works, documents, records; (2) take notes, extracts or certified copies of documents or records; (3) take certified samples of material; (4) obtain information in form of printouts, diskettes, floppies, tapes, video cassettes or in any other electronic mode or through printouts.

The Act extends to the whole of India except the State of Jammu and Kashmir.

Right to Property used to be a Fundamental Right but has now become only a legal right. The Janata Government on 20 June 1978 omitted the Right to Property by Constitution (44th) Amendment Act, 1978. No person shall be deprived of his property save by authority of law [Article 300A].

Directive Principles

Part IV (Articles 36–51)
Part IV of the Constitution deals with the Directive Principles of state policy. The main Directive Principles are:

1. Provision of adequate means of livelihood to all.
2. Equitable distribution of wealth among all.
3. Protection of children and youth.
4. Equal pay for equal work to both men and women.

5. Free and compulsory education for children up to the age of 14 years.
6. Prevention of cow slaughter.
7. The right to work, to education, to public assistance in case of unemployment, old age, sickness and disability.
8. Prohibition of liquor.
9. Establishment of village panchayats.
10. Protection of historical and national monuments.
11. Separation of the judiciary from the Executive to secure for all citizens, a uniform civil code.
12. Promotion of international cooperation and world security.
13. Free legal aid from the state to the weaker sections of society.
14. State to protect natural environment, forests and wildlife.

> Difference between Fundamental Rights and Directive Principles:
> - Fundamental Rights constitute a limitation upon the State actions whereas, Directive Principles are instruments of instruction to the government to carry out certain responsibilities.
> - Directive Principles cannot be enforced in a court of law and do not create any justifiable right in favour of an individual. The 42nd Amendment Bill, 1976 had given the Directive Principles precedence over the Fundamental Rights. This amendment also added two more Directive Principles: (i) Free legal aid from State to weaker sections and (ii) State to protect natural environment, forests and wildlife.

Some other Important Directive Principles

Article 38(2)—By 44th Amendment, the Janata government inserted section (2) in Article (38). 'The state shall, in particular, strive to minimise the inequalities in income, and endeavour to eliminate inequalities in status, facilities, and opportunities, not only among individuals but also among groups of people residing in different areas or engaged in different vocations' (Socialistic Principles).

Article 39—To secure right to work, education and public assistance in cases of unemployment, old age, sickness, etc. (Socialistic principles).

Article 40—The state shall organise village Panchayats as units of self-government (Gandhian Principle).

Article 43—State shall try to promote cottage industries especially in rural areas (Gandhian Principle).

Article 43 A—To deal with the participation of workers in the management of industries as per the 42nd Amendment Act.

Article 43 B—In Part IV of the constitution, after Article 43 A, the following article shall be inserted namely 43 B which states that the state shall endeavour to promote voluntary formation, autonomous functioning, democratic control and professional management of cooperative societies (as per the 97th Amendment).

Article 44—To secure uniform civil code applicable to the entire country (Libero-intellectual).

Article 45—State shall promote with special care the educational and economic interest of weaker sections of the people (Gandhian Principles).

Article 47—State shall try to improve public health and the prohibition of intoxicating drinks and drugs (Gandhian Principles).

Article 48—State shall preserve and improve the breeds and prohibit the slaughter of cows, calves and other milch and draught cattle (Gandhian Principles).

Article 50—To separate judiciary from executive.

Article 51—Related to international peace and security. The state shall endeavour to (a) promote international peace and security; (b) maintain just and honourable relations between nations; and (c) the settlement of international disputes through arbitration.

42nd Amendment—Certain changes have been introduced in Part IV, adding new directives to accentuate the socialistic bias of the constitution.

Fundamental Duties

Part IV A (Articles 51A)
The 42nd Amendment Bill 1976 had added eleven fundamental duties, *viz.,*

1. To abide by the Constitution and to respect its ideals and institutions, the national flag and the national anthem [Article 51 A(a)].
2. To cherish and follow the noble ideas which inspired our national freedom struggle [Article 51 A(b)].
3. To uphold and protect the sovereignty, unity and integrity of India [Article 51 A(c)].
4. To defend the country and render national service when called upon to do so [Article 51 A(d)].
5. To promote harmony and spirit of common brotherhood among all the people of India, transcending religious, linguistic and regional or sectional diversities; to renounce practices derogatory to the dignity of women [Article 51 A(e)].
6. To value and preserve the rich heritage of our composite culture [Article 51 A(f)].
7. To protect and improve the natural environment [Article 51 A(g)].
8. To develop a scientific temper, humanism and the spirit of enquiry and reform [Article 51 A(h)].
9. To safeguard public property and abjure violence [Article 51 A(i)].
10. To strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement [Article 51 A(j)].
11. To provide opportunities for free and compulsory education to his child or ward between the age of six and fourteen years (Added by 86th Amendment Act, 2002) [Article 51 A(k)].

Writs Mentioned in the Indian Constitution

Habeas Corpus   It literally means 'to have the body'. By issuing such a writ, the court can order that a person who has been imprisoned or detained be brought before it and enquire under what authority he has been imprisoned or detained. Nobody can be deprived of his right to remain free either by the state or by any group or individuals without being assigned a lawful order. Generally, the writ of habeas corpus is applied only after a person has been arrested.

However, in exceptional cases, it may be granted even when detention is threatened or not yet to be carried out. The Constitution of India mentions habeas corpus in Articles (32) and (226).

Types of Writs Falling under Habeas Corpus

There are other species of writ under the wider fabric of habeas corpus. They are as follows:

Habeas Corpus ad Deliberatindum et Recipiendum   A writ used to remove a person confined in one place for trail to another place in which the offence is alleged to have been committed.

Habeas Corpus ad Faciendum et Recipiendum (also Called Habeas Corpus Cum Causa)   A writ issued in a civil case to remove the case from the trial court to a superior court (having jurisdiction), for disposal.

Habeas Corpus ad Presequendum   This writ is issued by the court, when it is necessary to bring before the issuing court, for trial, a person who is confined for some other offence.

Habeas Corpus ad Satisfaciendum   A writ that is issued when the prisoner has had judgement (in a civil case) passed against him in an action and the plaintiff is desirous of bringing him up before a superior court to charge him with the process of execution.

Habeas Corpus ad Subjiciendum   A writ directed to the person detaining another in his custody and commanding him to produce him, before the issuing court, the person so detained. This is most common form of writ. Its object is to test the legality of the detention of a person and to secure his release if the detention is found to be illegal.

Habeas Corpus ad Testification   It means 'you produce the body for testifying'. The writ is used to bring up a prisoner detained in jail or prison, to give evidence before the issuing court.

Mandamus   It literally means a 'command' issued by the court to any public or quasi-public legal body that has refused to perform its legal duty. It is an order by a superior court commanding a person or a public authority to do or forbear to do something in the nature of public duty. In India, this writ lies not only against the officers or other persons who are bound to do public duty but also against the government itself. The writ is also available against inferior courts or other judicial bodies when they refuse to exercise their jurisdiction, and thus, to perform their duties. The mandamus may not be granted against the President, the Governor and the private individual or body (incorporated or not), except where the state is in collusion with such private party in the matter of contravention of any provision of the Constitution, statute or statutory instrument. The purpose for which mandamus may be issued are:

For the Enforcement of Fundamental Rights   Where the public officer of the government has done some act that violates the fundamental rights of a person, the Court would issue a writ of mandamus restraining the public officer or the government from enforcing that order or doing that act against the person whose fundamental right has been infringed.

Other Purposes   (i) To enforce the performance of a statutory duty where a public officer has the power conferred by the constitution or a statute; (ii) The writ will also compel any

person to perform his public duty where the duty is imposed by the constitution, a statute, or a statutory instrument; (iii) To compel a court of jurisdiction tribunal to exercise its jurisdiction when it has refused to exercise it; and (iv) To direct a public official or the government not to enforce a law that is unconstitutional.

Prohibition   It is issued by a superior court to an inferior court preventing it from dealing with a matter over which it has no jurisdiction. The object of the writ is to compel inferior courts to keep themselves within the limits of their jurisdiction. The writ of prohibition differs from the mandamus in that while mandamus commands activity, prohibition commands inactivity. Further, mandamus is available not against administrative authorities, prohibition as well as certiorari are issued against administrative and quasi-judicial authorities. Hence, prohibition is not issued against a public officer who is not vested with judicial functions. The difference between the prohibition and certiorari lies in the fact that though both are issued against courts or tribunals exercising judicial or quasi-judicial powers, certiorari is issued to quash the order or decision of the tribunal while prohibition is issued to prohibit the tribunal from making the ultra vires order of decision. In India, the writ of prohibition may be issued not only in cases of absence or excess of jurisdiction but also in cases where the court or tribunal assumes jurisdiction under a law, which itself contravenes some fundamental right guaranteed by the Constitution. Superior court can issue the writ only where a fundamental right is affected due to the jurisdictional defect in the proceedings.

Certiorari   It is a writ issued by a superior court to an inferior court or body exercising judicial or quasi-judicial powers to remove a suit and adjudicate upon the validity of the proceedings or body exercising judicial or quasi-judicial functions. In India, certiorari would be available even against administrative bodies not having quasi-judicial obligations, if they affect the rights of individuals, without conforming to the principles of 'fair play'.

The object of the writ of certiorari is to get rid of a decision that is vitiated by a defect or jurisdiction or a denial of the basic principles of justice—not substitute a right determination for a wrong one.

Quo Warranto   It is an order issued by the court to prevent a person from holding office to which he is not entitled and to oust him from that office.

It is a powerful instrument for safeguarding against the usurpation of public offices. The fundamental basis of the proceeding of quo warranto is that the public has an interest in seeing that an unlawful claimant does not usurp public office. Quo warranto is a discretionary remedy that the court may grant or refuse according to the facts and circumstances of each case. However, the court may refuse it where the application was actuated by ill-will or malice, or ulterior motive. The conditions necessary for the issue of writ are: (i) The office must be public and it must be created by a statute or by the constitution itself; (ii) The office must be a substantive one and not merely the function or employment of a servant at the will and during the pleasure of another; and (iii) There has been a contravention of the constitution, a statute or statutory instrument, in appointing such a person to that office.

THE UNION EXECUTIVE

The President

Part V

The President of India is the constitutional head of a parliamentary system of government. He represents the nation but does not rule it. The real power vests with the council of ministers. The President is elected by an electoral college consisting of:

1. Elected members of the Parliament (both Houses)
2. Elected members of the state legislature.
3. Elected members of legislative assemblies of Delhi and Puducherry.

Electoral Procedure

The President is elected by an electoral college consisting of the elected members of both Houses of parliament and the elected members of the legislative assemblies of the states and territories (only Delhi and Puducherry). Article (54) of the Constitution provides for the election of the President of India. The names of the Presidential candidates are proposed and seconded only by the members of parliament or the members of state legislative assemblies. Nominations are then scrutinised and the valid names are published in the Gazette of India. The date of election is fixed by the Election Commission.

- The participation of state and territory assemblies in the election is designed to ensure that the President is chosen to head the nation and not merely the majority party in Parliament, thereby placing the office above politics and making the incumbent a symbol of national unity.
- The President is elected by an electoral college consisting of: (i) elected members of the Parliament (both Houses), and (ii) elected members of the state legislatures. (iii) elected members of the legislative assemblies of the union territories of Delhi and Puducherry (w.e.f. of June 1992).
- The election is conducted by secret ballot, in accordance with the system of proportional representation by means of a single transferable vote. This makes the system of electing the President indirect and simple.
- In order to ensure uniformity in the scale of representation among the states, the total population of each state is first divided by the total number of elected members of that state in the legislative assembly.
- The resultant figure is further divided by 1,000, which gives the number of votes each member can cast. For example, if a state has a total population of 2,55,75,352 and it has 255 elected members in the legislative assembly, then the number of votes to its each member in the Presidential election will be calculated as:

$$\text{Value of vote of an MLA} \quad \frac{\text{Total population of state}}{\text{Total number of elected MLAs}} \times \frac{1}{1000}$$

Procedure for Impeachment of the President   The President of India can be removed from office by impeachment for violation of the Constitution. Impeachment has to be approved by both the Houses of parliament. One-fourth of the total members of a Houses can give notice at least fourteen days in advance of their intention to impeach the President. The charges, if approved by two-thirds majority, will be referred to the other House for investigation. If the investigating House also approves the charges with two-thirds majority, the President shall stand impeached and will vacate his office, on the date on which such as resolution is passed.

Qualifications

1. He must be a citizen of India.
2. He must not be less than 35 years of age.
3. He must be qualified to be an elected member of the Lok Sabha but shall not be a sitting member.
4. He must not be holding any office of profit under the Government of India or any other governments.

Tenure and Emoluments

- Elected for five years but is eligible for immediate re-election and can serve any number of terms.
- Receives a salary of ₹ 1,50,000 per month. Ex-President receives a pension of ₹ 75,000 per month.

Powers

1. *Executive and Administrative Powers*: He appoints the senior officials of the state including the Prime Minister. All Union Territories are under the President of India.
2. *Legislative Powers*: (a) Appoints 12 members to the Rajya Sabha and two Anglo-Indian members to the Lok Sabha; (b) Dissolves the House of People; (c) Assents or withholds his assent to any Bill passed by the Parliament; (d) Issues ordinances.
3. *Financial Powers*: (a) Causes the budget to be laid before the Parliament; (b) Sanctions introduction of money bills; (c) Apportions revenue between the Centre and the States.
4. *Judicial Powers*: Empowered to grant pardons, reprieve, remit the sentences, or suspend, remit or commute punishments.
5. *Emergency Powers*: Article (352) empowers the President to proclaim an emergency and take under his direct charge the administration of any State.

The President cannot be questioned by any court for the action taken by him in the discharge of his duties. No criminal proceedings can be launched against him. He may be removed from office for violation of the Constitution by impeachment (Article 61).

Vice-President

1. *Election*: The Vice-President is elected by members of an electoral college consisting of the members of both the Houses of Parliament. However, his election is different from that of the President as the state legislatures have no part in it.
2. *Tenure*: Five years and is eligible for immediate re-election.

Functions

1. *Acts as Ex-officio* Chairman of the Rajya Sabha.
2. Officiates as President in case of death, resignation or removal of the latter.

Emoluments

President's salary raised from ₹ 50,000 to ₹ 1,50,000 per month and Vice-President's salary from ₹ 40,000 to ₹ 1,20,000 per month. After new amendments, the former President will get a pension of ₹ 75,000 per month instead of ₹ 25,000 per month. Vice-President will get a pension of ₹ 60,000 per month instead of ₹ 20,000 per month. Former presidents will also be provided with two telephones—one phone with the Internet connectivity and the other (mobile phone) will have national roaming facilities.
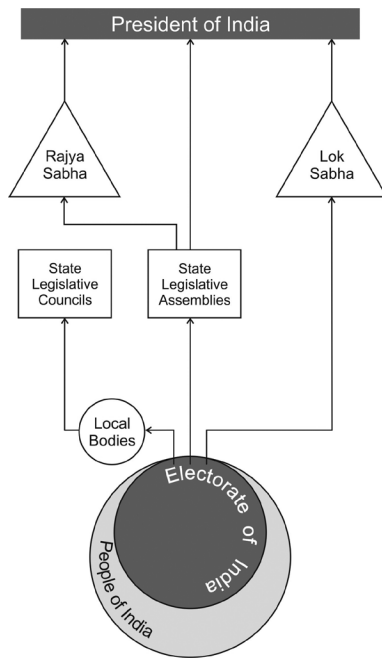
Figure 3.1   Representation of India's Democratic Structure

3. Functions as the President when the President is unable to discharge his functions due to illness, absence or any other cause.

The Prime Minister

The Prime Minister of India heads the council of ministers. He is the leader of the party that enjoys a majority in the Lok Sabha. He is appointed by the President.

1. *Tenure*: Five years and holds the office with the consent of the President till a new Lok Sabha is formed.
2. *Resignation*: If the government is defeated in the Lok Sabha (not in Rajya Sabha), the cabinet as well as the Prime Minister have to resign.
3. *Emoluments*: The PM gets the same salary and allowances which are paid to the member of Parliament. In addition, he gets a sumptuary allowance of ₹ 15,000 per month, free residence, free travel and medical facilities.

Council of Ministers

The Constitution provides for a council of ministers headed by the Prime Minister. It is a policy-making body and the government in the real sense. The Prime Minister is appointed by the President and the other ministers are appointed by the President on the advice of the Prime Minister.

Any person who is not a member of the legislature, can also be appointed as a minister, but he cannot continue in that capacity for more than six months unless he secures a seat in either House of Parliament.

Cabinet

Features of Cabinet   In the parliamentary government, the cabinet is described as the committee of parliament.

The cabinet brings together the executive and legislative branches. The features of cabinet are as follows:

- Real executive drawn from parliament
- Link between the real executive and the legislature
- Leadership of the prime minister
- Political homogeneity
- Cabinet responsible to the legislature
- Party government
- Individual and collective responsibility.
- Cabinet secrecy.

Functions of Cabinet   The cabinet is a policy formulating body which discusses and decides all sorts of national and decides all sorts of national and international problems confronting the country. The cabinet is the supreme national executive and it superintends, supervises and directs the work of the civil servants of all over the union. The function of the cabinet is to co-ordinate and guide the functions of the several departments of government. The cabinet is responsible for the whole expenditure of the country and for raising necessary revenues to meet it.

The Prime Minister's Office (PMO)   The PMO provides secretarial assistance to the prime minister which is headed by the principal secretary to prime minister. The PMO includes the anti-corruption unit and the public wing dealing with grievances. The subject matter of files required to be submitted to the prime minister depends on whether he is holding direct charge of the ministry or whether there is a cabinet minister or minister of state in charge of the ministry. Some of the important matters that require the prime minister's person attest include the following

- All important defence related issues.
- All important policy issues.
- All important decisions relating to the cabinet secretariate.
- All important appointments.
- All Policy matters relating to the administration of the civil servants and administrative reforms.

Parliament

(Articles 79–122)

The Parliament is the Union legislature of India which comprises:

1. The President of India.
2. The Council of States (*Rajya Sabha*).
3. The House of People (*Lok Sabha*).

Rajya Sabha

It is the Council of States which is also known as the Upper House. It is made up of representatives from the states and members nominated by the President, who have distinguished themselves in literature, arts, science or social service.

1. *Strength*: 250 members (238 members representing the States and Union Territories who come through election and 12 members who are nominated by the President).

2. *Chairman of the Rajya Sabha*: The Vice-President of India is the ex-officio Chairman and the Deputy Chairman is elected from the members of the Rajya Sabha.

3. *Tenure*: The Rajya Sabha is a permanent body, not subject to dissolution. A third of its members retire after every two years. Thus, every member enjoys a six-year tenure.

4. *Functions*: Shares with the Lok Sabha the power of amending the Constitution. It can originate any bill (except a money bill); refer the charge of impeachment against the President. The elected and nominated members of the Rajya Sabha take part in the election of the President and Vice-President.

Emoluments

The members of the Council of Ministers receive the same salaries and allowances as paid to other MPs. In addition, they get a sumptuary allowance. At present, a member of Parliament draws a monthly salary of ₹ 4,000. They get, in addition to the monthly salary, a secretarial allowance (₹ 2,500 per month), constituency allowance (₹ 8,000 per month) and daily allowance (₹ 400), a car advance up to ₹ 1 lakh and free to-and-fro air tickets up to 16 journeys (or 32 single journeys). The spouses of MPs are entitled to free rail travel throughout the country. On retirement, MPs draw a monthly pension of ₹ 2,500 and widows of MPs get ₹ 1,000 as pension. Moreover, they are also entitled to free accommodation, medical and travel facilities.

Lok Sabha

Also called the House of People or the Lower House of the Parliament. It consists of members elected by direct election from territorial constituencies in various states and union territories and two members nominated (Anglo-Indian) by the President.

Emoluments of Members of Parliament

The salaries and allowances payable to the members of Parliament are determined by the Parliament itself. At present, a member of Parliament draws a monthly salary of ₹ 16,000. They get, in addition to the monthly salary, a secretarial allowance (₹ 20,000 per month), constituency allowance (₹ 20,000 per month), daily allowance (₹ 1,000). The spouses of MPs are entitled to free rail travel throughout the country. On retirement, MPs draw a monthly pension of ₹ 8,000 and widows of MPs get ₹ 4,000 as pension. Moreover, they are entitled to free accommodation, medical and travel facilities.

1. *Strength*: 552 (530 represent states and 20 represent Union Territories) and not more than two members of the Anglo-Indian community to be nominated by the president, only if the President thinks this community is not adequately represented in the House.
2. *Presiding Officer*: Speaker, who is elected by the members. The Speaker of the House elects a Deputy Speaker, who discharges the duties of the Speaker in his absence.

Speaker

The constitution provides for a speaker and a deputy speaker for the Lok Sabha. The speaker and the deputy speaker are chosen by the member of Lok Sabha among its members. In the absence of the speaker in the House, the deputy speaker takes charges of the functions of the speaker. He/is the head of Lok Sabha and vacates his office if he ceases to be a member of the House. The smooth and orderly conduct of the business of the House is primarily his/her responsibility. In all matters connected with the House, his/her word is final. He does not vote in the House except when there is an equality of votes. In the event of final disagreement between the Houses on a legislative measure, a joint sitting is called. The speaker presides over such a joint sitting and all the rules of procedure in such a sitting operate under his directions and orders.

Session of Parliament   According to the constitution, the parliament has at least two sessions every year. The president summons the parliament incase there is a gap of more than six months between two sessions. In practice, the parliament normally meets three times a year. These sessions are called:

- Budget session
- Monsoon Session
- Winter Session

Functions of Parliament   (i) Legislation functions; (ii) Overseeing of administration; (iii) Passing of Budget; (iv) Ventilation of public grievances. Discussion of various subjects like development plans, international relations and national policies. Functions of parliament are not only varied in nature, but considerable in volume. It gives careful consideration to all legislative and other matters that are discussed therein.

Difference between Lok Sabha and Rajya Sabha   Members of Lok Sabha are directly elected by the people on the basis of universal adult franchise whereas members of Rajya Sabha are elected by the elected members of state legislative assemblies in accordance with the system of proportional representation by means of single transferrable vote. The normal tenure of Lok Sabha is 5 years whereas Rajya Sabha is a permanent body. Money bills are introduced in Lok Sabha. Lok Sabha also grants the money for running the administration of the country.

Functions of the Parliament (Both Houses)

1. Enact laws for the good governance of the country.
2. Control the finance of the Union.
3. Elicit information by asking questions and supplementaries.
4. Move adjournment motions and thus, criticize the government for any failure.

5. Can impeach the President by resolution for violation of the constitution.
6. Can pass a no-confidence motion to dismiss the government.

Conduct of Business in Parliament

1. *Ordinary Bills*: All bills, except money bills, are introduced in either House of Parliament. A bill, after debate, is passed by a majority vote and sent to the other House. In case certain amendments are suggested in the other House, it is sent back to the House where the bill had originated for reconsideration. The bill is regarded as passed by both the Houses if the original House accepts the amendments of the other House. It is then presented to the President for his assent, in case:

   (i) if the President gives his assent to the bill, it then becomes an Act.
   (ii) if the President withholds his assent, the bill is nullified.
   (iii) if the President neither gives his assent nor withholds his assent, he may return it to the Parliament for reconsideration.
   (iv) if, however, the Houses pass the bill again after reconsideration, the President is bound to give his assent.

2. *Money Bills*: A money bill can originate only in the Lok Sabha on the recommendation of the President. After it has been passed by the Lok Sabha, it is sent to the Rajya Sabha. The Rajya Sabha is given 14 days to make its recommendation. If it fails to do so within 14 days, the bill is considered as passed by both Houses. If the Rajya Sabha returns the bill with its recommendation, it is up to the Lok Sabha to accept or reject the recommendations. Even if the Lok Sabha rejects the recommendations of the Rajya Sabha, the bill is considered to have been passed.

3. *Joint Sitting of Parliament*: A joint session of both Houses is ordered by the President to consider a particular bill (except money bill & constitution amendment bill) in case:

   (i) a bill is passed by one House and is rejected by the other.
   (ii) the amendments made by the other House are not acceptable to the House where the bill originated.
   (iii) a bill remains pending (unpassed) in a House for more than six months from the date of its receipt from the House where it originated.

THE UNION JUDICIARY

Supreme Court

(Articles 124–147)

The Supreme Court stands at the apex of the judicial system of India.

1. *Composition*: The Supreme Court consists of one Chief Justice and there are 30 sanctioned posts of judges in Supreme Court of India. The Chief Justice is appointed by the President and the other judges are appointed by the President in consultation with the Chief Justice.

2. *Seat*: The Supreme Court normally sits in New Delhi. However, it can hold its meetings anywhere in India. The decision in this regard is taken by the Chief Justice of India in consultation with the President.

3. *Qualification*: Any citizen who has been a judge of a High Court for 5 years or an eminent jurist or who has been a practising advocate of High Court for a period of 10 years, can be nominated as a Supreme Court judge.

THE JUDICIARY

Supreme Court of India
(Chief justice and 30 sanctioned posts of judges in the Supreme Court)

High Court (in each state)
(Over 882 approved posts of judges in 24 High Courts in India)

(In Metropolitan areas)

District and Sessions Judge's Court (In districts)
(Over 2067 D and S Judges and 1375 Senior Civil
Judges and Chief Judicial Magistrates)

Metropolitan
Magistrate's Court

City Civil and
Sessions Courts

Presidency Small
Cause Court

Provincial Small
Cause Court

Court of Session
(Criminal)

Subordinate Judge's
Court (Civil)

Subordinate
Magistrate's Court

Panchayat
Adalats

Munsiff's Court
(About 4307 Munsiffs/
Subordinate Judges)

Nyaya Panchayats

Judicial
Magistrates

Executive
Magistrates

The Judicial System in India

4. *Jurisdiction of the Supreme Court*: (i) It decides disputes between the Union Government and the states; (ii) It hears certain appeals in civil and criminal cases from the High Courts; (iii) The President can refer any question of law or fact of sufficient importance to the Supreme Court for its opinion and (iv) It can issue directions or writs for the enforcement of any of the Fundamental Rights referred by the Constitution. Law declared by Supreme Court to be binding an all courts (Article 141). Supreme Court to be a court of record (Article 129).

5. *Tenure*: Judges of the Supreme Court can hold office up to the age of 65 years.

6. *Remuneration*: Chief Justice of India—₹ 1,00,000 per month; Judges of the Supreme Court—₹ 90,000 per month.

7. *Retirement*: The Chief Justice and other judges are entitled to a pension of ₹ 60,000 and ₹ 54,000 per annum, respectively. After retirement a judge of the Supreme Court shall not plead or act in any court before any authority in India.

Jurisdiction of the Supreme Court

1. *Original Jurisdiction*   The Constitution of India vests the Supreme Court with original and exclusive jurisdiction in any dispute: (a) between the Government of India and one or more states, or (b) between the Government of India and one or more states or one or more other states on the other or (c) between two or more states.

2. *Appellate Jurisdiction*   The Supreme Court is the final appellate Court in the country. The Supreme Court hears appeals against the judgments of the High Courts of states in both civil and criminal cases. Such a case can be brought before the Supreme Court only if the High Court certifies that the case involves a substantial question of law as to the interpretation of the constitution. In the civil cases, an appeal can be made to the Supreme Court against the judgement of the High Court. In the criminal cases, an appeal against the judgement of final order or sentence in a criminal proceeding of High Court in the territory of India can be taken to the Supreme Court.

3. *Advisory Jurisdiction*   The Supreme Court can provide advice to the Indian president on any matter related to law. The constitution confers on the president the power to refer to the Supreme Court any question if law or fact which in his opinion is of public importance.

4. *Write Jurisdiction*   Article (32) is the soul and heart of the constitution (Right to Constitutional Remedies) because it safeguards the rights, liberty and privileges of every citizen of India in terms of writs.

Miscellaneous Jurisdiction   The law declared by Supreme Court is binding on all courts within the territory of India. The Supreme Court is a court of record and enjoys all the powers of such a court including the power to punish for contempt of itself. The Supreme Court is authorized to make rules for regulating generally the practice and procedure of the Court with the approval of the President. The Supreme Court has complete control over its own establishment.

Removal of a Judge Article 124(4)

A judge of the Supreme Court can only be removed from office by an order of the President, after an address by each House of Parliament, supported by a majority of the total membership of the Houses and by a majority of not less than two-third of the members present and voting. He can be removed only on the grounds of:

- proven misbehaviour
- incapacity to act as a judge [*Article 124(4)*].

THE STATE EXECUTIVE

Part VI

The executive at the state level consists of:

1. The Governor
2. The Chief Minister
3. The Council of Ministers
4. The Advocate General of the State

The Governor

The Governor is the nominal executive head of the state and is appointed by the President of India for a term of 5 years. He holds the office with the consent of the President.

Remuneration: ₹ 1,10,000 per month (varies from state to state), in addition he is entitled to free residence, medical facilities and certain other allowances.

Powers

1. Executive Power
2. Legislative Power
3. Financial Powers
4. Judicial Power
5. Discretionary Power

President vs Governor

The governor of a state cannot appoint the judges of the State High Courts but the President can (in consultation with the governor and the Chief Justice of India). Also, the governor has no emergency powers but the President has.

STATE COUNCIL OF MINISTERS

Chief Minister

The leader of the party that commands a majority in the Legislative Assembly is invited by the Governor to become the Chief Minister.

A person, who is not a member of the State Legislature, can be appointed as the Chief Minister but the person concerned is required to get himself elected as a member within six months of his appointment.

The Chief Minister recommends the names of ministers together with proposed portfolios for them to the Governor, who then appoints them.

Term: 5 years

Removal of Chief Minister

The Chief Minister of a state can be removed from his office if:

- his government is defeated in the State Assembly; or
- after his defeat in the State Assembly, the Chief Minister refuses to resign; or
- he fails to get himself elected to the State Assembly within six months of his appointment, in case he was not already a member; or
- the President proclaims emergency in the state on account of failure on the part of the state government to carry on the administration in accordance with the provisions of the Constitution.

Council of Ministers

1. *The Formation of Council of Ministers*: As per the Constitution, every state must have a Council of Ministers to aid and advise the Governor in exercising his executive functions (apart from those functions in which he shall act at his discretion). Once the Governor appoints a Chief Minister, as per the Constitution, the Chief Minister finalizes the list of his Ministers, which is customarily permitted by the Governor. Thus, the Ministry is created in the state and a formal Council of Minister takes precise shape. The Council of Ministers is permanently interconnected to the State Legislature and it functions as an executive arm of the State Legislature. Constitutionally, all ministers have to be members of either House of State Legislature.

2. *The Oath and the Emoluments*: Before a Minister enters his office, the Governor administers the oaths of office and of secrecy to him according to the forms set out for the purpose in the Third Schedule. The salaries and allowances of ministers are as the Legislature of the state specifies.

3. *Provisions as to the Council of Ministers*: The Council of Ministers are collectively responsible to the Legislative Assembly of the State. It means that the ministry can remain in office till it commands the confidence of the Lower House. A minister who, far any period of six consecutive months, is not a member of the Legislature of the state shall, at the expiration of that period, cease to be a minister.

THE STATE LEGISLATURE

The State Legislature consists of the Governor and one or two Houses, as the case may be. If the state has only one House, it is known as *Legislative Assembly*. The other is the Legislative Council. The states having one House are called unicameral and the states having two Houses—bicameral.

Bicameral States

At present only seven states have a bicameral legislature, that is: Bihar, Jammu and Kashmir, Karnataka, Maharashtra, Uttar Pradesh, Telangana and Andhra Pradesh. All other states have only one House.
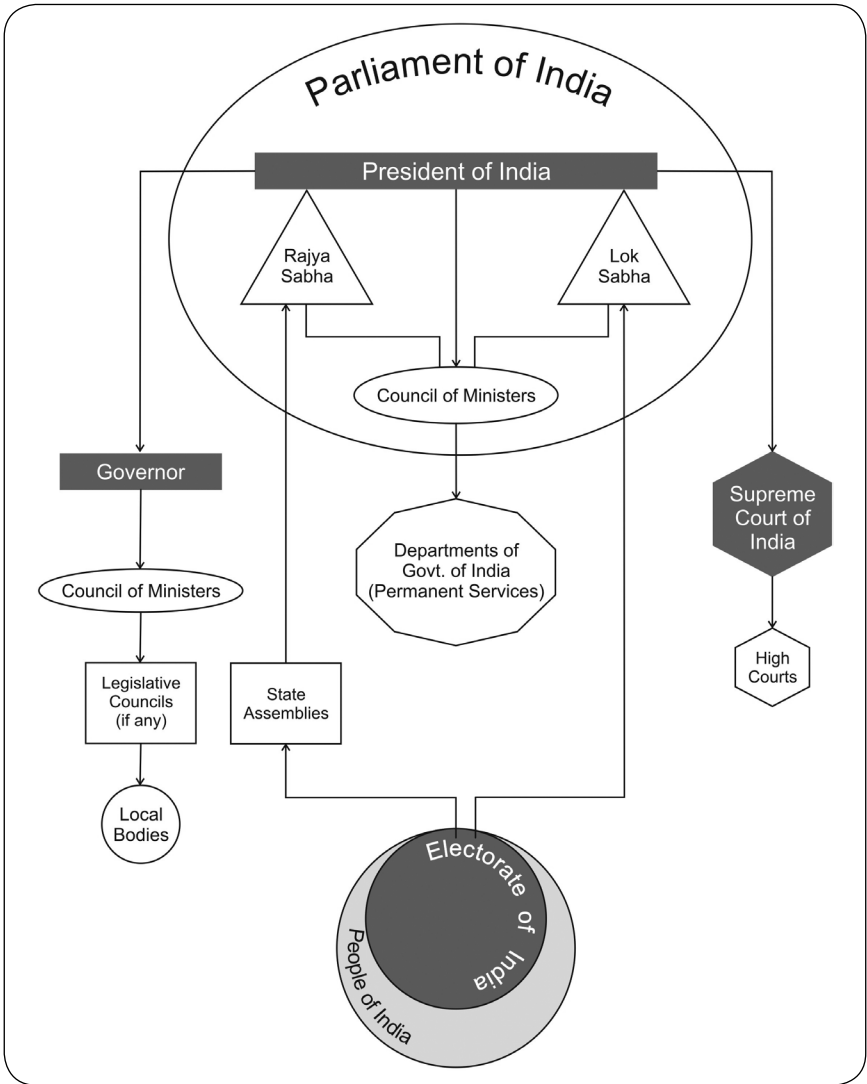
Figure 3.2 Representation of Parliament of India

Legislative Council (Vidhan Parishad)
Also known as the *Upper House*.

1. *Strength*: The total strength does not exceed one-third of the strength of the Legislative Assembly, subject to a minimum of 40 members. The strength varies as per population of the state concerned.

2. *Tenure*: Six years with one-third of the members retiring every two years.

3. *Election*: One-third of the members of a Legislative Council are elected by local bodies, one-third by the Legislative Assembly, one-twelfth by university graduates of at least three years standing, similar proportion by teachers and one-sixth are nominated by the Governor.

Legislative Assembly (Vidhan Sabha)

Also known as the *Lower House.*

1. *Strength*: Legislative Assembly consists of not more than 525 members and not less than 60 members. However, the legislative assembly of Sikkim has only 32 members.

2. *Tenure*: 5 years.

3. *Election*: Members are chosen by direct election from the territorial constituencies of the state.

The Council of Ministers is collectively responsible to the Assembly. The Chief Minister is the leader of the House.

THE STATE JUDICIARY

High Court

Each state has a High Court, which is the highest judicial organ of the state. However, there can be a common High Court for two or more states. For example, Punjab, Haryana and the Union Territory of Chandigarh have a common High Court. At present there are 24 High Courts in the country.

1. *Constitution*: The state judiciary consists of a chief justice and such other judges as the president of India may deem necessary to appoint. The strength of High Courts is not identical. For example, the Allahabad High Court has 37 judges against five in Jammu and Kashmir High Court.

2. *Term*: A judge of the High Court holds office till the age of 62 years. His term can be cut short due to resignation or removal by the president through the process of impeachment in the Parliament. He vacates his office either on his appointment as judge of the Supreme Court or when he is transferred to another High Court.

3. *Removal*: The president can remove a judge of the High Court only if the Parliament passes a resolution by a two-third majority of its members present and voting in each House, requesting him to remove a judge.

4. *Restriction on Legal Practice*: A person who has held office of a judge of the High Court is not allowed to practise law before the authority of the same court except the Supreme Court and a High Court, other than the one in which he served as a judge.

5. *High Court's Power of Superintendence*: Each High Court has power of superintendence over all courts within its jurisdiction. It can call for any returns from such courts, make and issue general rules and prescribe forms to regulate their practice and proceedings and determine the manner and form in which book entries and accounts shall be kept.

Functions of the High Courts

1. *Judicial*: A High Court has original appellate and revisory jurisdiction with respect to revenue and its collection as also for enforcement of the fundamental rights. It is a 'Court of Record' and its decisions are referred to in all future cases.

2. *Administrative*: It supervises the working of all subordinate courts and frames rules and regulations for the transaction of business. It can examine the records of subordinate courts. However, it does not have any power of superintendence over any court or tribunal constituted under any military law.

Appointment of Judges

Every judge of a High Court including the chief justice is appointed by the president. The appointment of the chief justice is made after consultation with the chief justice of India and the govenor of the state concerned. In case of appointment of a judge, the chief justice of the High Court concerned is also consulted in addition to the chief justice of India and the governor of the state concerned. Appointment of all judges, is, however, done by the president only.

On 6 October 1993, the Constitution bench of the Supreme Court held that the opinion of the chief justice (of the concerned High Court and the Supreme Court) will have primacy on both the appointment as well a transfer of senior judges.

Qualification: For appointment as a judge to the High Court, the person: (1) must be a citizen of India; (2) should have been an advocate of a High Court or of two such courts in succession for at least 10 years; or should have held judicial office in Indian territory for a period of at least 10 years.

Advocate-General

There is an advocate-general for each state, appointed by the governor, who holds office during the tenure of the governor. He/she must be a person qualified to be appointed as a judge of High Court. His/her duty is to give advice to state governments upon such legal matters and to perform such other duties of legal character, as may be referred or assigned to him/her by the governor. The advocate- general has the right to speak and take part in the proceedings of the state legislature without the right to vote.

Subordinate Courts

Structure   The structure and functions of subordinate courts are more or less uniform throughout the country.

Designations of courts and their functions.   These courts deal with all disputes of civil or criminal nature, as per the powers conferred on them. They have been derived principally from two important code prescribing procedures, the Code of Civil Procedure (1908) and the Code of Criminal Procedure (1973), and have been further strengthened by local statutes.

The National Judiciary Academy

The National Judicial Academy has been set up by the Government of India to provide in-service training to judicial officers. The Academy was registered on 17 August 1993, under the Societies Registration Act, 1860. The Academy, located in Bhopal, has its registered office in New Delhi. It provides training to judicial officers of states/UTs as well as ministerial officers working in the Supereme Court of India and the High Courts.

Districts and Session Courts

The district courts of India are presided over by a judge. They administer justice in India at a district level. These courts are under administrative and judicial control of the High Court of the State to which the district concerned belongs.

The highest court in each district is headed by district and sessions Judge. The district judge presides over a civil case while the session judge over a criminal case. This is the principal court of civil jurisdiction. This is also a court of Sessions. Session court—triable cases are tried by the sessions court. It has the power to impose any sentence including capital punishment.

Other Subordinate Courts

There are many other courts subordinate to the court of district and sessions. There is a three tier system of courts. On the civil side, at the lowest level is the court of civil judge (junior division). On criminal side, the lowest court is that of the judicial magistrate. Civil judge (junior division) decides civil cases of small pecuniary stake. Judicial magistrates decide criminal cases which are punishable with imprisonment of up to 5 years. At the middle of the hierarchy, there is the Court of Civil Judge (senior division) on the civil side and the Court of the Chief Judicial Magistrate on the criminal side. Civil Judge (senior division) can decide civil cases of any valuation. There are many additional courts of Additional Civil Judge (senior division). The jurisdiction of these addition courts is the same as that of the Principal Court of Civil Judge (senior division). The chief judicial magistrate can try cases which are punishable with imprisonment for a term up to 7 years. Usually, there are many additional courts of additional chief judicial magistrates. At the top level, there may be one or more courts of additional district and sessions judge with the same judicial power as that of the district and sessions judge. Judicial independence of each court is the characteristic feature of the district judiciary.

In each district there is a strong bar which ensures that courts decide cases according to law and without fear or favour. The greatest problem of district courts is that of huge backlog of cases leading to undue delay in deciding cases.

Lok Adalats and Nyaya Panchayats

Lok Adalats   A lok adalat has the jurisdiction to settle, by way of effecting compromise between the parties, any matter which may be pending before any court, as well as matters at pre-litigative stage, that is, disputes which have not yet been formally instituted in any court of law. Such matters may be civil or criminal in nature, but any matter relating to an offence not compoundable under any law cannot be decided by the lok adalat even if the parties involved therein agree to settle the same. Lok adalats can take cognizance of matters involving not only those persons who are entitled to avail free legal services but of all other persons also, be they women, men, or children and even institutions. The Legal Services Authorities Act, 1987 (as amended vide Act No. 37 of 2002) provides for setting up of a 'Permanent Lok Adalat' which can be approached by any party to a dispute involving 'public utility services' which have been defined in the Act (as amended) to include transport services for the carriage of passengers or goods by air, road or water; postal, telegraph or telephone services; insurance service, as also services in hospital or dispensary, supply of power, light or water to the public, besides systems of public conservancy or sanitation. Any civil dispute with a public utility service and where the value of the property in dispute does not exceed ₹10 lakh; or any criminal dispute which

does not involve an offence not compoundable under any law, can be taken up in the permanent lok adalat.

An important feature of this amendment is that after an application is made to the permanent lok adalat, no party to that application can invoke jurisdiction of any court in the same dispute. Such disputes involving public utility services shall be attempted to be settled by the permanent lok adalat by way of conciliation and failing that, on merit, and in doing so the permanent lok adalat shall be guided by the principles of natural justice, objectivity, fair play, equity and other principles of justice without being bound by the code of civil procedure and the Indian Evidence Act.

Nyaya Panchayats

The nyaya panchayats are the judicial bodies in village, which provide speedy and inexpensive justice on all petty civil suits and minor offences within their domain of operations. Usually their domain of jurisdiction is limited to four to five villages only. They can impose only monetary fines at the most as punishments and are barred from the power to award imprisonment sentences (except in Bihar).

Important Processes in the Indian Judiciary System

Public Interest Litigation   Although the proceedings in the Supreme Court arise out of judgements or orders made by the subordinate courts, including the High Courts, of late, the Supreme Court has started entertaining matters in which the interest of the public at large is involved. The proceeding of court can be moved by any individual or group of persons either by filing a writ petition at the filing counter of the Court or by addressing a letter to the Chief Justice of India, highlighting the questions of public importance, for invoking this jurisdiction. Such a concept is popularly known as 'Public Interest Litigation' (PIL) and several matters of public importance have become landmark cases. This concept is unique to the SC of India only and perhaps no other court in the world has been exercising this extraordinary jurisdiction. A writ petition filed at the filing counter is dealt with like any other writ petition and is put into the process as such. Justice VR Krishna Iyer is considered as one of the progenitors of PIL in the India judicial system. Justice PN Bhagwati was the chief justice of India when PIL was introduced in the Indian Judicial System.

Amicus Curiae   It is a Latin word which literally means friend of the court. It refers to someone who provides information on point of law. If a petition is if the accused is unrepresented then an advocate is appointed as amicus curiae by the court to defend and argue the case of the accused. In civil matters also the Court can appoint an advocate as amicus curiae if it thinks it necessary in case of any unrepresented party; the court can also appoint amicus curiae in any matter of general public importance or in which the interest of the public at large is involved.

Central Administrative Tribunal

The Central Administrative Tribunal (CAT) has been established for adjudication of disputes with respect to recruitment and conditions of service of persons appointed to public services and posts in connection with the affairs of the Union or other local authorities within the territory of India or under the control of Government of India and for matters connected therewith or incidental thereto. This was done in pursuance of the amendment of Constitution of India by Articles (323A). Parliament had enacted the Administrative

Tribunals Act, 1985 which came into force in July, 1985 and the Administrative Tribunals were established in November, 1985 at Delhi, Mumbai, Calcutta and Allahabad. There are 17 Benches of the Tribunal located throughout the country wherever the seat of a High Court is located, with 33 Division Benches.

In addition, circuit sittings are held at Nagpur, Goa, Aurangabad, Jammu, Shimla, Indore, Gwalior, Bilaspur, Ranchi, Pondicherry, Gangtok, Port Blair, Shillong, Agartala, Kohima, Imphal, Itanagar, Aizawl and Nainital.

The members of the CAT are drawn from both judicial and administrative streams.

THE POLITICAL PROCESS IN INDIA

India is a constitutional democracy with a parliamentary system of government and at the heart of the system is a commitment to hold regular, free and fair elections. These elections determine the composition of the government, the membership of the two Houses of Parliament, the state and union territory Legislative Assemblies and the Presidency and Vice-Presidency. The decline of the Congress (I) since the late 1980s has brought an end to the dominant single-party system that had long characterised India's politics. Under the old system, conflict within the Congress was often a more important political dynamic than conflict between the Congress and the opposition. The Congress had set the political agenda and the opposition responded. A new party system, in which the Congress (I) is merely one of several major participants, was in place by 1989. As often as not in the mid-1990s, the Congress (I) seems to respond to the initiatives of other parties rather than set its own political agenda.

General Elections in India

At least once every five years, India's Election Commission supervises one of the largest, most complex exercises of collective action in the world. India's elections in the 1990s involved overseeing an electorate of about 521 million voters who travelled to nearly 600,000 polling stations to choose from nearly 8950 candidates representing roughly 162 parties. The elections reveal much about Indian society. Candidates span a wide spectrum of backgrounds, including former royalty, cinema superstars, religious holy men, war heroes and a growing number of farmers. Campaigns utilise communication technologies ranging from the latest video van with two-way screens to the traditional rumour travelling by word of mouth. Increasing violence also has come to characterize elections. In 1991, about 350 people, including former Prime Minister Rajiv Gandhi, four other parliamentary candidates and twenty one candidates running in state legislative assembly elections, were killed in election related violence.

General Elections 2014

The general elections to the 16th Lok Sabha were held from 7th April 2014 to 12th May 2014. The elections took place in nine phases. BJP-led National Democratic Alliance (NDA) outshined all opposition parties to clinch a big win. Bhartiya Janta Party (BJP) got clear majority (282 seats out of 543 seats) and Narendra Modi became the Prime Minister of India. Indian National Congress (INC), the ruling party, mustered only 44 seats which was their lowest ever tally.

Table 3.1 Comparative Study of Constituencies (area wise) 2014 General Elections

Biggest constituencies: (km²)	Smallest constituencies: (km²)
Ladakh (J&K): 172,374.10	Lakshadweep (Lakshadweep): 30.29
Barmer (Rajasthan): 55,074.34	Mumbai South (Maharashtra): 39.38
Kutch (Gujarat): 41,414.34	Kolkata Uttar (West Bengal): 44.31
Arunachal East (AP): 39,703.81	Mumbai North Central (Maharashtra): 45.41
Arunachal West (AP): 39,613.00	Mumbai South Central (Maharashtra): 49.54

Political Parties in India

India's party system is in the throes of historic change. The 1989 general elections brought the era of Congress dominance to an end. Even though the Congress (I) regained power in 1991, it was no longer the pivot around which the party system revolved. Instead, it represented just one strategy for organising a political majority and a declining one at that. While the Congress (I) was encountering growing difficulties in maintaining its coalition of upper-caste elites, Muslims, Scheduled Castes and Scheduled Tribes, the BJP was endeavouring to organise a new majority around the appeal of Hindu nationalism. The Janata Dal and the BSP, among others, were attempting to fashion a new majority out of the increasingly assertive backward classes, Dalits, Scheduled Castes, Scheduled Tribes and religious minorities.

Official Language—Hindi

The makers of the Indian Constitution faced a peculiar problem in selecting a national language as more than 1600 spoken languages were used by the vast population of India. The official language of the Union was decided to be Hindi in Devanagri script [as per Article 343(1) of the Constitution], but for a period of 15 years from the commencement of the Constitution, the English language was allowed to be used for all the official purposes of the Union for which it was being used immediately before such commencement. Thus, English continued to be the official language of the Union side by side with Hindi, until 1965 and thereafter, the use of English for any purpose depended on parliamentary legislation. The Parliament made this law by passing the Official Languages Act 1963. The Act also lays down that both Hindi and English shall compulsorily be used for certain specified purposes such as resolutions, general orders, rules, notifications, press communiques, administrative and other reports, licences, permits, contracts, agreements, etc.

- The official language(s) of any state, shall be as the State Legislature adopts [Article 345].
- The President, under Article (350B) appoints the special officers for linguistic minorities.
- The Supreme Court and High Courts use the English language as per Article (348).

Panchayati Raj System in Independent India

(Articles 243–243-0)

Balwant Rai Mehta Committee   After the independence, 'Community Development Programme' was started in 1952, but because it was not attached to the people, it, therefore,

did not prove to be a success story. People took it as a burden put on them by the government. A team, under the leadership of Balwant Rai Mehta, tried to find out the cause for the failure of this programme and came up with the inference that there should be an organization at the village level, which would select the true beneficiaries and implement various government programmes and schemes. This organization would act as the representative of all villagers and would ensure the development of the village as well as participation of villagers. In this way Balwant Rai Mehta tried to achieve local self-government through panchayats. This concept of local self-government was the right step towards a decentralized democracy. In this process, for the first time the State of Rajasthan adopted the three levelled structure of panchayati raj—Village Level, Intermediate Level and District Level.

Ashok Mehta Committee   In 1977, the Ashok Mehta Committee was set up to review the working of panchayats. The committee found out that panchayati raj is the soul of democracy and therefore, it should be empowered with more authority. The panchayats which were formed after 1977 are known as Second Generation Panchayats. In West Bengal, Panchayats became more effective after accepting the suggestions made in this report. During the decade of 1990s, it was realized that without constitutional power, self-government cannot be fruitful; therefore, the Central Government passed the 73rd Constitutional Amendment Act in 1992, which became effective from 20 April 1993 (from the date of publication in the Gazette of India).

Structure of Panchayati Raj
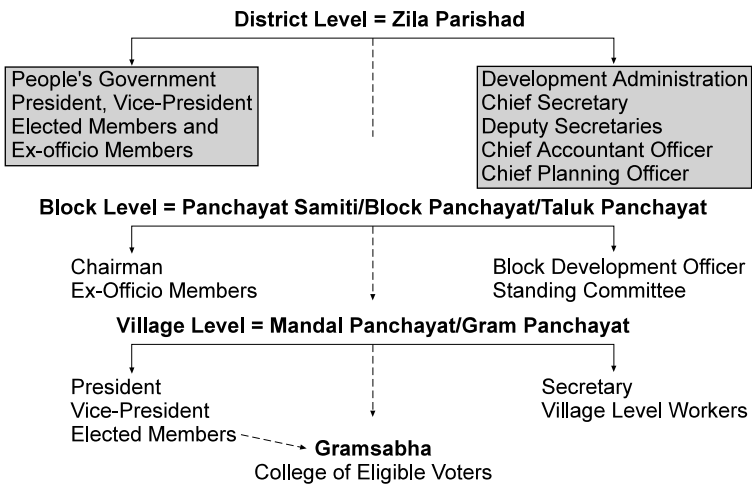
Source: Geoge Kurain (1998) Empowering Conditions in the Decentralisation Process—An Analysis of Dynamics, Factors and Actors in Panchayati Raj Institutions from West Bengal and Karnataka, India Center for Policy Research and Advocacy, Bhubaneswar, p124.

Figure 3.3

Basic Concepts of Panchayati Raj
Panchayati Raj works on the underlying principle of enabling the masses in the rural set-up to think, decide and act as per their own socio-economic interests. Thus, the Panchayati Raj Act is related to village self-governance, where the people in the form of an organization will think, decide and act for their collective interest. Self-government allows us to decide about ourselves without hampering others' interest. Whenever we talk about collective benefits, one point is clear that there is no conflict between the villagers' collective interest on one side and societal and national interest on the other, rather they are complementary. Where panchayats end their activities, the state government takes them up.

Zonal Councils

The five Zonal Councils are:

1. Northern Zone—comprising the state of Haryana, Punjab, Rajasthan, Jammu and Kashmir, Himachal Pradesh and the National Capital Region of Delhi.
2. Eastern Zone—comprising Bihar, Jharkhand, West Bengal, Orissa, Assam, Manipur, Tripura, Nagaland, Arunachal Pradesh, Mizoram and Meghalaya.
3. Central Zone—comprising the states of Uttar Pradesh, Uttarakhand, Madhya Pradesh and Chhattisgarh.
4. Western Zone—comprising Gujarat, Maharashtra and Goa.
5. Southern Zone—consisting of Andhra Pradesh, Tamil Nadu, Karnataka and Kerala, Telangana.

Functions

Zonal councils acts as a consultative body to discuss matters of common interest of the member states. It recommends the member states on the issues of (i) Social planning; (ii) Inter-state transport; (iii) Economic planning; (iv) Border dispute and (v) Matters concerning minorities, etc.

Key Functionaries

Attorney-General of India

The Attorney-General is the chief law officer of the government. He advised the government on legal matters and perform other duties of a legal nature as may be assigned. Constitution has a provision for the president to appoint a person qualified to be a supreme court judge as the Attorney-General of India. Attorney-General of India has first right of audience in all courts of India. He holds office during the pleasure of the president. However, in as much as he is appointed on the advice of the government, a convention has grown that with a change in government, he submits his resignation. Article (76) of the Constitution makes provision for the appointment of a law officer, the Attorney-General, by President of India. It is his duty to give advice to the Government of India upon legal matters and to perform such other duties of a legal character, as it may vary from time to time be referred or assigned to him by the President and to discharge the functions conferred on him by or under this constitution or any other law for the time being in force. The Attorney-General is the highest law officer in the country and, in the performance of his duties, he has a right of audience in all courts in the territory of India. The Attorney-General holds office during the pleasure of the president and receives such remuneration as the president determines from time to time.

Apart from the Attorney-General, the other law officer is the Solicitor General of India.

The Comptroller & Auditor General of India (CAG)

According to Act. 148, the CAG controls the entire financial system of the union as well as the states. The CAG is appointed by the president. However, he can be removed only on an address from both Houses of parliament on the ground of proved misbehavior or incapacity. The tenure of the CAG is 6 years from the date on which he assumes office. His salary and conditions of service are laid down by parliament and cannot be varied to his disadvantage during his term of office. His salary is equal to that of a judge of the supreme court. He is disqualified for any further government office after retirement.

Main Duties of the CAG are:

- To audit and report on all expenditures from the consolidated fund of India and of each state and each union territory having a legislative assembly as to whether such expenditure has been in accordance with the law.
- To audit and report on all trading manufacturing profit and loss accounts etc. kept by any department of the union or a state.
- To see that rules and procedures in that behalf are designed to secure an effective check on the assessment, collection and proper allocation of revenue.

Central Vigilance Commission (CVC)

The Central Vigilance Commission (CVC) was set up by the government in February 1964 on the recommendations of the committee on prevention of corruption, headed by Shri K. Santhanam, to advise and guide central government agencies in the field of vigilance. CVC is conceived to be the apex vigilance institution, free of control from any executive authority, monitoring all vigilance activity under the central government and advising various authorities in central government organisations in planning, executing, reviewing and reforming their vigilance work. Consequent upon promulgation of an Ordinance by the President, the CVC has been made a multi-member commission with 'statutory status' with effect from 25th August, 1998.

Presently, the CVC bill was passed by both the Houses of parliament in 2003 and the president gave its assent on September 11, 2003. Thus, the Central Vigilance Commission Act 2003 (No45 of 2003) came into effect from that date.

The Commission shall Consist of:

A central vigilance commissioner chairperson; not more than two vigilance commissioners members; Vide GOI Resolution on 'Public Interest Disclosure and Protection of Informer' dated April 2004, the Government of India has authorised the CVC as the 'designated agency' to receive written complaints for disclosure on any allegation of corruption or misuse of office and recommend appropriate action.

Finance Commission

Composition   So far, 14 Finance Commissions have been constituted. It consists of a chairman and four other members appointed by the president. The chairman is selected on the basis of experience in public affairs, while the members are selected from persons who: (i) are or have been, qualified to be appointed judges of the high court, or (ii) have special knowledge of the finance and accounts of the government, or (iii) have wide experience in financial matters and its administration, or (iv) have special knowledge of economics.

Significance of Finance Commission Under Article (280) of the Constitution, provision has been made for the constitution of a finance commission within 2 years of the commencement of the constitution and thereafter at the expiration of every fifth year. It undertakes the processing of and follow-up action on the various recommendations and suggestions of the finance commissioner's reports, including issue of presidential/ executive orders and sanctions. The recommendations of the commission, together with an explanatory memorandum as to the action taken thereon, are laid before each House of the parliament. Conventionally, the Government of India has accepted the recommendations of the various finance commissions in the past without modifications.

Functions of Finance Commission (a) Distribution of the net proceeds of the taxes that are divisible between the union and the states. (b) To recommend the principles that should govern the grantin-aid of the revenues of the states out of the consolidated funds of India. (c) To tender advice to the President on any other matter referred to the commission in the interests of sound finance.

Election Commission

The Election Commission consists of a Chief Election Commissioner. They are appointed by the president for a term of 6 years. The term can be cut short on account of resignation or removal by the president on grounds of proven misbehaviour or incapacity, on the recommendation of the parliament.

Powers The chief election commissioner cannot be removed by the President, except as a consequence of the passing of a resolution by the parliament on the grounds of proven misbehaviour or incapacity.

Functions (a) To superintend, direct and control the preparation of the electoral rolls for election; (b) To conduct all elections to the parliament and state legislatures and elections of the president and vice president; (c) To advice the president regarding disqualification of the members of parliament, etc. (d) To examine the return of election expenses filed by the candidates.

AMENDMENT OF THE CONSTITUTION

Procedure (Article 368)
The methods of amendment are three—according to the subject matter of the Article concerned:

1. Articles that may be amended by a simple majority (*Outside the scope of Article 368*).
2. Articles that may be amended by a two-thirds majority of both Houses of Parliament—these are comparatively important matters.
3. Articles that require not only a two-thirds majority of the Parliament but also ratification by at least one-half of the State Legislatures.

It may be noted that provisions which affect the federal character of the Constitution can be amended only with the approval of the states. Further, the initiative to amend the Constitution rests only with the Centre and the states cannot initiate any amendment.

Following are the subjects of amendments: (1) Fundamental Rights (2) Territorial changes (3) Transitional provisions (4) Democratic reforms. The Democtatic reforms further include:

- Restrictions on imposition of an internal emergency;
- Creation of mechanisms for Panchayati Raj (local self governance);
- Disqualification of members from changing party allegiance;
- Restrictions on the size of the cabinet;
- Creation of the National Commission for Scheduled Castes;
- Creation of the National Commission for Scheduled Tribes.

Important Constitutional Amendments

1. The *First Amendment*: 1951, to overcome certain practical difficulties related to Fundamental Rights. It made provision for special treatment of educationally and socially backward classes and added Ninth Schedule to the Constitution.

2. The *Third Amendment*: 1954, it substituted entry 33 of List III (Concurrent List) of the Seventh Schedule to make it correspond to Article (369).

3. *The Seventh Amendment*: 1956, was necessitated on account of reorganization of states on a linguistic basis and changed First and Fourth Schedules.

4. *The Eighth Amendment*: 1960, extended special provision for reservation of seats for SCs, STs and Anglo-Indians in Lok Sabha and Legislative Assemblies for a period of 10 years from 1960 to 1970.

5. *The Ninth Amendment*: 1960, transferred certain territories to Pakistan following September 1958 Indo-Pak Agreement.

6. *The Tenth Amendment*: 1961, incorporated the territories of Dadra and Nagar Haveli in Indian Union.

7. *The Twelfth Amendment*: 1962, incorporated the territories of Goa, Daman and Diu in Indian Union.

8. *The Thirteenth Amendment*: 1962, created Nagaland as a State of the Union of India.

9. *The Fourteenth Amendment*: 1962, incorporated former French territory of Pondicherry in Indian Union.

10. *The Eighteenth Amendment*: 1966, was made to facilitate reorganization of Punjab into Punjab and Haryana and also created the UT of Chandigarh.

11. *The Twenty-First Amendment*: 1967, included Sindhi as the 15th regional language in the Eighth Schedule.

12. *The Twenty-Second Amendment*: 1969, created a sub-state of Meghalaya within Assam.

13. *The Twenty-Third Amendment*: 1970, extended the reservation of seats for SC/ST and nomination of Anglo-Indians for a further period of 10 years (upto 1980).

14. *The Twenty-Sixth Amendment*: 1971, abolished titles and special privileges of former rulers of princely states.

15. *The Twenty-Seventh Amendment*: 1971, provided for the establishment of the states of Manipur and Tripura; the formation of the Union Territories of Mizoram and Arunachal Pradesh.

16. *The Thirty-First Amendment*: 1973, increased elective strength of Lok Sabha from 525 to 545. Upper limit of representatives of state became 525 from 500.

17. *The Thirty-Sixth Amendment*: 1975, made Sikkim a state of the Indian Union.

18. *The Thirty-Eighth Amendment*: 1975, provided that the President can make a declaration of emergency and the promulgation of ordinances by the President, Governors and administrative heads of UTs would be final and could not be challenged in any court.

19. *The Thirty-Ninth Amendment:* 1975, placed beyond challenge in courts, the election to Parliament of a person holding the office of Prime Minister or Speaker and election of the President and Vice President.

20. *The Forty-Second Amendment*: 1976, provided supremacy of Parliament and gave primacy to Directive Principles over Fundamental Rights; added 11 Fundamental Duties and altered the Preamble.

21. *The Forty-Fourth Amendment*: 1978, restored the normal duration of Lok Sabha and Legislative Assemblies to 5 Years; Right to property was deleted from Part III; it limited the power of the govt to proclaim internal emergency.

22. *The Forty-Fifth Amendment*: 1980, extended reservation for SC/ST by 10 years (upto 1990).

23. *The Fifty-Second Amendment*: 1985, inserted the Tenth Schedule in the Constitution regarding provisions as to disqualification on the grounds of defection.

24. *The Fifty-Fourth Amendment*: 1986, enhanced salaries of Judges of Supreme Court and High Courts.

25. *The Fifty-Fifth Amendment*: 1986, conferred statehood on Arunachal Pradesh.

26. *The Fifty-Sixth Amendment*: 1987, Hindi version of the Constitution of India was accepted for all purposes and statehood was also conferred on the UT of Goa.

27. *The Fifty-Eighth Amendment*: 1987, provided reservation of seats in legislatures for the four north-eastern states of Arunachal Pradesh, Meghalaya, Mizoram and Nagaland.

29. *The Sixty-First Amendment*: 1989, reduced voting age from 21 to 18 years for Lok Sabha and Assemblies.

30. *The Sixty-Second Amendment*: 1989, extended reservation of seats for SC/ST upto the year 2000.

31. *The Sixty-Third Amendment*: carried out in 1989, repealed the 59th Amendment which empowered the government to impose Emergency in Punjab.

32. *The Seventy-Second Amendment*: 1992, (Panchayati Raj Bill) provided Gram Sabha in villages, constitution of panchayats at village and other levels, direct elections to all seats in panchayats and reservation of seats for SC/ST and fixing of Panchayat's tenure to 5 years.

33. *The Seventy-Third Amendment*: 1993, (Nagarpalika Bill) provided for constitution of municipalities, reservation of seats in every municipality for the SC and ST, women and the backward classes.

34. *The Seventy-Fourth Amendment*: 1993, inclusion of a new part IX-A relating to the municipalities had been incorporated in the Constitution to provide, among other things, constitution of three types of municipalities, that is, 'Nagar Panchayats' for areas in transition from a rural area to urban area, 'Municipal Councils' for smaller urban area and 'Municipal Corporations' for larger urban areas.

35. *The Seventy-Eighth Amendment*: 1995, provides for some land reform acts included in Ninth Schedule which consists of list of laws enacted by the central governments and various state governments which, inter alia, affect rights and interest in property including land.

36. *The Seventy-Ninth Amendment*: 2000, extended reservation for the SC/ST for further period of ten years, that is, up to 25 January 2010.

37. *The Eightieth Amendment*: 2000, Certain changes were made to tax distribution provided under Articles (269), (270) and (272) of the constitution.

38. The *Eighty-First Amendment*: 2000, The unfulfilled vacancies/seats of a year, which were reserved for SC/ST candidates, for being filled up in that year in accordance with any provision for reservations made under Article (16) of the Constitution, shall be considered as a separate class of vacancies to be filled up in any succeeding year or years and such class of vacancies shall not be considered together with vacancies of the year in which they were filled up for determining the ceiling of fifty per cent reservation against total number of vacancies of that year.

39. *The Eighty-Fourth Amendment*: 2002, The number of representatives in the Lok Sabha and State Assemblies to freeze to current levels for the next 25 years (till 2026).

40. *The Eighty-Fifth Amendment*: 2002, provided for consequential seniority in case of promotion (with retrospective effect from 17 June 1995) by virtue of the rule of reservation for government servants belonging to SCs/STs.

41. *The Eighty-sixth Amendment*: 2002, The Act deals with the insertion of a new Article (21A) after Article (21). The new Article (21A) deals with Right to Education. 'The state shall provide free and compulsory education to all children from the age of 6 to 14 years in such a manner as the state may, by law, determine.'

42. *The Eighty-Eighth Amendment*: 2003, provides for the insertion of a new Article 268A. Service tax levied by Union and collected and appropriated by the Union and the States. Amendment of article 270, amendment of Seventh Schedule.

43. *The Eighty-Ninth Amendment*: 2003, provides for the amendment of Article 338. There shall be a National Commission for the SCs/STs.

44. *The Ninety-First Amendment*: 2003, amended the anti-defection laws and provided for amendment of Article (75). The total number of Ministers, including the Prime Minister, in the Council of Ministers shall not exceed fifteen per cent of the total number of members of the House of the people.

45. *The Ninety-Second Amendment*: 2003, provided for the amendment of Eighth Schedule by adding four new regional languages (Bodo, Maithili, Santhali and Dogri) thus extending the list to 22 languages.

46. *The Ninety-Third Amendment*: 2006, (came into effect on 20 January 2006), provided for special provision, by law, for the advancement of any socially and educationally

backward classes of citizens or for the SCs/STs in so far as such special provisions relate to their admission to educational institutions including private educational institutions.

47. *The Ninety-Fourth Amendment*: 2006, provides for the exclusion of Bihar from the proviso to Clause (I) of Article (164) of the constitution which provides that there shall be a Minister in charge of tribal welfare who may in addition be in charge of the welfare of the scheduled castes and backward classes in Bihar, Madhya Pradesh and Orrisa. It also proposes to extend the provisions of Clause (I) of Article (164) to the newly found states of Chattisgarh and Jharkhand.

48. *The Ninety-Fifth Amendment*: 2010, extends the reservation of seats and special reservation of SC and ST in the House of People and in the Legislative Assemblies of states for 10 more years under Article (334).

49. *The Ninety-Sixth Amendment*: 2011, alters language 'Oriya' as 'Odia' in the Eighth Schedule.

50. *The Ninety-Seventh Amendment*: 2012 (came into force on 12 January 2012 date of ascent), add the words 'or co-operative societies' after the word 'or unions' in Article 19(1)(c) and insertion of Article (43B) i.e., Promotion of co-operative societies and added Part-IXB i.e., The co-operative Societies.

51. *The Ninety-Eighth Amendment*: 2012 (came into force on 01 January 2013), deals with insertion of new article 371J, on special provisions with respect to the state of Karnataka to empower the Governor of Karnatka to take steps to develop the Hyderabad–Karnataka Region.

52. *The Ninety-ninth Amendment (2015)*: Formation of a National Judicial Appointments Commission (NJAC). 16 State assemblies out of 29 states including Goa, Rajasthan, Tripura, Gujarat and Telangana ratified the Central Legislation, enabling the President of India to give assent to the bill. However, this amendment has been as it is quashed by Supreme Court on 16 October 2015.

53. *The Hundredth Amendment (2015)*: (relates to the amendment of First Schedule to Constitution) Conferment of citizenship rights to residents of enclaves consequent to signing of Land Boundary Agreement (LBA)Treaty between India and Bangladesh due to exchange of certain enclave territories with Bangladesh.

Fact Bytes: Indian Elections/Political System

➤ The word candidate comes from the Latin '*candidatus*' meaning 'one clad in white' and most, till this day carry on with this white. ➤ 'Ballot' and 'bullet' are both derived from words for 'balls'. The Greeks dropped a white ball when they favoured a candidate and a black when they were against. The term 'blackballed' comes from this too. ➤ Designed by Electronics Corporation of India Ltd and Bharat Electronics Ltd, electronic voting machines were first used in Kerala. The highest number of candidates that an electronic voting machine can support is 64. If the number exceeds this, the manual ballot is used. ➤ In the Modaurichi assembly constituency in Tamil Nadu, 1033 candidates fought for a single seat in 1996. The ballot paper was in the form of a booklet! ➤ The Congress in 1988 did not win

a single seat in Uttar Pradesh. ➤ Mayawati's BSP and George W. Bush's Republican Party both have the same electoral symbol—the elephant. ➤ The lowest voter turnout in a polling station is three. It happened in Bomdila district in Arunachal Pradesh. ➤ Elections in 1950s were carried out using different ballot boxes for each candidate, rather than voting on ballot paper. Different coloured boxes represented different parties. ➤ Chhindwara in Madhya Pradesh is the only constituency in the Hindi belt which has always returned the Congress candidate during the general elections. ➤ Atal Bihari Vajpayee is the only politician who has won from six different constituencies: Balrampur-1957, 1967, Gwalior-1971, New Delhi-1977, 1980, Vidisha-1991, Gandhinagar-1956, Lucknow-1991, 1996, 1998, 2004. He is also the only parliamentarian to be elected from four different states—UP, Gujarat, MP and Delhi. ➤ BJP won Lok Sabha seats for the first time in the states of Tamil Nadu and West Bengal in 1998. ➤ Rajnandagaon in Madhya Pradesh has a unique feature—father, mother and son have represented this constituency at different times. ➤ The highest voting percentage in any general elections has been 62.2 per cent in 1957, the lowest was in 1967 when only 33 per cent citizens cast their vote.

2014 General Elections

➤ None of the Above: (i) Introduced in 2013 in State Assembly Elections. (ii) It is the last button on the Electronic Voting Machine (EVM). (iii) Voter can press this button if he/she does not wish to vote for any candidate. ➤ Voter Verifiable Paper Audit Trail: (i) Prints a ballot slip showing the name and symbol of candidate to whom vote has been given. (ii) To improve voter satisfaction.

Electoral Participation

➤ Electoral Rolls: (i) Lists of registered electors in each constituency. (ii) Revised annually. (iii) All rolls computerized; include electors' photos. ➤ Elector Photo Identity Card (EPIC): (i) Electors' Photo Identity Card. (ii) Provided upon registration to each elector. (iii) Free of cost. ➤ Systematic Voter Education and Electoral Participation (SVEEP): (i) Systematic Voter Education and Electoral Participation. (ii) To improve electoral participation and to build up a culture of participative democracy. (iii) Integral to election management in India.

Polling Management

➤ Electronic Voting Machines: (i) Voting by secret ballot. (ii) Used since 2004 General Elections. ➤ Polling Stations: (i) Usually in public institutions. (ii) Within 2 km of every voter. (iii) No polling station deals with more than 1500 voters. ➤ Postal Ballot: (i) Certain voters entitled to vote by post. (ii) Includes those on election duty, service voters and certain others. ➤ Proxy Voting: (i) Option to vote through proxy or through postal ballot is available to service voters in the Armed Forces or to members belonging to a force to which the Army Act applies. ➤ Counting of Votes: (i) Done after completion of all phases of polling. (ii) Under the supervision of returning officers and election observes. (iii) Counting for all 543 constituencies done on a single day. (iv) Results declared within a few hours.

Other Quick Facts

➤ 9,19,452 polling stations ➤ 9 poll days ➤ EVMs: 9,08,643 control units (CUs) ➤ 11,83,543 ballot units (BUs) ➤ 74,729 videographers ➤ 40,599 digital cameras ➤ Election Expenditure by Central Government – ₹ 8,466 million ➤ 1,080 counting centres ➤ Five phases ➤ Spread over 1 month ➤ 814 million registered electors.

Important Constitutional Provisions for Minorities	
Article 15	Prohibition of discrimination on grounds of religion
Article 16	Equality of opportunity in matters of public employment
Article 25	Freedom of conscience and free profession, practice and propagation of religion
Article 26	Freedom to manage religious affairs
Article 29	Right to conserve language, script and culture
Article 30	Right to establish and administer educational institutions
Article 347	Recognition of language
Article 350	Redressal of grievances to any authority in the government in any of the languages used in the States/Union Territories
Article 350(A)	Instruction through mother tongue at the primary stage of education
Article 350(B)	Investigate all matters relating to linguistic minorities

4 Indian Economy

A policy of mixed economy is followed in the country. In a mixed economy, the public sector enterprises (government owned) exist alongside the private sector to achieve a socialist pattern of society in a welfare state. In a mixed economy, a public sector works to achieve certain priorities and goals, both social and economic, with an economic plan to guide it. A mixed economy is always a planned economy and Indian economy is as a good example of mixed economy. The public and private sectors are viewed as complimentary.

Different Features of Indian Economy*

As an Underdeveloped Economy—Heavy population pressure; Predominance of agriculture in occupational pattern; Chronic unemployment and underemployment; Low levels of capital formation, HDI (Human Development Index), technology usage, standard of Living and socio-economic indicators of consumption; evils of black money, maldistribution of weatlh etc.

As Developing Economy—Rise in NNP (Net National Product); Consistent GDP growth rate for many years and increasing per capita income; Progress in banking and financial sector and overall increase in services sector; Growth of basic capital goods industries and expanstion in social overhead capital.

As a Dualistic Economy—Modern economy existing side-by-side with traditional primitive economy; Clear evidence of technological dualism in Indian society; existence of financial dualism (i.e., coexistence of different interest rates existing in organized and unorganized money markets in India).

PLANNING IN INDIA

THE NITI Aayog

On January 1, 2015, National Institution for Transforming India (NITI) Aayog was set up replacing the Planning Commission of India. The government notified a resolution constituting NITI and laying down inter-alia its objectives and structure.

The NITI Aayog will be a medium to the developmental process; overseeing an overall conducive environment, through a holistic approach to development moving beyond the restricted field of the Public Sector and Government of India.

NITI Aayog will involve different specialised Wings, such as:

1 Research Wing: It will develop in-house sectorial expertise as a devoted think tank of concerned field experts, specialists and scholars.

*A Bonus section has been provided in this book that deals comprehensively with Banking Specific General Awareness.

2. Consultancy Wing: It will make provision for a market place of panels of expertise and funding, for Union and State Governments to make full utilisation from; fulfilling their demands with solution providers, public and private, national and international.

NITI Aayog will function as a matchmaker instead of providing the whole service on its own, and will be able to concentrate its resources on priority issues, offering direction and a comprehensive quality check to the rest.

3. Team India Wing: Including representatives from all States and Ministries will provide a permanent platform for national collaboration..

NITI Aayog will act in close coordination, discussion and cooperation with the Union Ministries and State governments. No doubt, it will make recommendations to the Union and State Governments; however, they will be responsible for taking and implementing decisions.

FUNCTIONS OF NITI

With the maturing and deepening of India as a nation, we have initiated a better measure of pluralism and decentralization. It demands a concept change in how the Union government approaches the State as well as local governments. They need to be made equal stakeholders in national development. Their different regional peculiarities must be included into national policies and programs, with the required flexibility. NITI has the role to work with the Centre to forge a model of cooperative federalism, whereby the Centre and States forming Team India can come together to chart a common course for progress and prosperity. To follow this principle NITI Aayog will:

1. Cooperative and Competitive Federalism:
2. Shared National Agenda:
3. State's Best Friend at the Centre:
4. Decentralized Planning:
5. Vision & Scenario Planning:
6. Domain Strategies:
7. Sounding Board:
8. Network of Expertise:
9. Knowledge and Innovation hub:
10. Harmonization:
11. Conflict Resolution:
12. Coordinating interface with the World:
13. Internal Consultancy:
14. Capacity building:
15. Monitoring and Evaluation:

Justification for Replacing Planning Commission with NITI

It was on March 15, 1950, when the Government of India through a resolution constituted the Planning Commission. It has served India well. However, there have been dramatic changes in India over the past 65 years. These changes can be seen at different levels.

Purpose of the Five Year Plans

India is a vibrant, pluralistic and federal democratic set-up. The decision-making process necessitates consensus building with extensive consultations between the Central Government, State Governments, numerous governmental and non-governmental organizations.

Within this complex framework, the planning in India over the last sixty years have served three primary objectives: (1) to provide a common, agreed, framework of objectives and a strategy within which compatible decisions can be evolved, (2) to analyze the rationale of these decisions, (3) to delineate the strategy for accelerated growth of the economy and enhance the welfare of all citizens.

Planning Commission (PC)

In March 1950, Government of India constituted a statutory body with the Prime Minister of India as its chairman—called the *Planning Commission*. Pt Jawaharlal Nehru was the first chairman of the Planning Commission. The Planning Commission was charged with the responsibility of making assessment of all resources of the country augmenting deficient resources, formulating plan for the most effective and balanced utilization of resources and determining priorities. It is an extra-constitutional and non-statutory body. The Planning Commission has a chairman (usually the Prime Minister of India), a deputy-chairman and minister of state for planning (ex-officio member) as its important members.

National Planning Council (NPC)

It is an advisory body attached to the Planning Commission and was established in 1965. It includes experts representing a cross-section of the Indian economy.

National Development Council (NDC)

Chief Ministers of the states, together with the members of the Planning Commission, constitute the National Development Council. The Prime Minister of India presides over the Council. In 1952, the NDC was formed for the first time as an adjunct to the PC to associate the states in the formulation in the plans.

Planning in India derives its objectives and social premises from the Directive Principles of State Policy enshrined in the Indian Constitution. Main features of planning in India are: Comprehensive plans; Indicative economic planning but based on erratic data; More of social planning than economic planning. India has completed 11 five-year plans since 1951. Broad objectives of India Five year Plans include: Economic growth; Self-reliance; purging unemployment; decline of Income inequalities; poverty eradication and modernization. Apart from basic objectives, each five year plan takes into account the new constraints and possibilities face during the period and attempts to make the necessary directional emphasis. Planning Commission is an extra-constitutional and non-statutory body. National Development Council is an extra-constitutional and extra-legal body.

FIVE YEAR PLANS

The development plans are drawn by the Planning Commission to establish India's economy on a socialistic pattern in successive phases of five year periods—called the *Five Year Plans*. The organization was set-up to formulate basic economic policies, draft plans and watch its progress and implementation. It consists of:

1. Planning Commission of India.
2. National Planning Council.
3. National Development Council and State Planning Commissions.

*For current information of Indian Economy please refer to the Current Events Section of this book.

Table 4.1   Five Year Plans at a Glance

Period	Plan	TG	AG	Remarks
1951–52 to 1955–56	First Plan			Priority given to agriculture and irrigation
1956–57 to 1960–61	Second Plan	4.5%	4.27%	Development of basic and heavy industries
1961–62 to 1965–66	Third Plan	5.6%	2.84%	Long-term development of India's economy
1966–67 to 1968–69	Annual Plans			Plan holiday period—Chinese and Pakistani wars
1969–70 to 1973–74	Fourth Plan	4.4%	3.8%	It brought in a 'scientific temper' to Indian agriculture
1974–75 to 1977–78	Fifth Plan	4.4%	2.8%	Terminated a year earlier by the Janata Government which introduced the 'Rolling Plan' concept
1978–79 to 1979–80	Rolling Plan			Launched by the Janata Government to save path for planned growth ahead
1980–81 to 1984–85	Sixth Plan	5.2%	5.66%	Originally launched by the Janata Government. However, abandoned by the new Government and a maximize plan for 1981–85 subsequently approved
1985–86 to 1989–90	Seventh Plan	5.0%	6.01%	Food, work and productivity were the basic priorities
1990–91 to 1991–92	Rolling Plan			Basic thrust was on maximization of employment and social transformation
1992–93 to 1996–97	Eighth Plan	6.5%	5.35%	Faster economic growth, faster growth of manufacturing, agricultural and allied sectors, significant growth rates in exports and imports, improvement in trade and current account deficit and significant reduction in Central govt's fiscal deficit
1997–98 to 2001–02	Ninth Plan	6.5%	5.4%	Priority to agriculture and rural development; accelerating growth rate of economy; food and nutritional security for all; containing growth rate of population; empowerment of women and socially disadvantaged groups such as SC/STs, backward classes and minorities, etc.; promoting and developing participatory institutions like 'Panchayati Raj' institutions, co-operatives and self-help groups.
2002–2007	Tenth Plan	8.1%	5.4%	Cutting down on unnecessary expenditure; improving farm sector, financial sector, judicial system; eliminating harassment, corruption and red tapism; controlling drought, floods, population growth; increasing FDI and FPIs; labour and economic growth.
2007–2012	Eleventh Plan	9.0%	8.0%	Growth in agriculture, education, health care facilities; provision of safe drinking water, providing scholarships; improving and making integrated development services and National Rural Employment Guarantee Scheme to reach more beneficiaries; emphasis on HIV/AIDS, polio, urban development and care of women and children, treatment of communicable diseases.
2012–2016	Twelfth Plan	8.0%	N/A	Basic objective is faster, more inclusive and sustainable growth.

(Continued)

Period	Plan	TG	AG	Remarks
				(Could aim at 9 to 9.5% which will need strong policy action. Major sectoral challenges are energy, water and environment which need to be addressed without sacrificing growth. To find resources to create a world class infrastructure in the country. Require better performance in agriculture, for growth to be more inclusive. Plus, faster creation of jobs, especially in manufacturing and stronger efforts at health, education and skill development are given importance. Also, need to improve effectiveness of programmes directly aimed at the poor, special programmes for socially vulnerable groups and special plans for disadvantaged/backward regions.)

Key Messages from Consultations During the Drafting of the 12th Five Year Plan
Strong demand from all sectors of society to improve implementation, accountability and service delivery. Citizens' Groups broadly support the stated objectives of existing government programmes. However, the design and institutional arrangements are weak. Greater devolution and empowerment are needed. Government programmes need a new architecture: greater localization, break-down of silos, feedback from citizens and mechanisms for learning and sharing of best practices. A major contribution to economic growth now comes from the private sector. A policy environment that supports this dynamism is, therefore, important. Create environment for nurturing enterprise, improving markets, supporting innovation, providing access to finance and inculcating respect for common pool resources.

Twelfth Five Year Plan (2012–16)

On April 2011 the Prime Minister, Dr Manmohan Singh, addressed the Full Planning Commission meeting in New Delhi concerning the Twelfth Five Year Plan of India. Highlights of the white paper on the Twelfth plan are:

Twelfth Plan Resources for the Centre (as percent of GDP)

- Resources for the plan are being worked out in collaboration with the Ministry of Finance.
- A preliminary picture (as percentage of GDP) is:

	11th Plan Realization	12th Plan Projection	2011–12 BE	2016–17
1. Tax Revenue (Net)	7.7	8.0	7.2	8.8
2. Non-tax Revenue incld.	2.4	1.9	2.2	1.6
3. Fiscal Deficit	4.9	3.3	4.6	3.0
4. Total Resources (1+2+3)	**15.0**	**13.2**	**14.0**	**13.4**
5. Non-Plan Expenditure	10.3	8.0	9.1	7.2
6. Centre's GBS (4–5)	**4.7**	**5.4**	**4.9**	**6.2**
(a) Assistance to States	1.2	1.3	1.2	1.4
(b) GBS for Centre	3.5	4.1	3.7	4.8
7. IEBR of PSUs	2.9	3.3	2.9	3.6
8. Central Plan {6(b) + 7}	**6.4**	**7.4**	**6.6**	**8.4**

Resource Allocation Priorities in 12th Plan

- Health and Education received less than projected in 11th Plan. Allocations for these sectors will have to be increased in 12th Plan.
- Health, Education and Skill Development together in the Centre's Plan will have to be increased by at least 1.2% point of GDP.
- Infrastructure, including irrigation and watershed management and urban infrastructure, will need additional 0.7% point of GDP over the next 5 years.
- Since Centre's GBS will rise by only 1.3% points over 5 years, all other sectors will have a slower growth in allocations.
- Must reduce the number of Centrally Sponsored Schemes (CSS) to a few major schemes. For the rest, create new flexi-fund which allow Ministries to experiment in other CSS areas.
- Use of PPP must be encouraged, including in the social sector, i.e., health and education. Efforts on this front need to be intensified.
- Distinction between plan and non-plan being reviewed by Rangarajan Committee.

Poverty Line

Poverty is one of the 8 Millennium Development Goals (MDGs) of the United Nations. In 1980, the Planning Commission, in its Sixth Five-Year Plan document, defined poverty line on the basis of nutritional standards. The people living below the barest desirable nutritional standards of daily calorie intake of 2400 calories per person in rural and 2100 calories per person in urban areas are said to be living below the poverty line.

Tendulkar Committee's report moved away poverty line from calorie intake norm and towards a Uniform Poverty Line Basket based on latest available household consumption data on rural and urban population. Rangarajan Committee report has now redefined poverty line suggesting a calorie-plus norm that would increase poverty numbers. The new consumption basket to redefine poverty line consists of adequate nourishment, clothing, house rent, conveyance, education and a behaviourally determined level of other non-food expenses.

Table 4.2 Population Under Poverty Line

	For Rural Population	For Urban Population	For Total Population
Number and Percentage of population below Poverty Line (2011–12)			
– % age of Persons	33.8	20.9	29.8
– No. of Persons (in lakhs)	2782.1	764.7	3546.8
Monthly Per Capita (in ₹) Poverty Lines for 2009–10	672.8	859.6	
Per Capita Consumption Expenditure on monthly basis converted into a corresponding consumer budget per month for family of five.			2.32
			1.69
			2.18
– Year of NSS Survey 2004–05 (in ₹)			
– Year of NSS Survey 2009–10 (in ₹)	2234	2894	
at prices prevailing in 2004–05 and 2009–10 respectively.	3364	4298	

	For Rural Population	For Urban Population	For Total Population
Rate of reduction in poverty as per the year of NSS Survey			
– 1993–94	50.1	31.8	45.3
– 2004–05	41.8	25.7	37.2
– 2009–10	33.8	20.9	29.8
– Rate of reduction between 1993–94 to 2004–05 (per year)	0.8	0.6	0.7
– Rate of reduction between 2004–05 to 2009–10 (per year)	1.6	1.0	1.5
– Rate of reduction between 2004–05 to 2011–12	2.32	1.69	2.18

Fact Bytes: Poverty in India

➤ The Head Count Ratio (HCR) is obtained using urban and rural poverty lines which are applied on the MPCE distribution of the states. ➤ The aggregated BPL population of the states is used to obtain the final all-India HCR and poverty lines in rural and urban areas. ➤ The all-India HCR has declined by 7.3% points from 37.2% in 2004–05 to 29.8% in 2009–10, with rural poverty declining by 8.0% points from 41.8% to 33.8% and urban poverty declining by 4.8% points from 25.7% to 20.9%. ➤ Poverty ratio in Himachal Pradesh, Madhya Pradesh, Maharashtra, Orissa, Sikkim, Tamil Nadu, Karnataka and Uttarakhand has declined by about 10% points and more. ➤ In Assam, Meghalaya, Manipur, Mizoram and Nagaland, poverty in 2009–10 has increased. ➤ Some of the bigger states such as Bihar, Chhattisgarh and Uttar Pradesh have shown only marginal decline in poverty ratio, particularly in rural areas. ➤ Poverty ratio for Social Groups—In rural areas, Scheduled Tribes exhibit the highest level of poverty (47.4%), followed by Scheduled Castes (SCs), (42.3%) and Other Backward Castes (OBC), (31.9%), against 33.8% for all classes. In urban areas, SCs have HCR of 34.1% followed by STs (30.4%) and OBC (24.3%) against 20.9% for all classes. In rural Bihar and Chhattisgarh, nearly two-third of SCs and STs are poor, whereas in states such as Manipur, Orissa and Uttar Pradesh the poverty ratio for these groups is more than half. ➤ Among religious groups—Sikhs have lowest HCR in rural areas (11.9%) whereas in urban areas, Christians have the lowest proportion (12.9%) of poor. In rural areas, the HCR for Muslims is very high in states such as Assam (53.6%), Uttar Pradesh (44.4%), West Bengal (34.4%) and Gujarat (31.4%). In urban areas poverty ratio at all-India level is highest for Muslims (33.9%). Similarly, for urban areas the poverty ratio is high for Muslims in states such as Rajasthan (29.5%), Uttar Pradesh (49.5%), Gujarat (42.4%), Bihar (56.5%) and West Bengal (34.9%). ➤ For occupational categories—Nearly 50% of agricultural labourers and 40% of other labourers are below the poverty line in rural areas, whereas in urban areas, the poverty ratio for casual labourers is 47.1%. As expected, those in regular wage/salaried employment have the lowest proportion of poor. In the agriculturally prosperous state of Haryana, 55.9% agricultural labourers are poor, whereas in Punjab it is 35.6%. The HCR of casual laborers in urban areas is very high in Bihar (86%), Assam (89%), Orissa (58.8%), Punjab (56.3%), Uttar Pradesh (67.6%) and West Bengal (53.7%).

➤ Based on the Education level of head of the household—In rural areas, as expected, households with 'primary level and lower' education have the highest poverty ratio, whereas the reverse is true for households with 'secondary and higher' education. Nearly two-thirds households with 'primary level of education' in rural areas of Bihar and Chhattisgarh are poor, whereas it is 46.8% for UP and 47.5% for Orissa. The trend is similar in urban areas. ➤ For categories by age and sex of head of the household—In rural areas, it is seen that households headed by minors have poverty ratio of 16.7% and households headed by female and senior citizen have poverty ratio of 29.4% and 30.3%, respectively. In urban areas, households headed by minors have poverty ratio of 15.7% and households headed by female and senior citizen have poverty ratio of 22.1% and 20.0%, respectively against overall poverty ratio of 20.9%. ➤ There has been no uniform measure of poverty in India. ➤ Arjun Sengupta Report (from National Commission for Enterprises in the Unorganized Sector): 77% of Indians live on less than ₹ 20 a day. ➤ N. C. Saxena Committee report: 50% Indian below the poverty line. ➤ Oxford Poverty and Human Development Initiative [using MPI (Multi-dimensional Poverty Index): 645 million living under the MPI in India. ➤ NCAER (National Council of Applied Economic Research) Report: 48% of the Indian households earn more than ₹ 90,000 (US$1998) annually. ➤ World Bank estimates: about 100 million Indians are 'below-the-poverty-line' households (i.e., about 456 million individuals). ➤ Important: The Planning Commission of India has accepted the Tendulkar Committee report which says that 37% of people in India live below the poverty line.

Employment

The number of persons on the live registers of the employment exchanges gives an idea of the trend of unemployment subject to certain limitations. Employment exchanges cover mainly urban areas. Not all the unemployed register their names in exchanges. Further, some already employed again get registered for better employment.

Poverty Alleviation and Employment Generation Programmes

India's anti-poverty strategy comprises a wide range of poverty alleviation and employment generation programmes, many of which have been in operation for several years and have been strengthened to generate more employment, create productive assets, impart technical and entrepreneurial skills, and raise the income level of the poor.

Integrated Rural Development Programme (IRDP) IRDP and its allied programmes were merged into a single self employment programme known as Swarnjayanti Gram Swarozgar Yojana (SGSY).

Swarnjayanti Gram Swarozgar Yojana (SGSY) It was launched in April 1999 after restructuring of the IRDP and allied programmes. The objective of the restructuring is to provide a sustainable income generation through micro-enterprise development, both land-based and otherwise.

Jawahar Rozgar Yojana (JRY) The National Rural Employment Programme (NREP) was introduced in 1980 and and Rural Landless Employment Guarantee Programme (RLEGP) in 1983. On the basis of the SR Hashim Committee report JRY was restructures and made for village specific only, and JRY was renamed as Jawahar Gram Samridhi Yojana (JGSY) in 1999.

The Employment Assurance Scheme (EAS) It has been universalized so as to make it applicable to all the rural blocks of the country. It aims at providing 100 days of unskilled manual work to up to two members of a family. The Ministry of Rural Development, merged the Employment Assurance Scheme (EAS) (the only additional wage employment scheme for rural areas), and the Jawahar Gram Samridhi Yojana (JGSY) (a rural infrastructure development Scheme) into one scheme, and launched the new scheme as Sampoorna Gramin Rozgar Yojana (SGRY) in 2001.

Sampoorna Grameen Rozgar Yojana (SGRY) It was launched in September 2001. The schemes of Jawahar Gram Samridhi Yojana (JGSY) and Employment Assurance Scheme (EAS) have been fully integrated with SGRY.

National Rural Employment Guarantee Act (NREGA) It was enacted by legislation on August 25, 2005 to provide for the enhancement of livelihood security of the households in rural areas of the country by providing at least one hundred days of guaranteed wage employment in every financial year to every household whose adult members volunteer to do unskilled manual work. Through this act, the 100 days of work in rural areas become a legal right. NREGA was renamed as ***Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)*** It was enacted on 2 October 2009 and is implemented throughout the country in the name of 100 Days employment programme in common parlance.

Pradhan Mantri Gramodaya Yojana (PMGY) PMGY was launched in 2000–01 in all the states and UTs in order to achieve the objective of sustainable human development at the village level.

Pradhan Mantri Gramodaya Yojana (Gramin Awas) It seeks to achieve the objective of sustainable habitat development at the village level.

Antyodaya Anna Yojana (AAY) It was launched by the Prime Minister in December 2000. Under the scheme, 2 crore of the poorest families, out of the BPL families covered under the Targeted Public Distribution system, are identified.

Annapurna It was launched on 1 April 2000, as a 100% CSS. It aims at providing food security to meet the requirement of those senior citizens who, though eligible for pension under the National Old Age Pension Scheme, are not getting the same.

Rural Employment Generation Programme (REGP) It was launched in 1995 with the objective of creating self-employment opportunities in the rural areas and small towns, and is being implemented by the Khadi and Village Industries Commission (KVIC).

Prime Minister's Rozgar Yojana (PMRY) It was started with the objective of making available self-employment opportunities to the educated unemployed youth by assisting them to set up any economically viable activity.

Jai Prakash Rozgar Guarantee Yojana (JPRGY) It seeks to provide guaranteed employment to the unemployed in the most distressed districts of the country. Operational modalities for launching of the scheme are being worked out.

Swarna Jayanti Shahari Rozgar Yojana (SJSRY) The Urban Self-Employment Programme and the Urban Wage Employment Programme are two special scheme of the SJSRY, initiated in December 1997, which replaced various programmes operated earlier for urban poverty alleviation.

Valmiki Ambedkar Awas Yojana (VAMBAY) It was formally launched by the Prime Minister on 2 December 2001. The scheme seeks to ameliorate the conditions of the urban slum dwellers living below the poverty line, who do not possess adequate shelter.

Recent Employment Related Schemes and Programmes

Deen Dayal Upadhyaya Grameen Koushalya Yojana (DDU-GKY) It is a placement linked skill development scheme for rural poor youth. This initiative is part of NRLM. The skilling program for rural youth has now been refocused and reprioritized to build the capacity of rural poor youth to address the needs of the domestic and global skill requirements.

Mahatma Gandhi NREGA The National Rural Employment Guarantee Act, (NREGA) was enacted by legislation on August 25, 2005. It aims to provide for the enhancement of livelihood security of the households in rural India through giving minimum 100 days of guaranteed wage employment in annually every household whose adult members volunteer to do unskilled manual work. Through this act, the 100 days of work in rural areas become a legal right. NREGA was renamed as Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) on 2 October 2009.

Intensive and Participatory Planning Exercise (IPPE) To prepare the labour budget for financial year 2015–16 in selected 2500 backward blocks has been initiated.

- Emphasis on agriculture and allied activities to ensure that at least 60% of the works in a district in terms of cost shall be used for creation of productive assets linked to agriculture and allied activities through development of land, water and trees.
- Provision for payment of technical assistants/barefoot engineers from the material Component of the Work.
- Special financial assistance of ₹147 crore for staffing of social audit units.
- Use of machines for works where speed of execution is most critical (like the works in a flood prone area).

National Livelihoods Mission (NRLM) This was launched after restructuring SGSY. It aims at organizing all rural poor households and continuously nurturing and supporting them till they come out of abject poverty, by organizing one woman member from each household into affinity-based.

National Urban Livelihood Mission (NULM) Swarna Jayanti Shahari Rozgar Yojana (SJSRY) which has been restructured into NULM, aims at organizing urban poor in self-help groups, imparting skill training to urban poor for self and wage employment and helping them to set up self-employment venture by providing credit on subsidized rate of interest.

Support to Training and Employment Programme (STEP) The scheme is intended to benefit women who are in the age group of 16 years and above by providing skills to them for their employability.

Special Central Assistance (SCA) to the Scheduled Castes Sub Plan (SCSP) This is a major initiative for uplifting the SCs above the poverty line through self-employment or training. The amount of subsidy admissible is 50 per cent of the project cost.

Nai Manzil for education and skill development was originally planned as a 'course to bridge the academic and skill development gaps of the Deeni Madrasa passouts'. The

scheme that is now targeted to enable minority youth who do not have a formal school-leaving certificate to obtain one and find better employment.

Upgrading the Skills and Training in Traditional Arts/Crafts for Development (USTAAD)   USTAAD aims to conserve traditional arts/crafts of minorities and for building capacity of traditional artisans and craftsmen belonging to minority communities.

Maulana Azad National Academy for Skills (MANAS)   It is for upgrading entrepreneurial skills of minority youth and 'Cyber Gram' to impart training for digital literacy. Direct Benefit Transfer (DBT) has become operational in 2014-15 for transfer of scholarships in the bank accounts of students under various schemes of Post-Matric Scholarship, MCM Scholarship, Padho Pardesh – the scheme for interest subsidy on loans for overseas studies, and Maulana Azad National Fellowship.

INDUSTRIES

Table 4.3   Public Sector Steel Plants

Location	Set-up with Assistance of	Remarks
1. Rourkela (Orissa)	Germany	Set-up under the Second Five-Year Plan at the cost of ₹ 171 crore. It went into production in 1959.
2. Bhilai (Madhya Pradesh)	Russian Government	Set-up under the Second Five-Year Plan at the cost of ₹ 8.5 crore. It went into production in 1959.
3. Durgapur (West Bengal)	British Government	Set-up under the Second Five-Year Plan at the cost of ₹ 188 crore. It went into production in 1962.
4. Bokaro (Jharkhand)	Russian Government	The biggest plant in Asia was set-up under the Fourth Five-Year Plan. It went into production in 1973.
5. Burnpur (West Bengal)		Acquired by the nationalization of private sector plant Indian Iron and Steel Co. in 1976.
6. Vishakhapatnam (AP)	Russian Government	Set-up under the Sixth Five-Year Plan at the cost of ₹ 2256 crore.
7. Salem (Tamil Nadu)		Set-up under the Sixth Five-Year Plan.
8. Bhadrawati (Karnataka)		Nationalized under the Sixth Five-Year Plan.

Major Large-scale Industries

The large-scale industries cover iron and steel, engineering, jute, cotton, textiles and sugar.

1. Iron and steel industry: *History:* In 1870, the first steel company, the Bengal Iron Company, was set-up at Kulti (West Bengal). The first large-scale steel plant came into being in 1907 when the Tata Iron and Steel Company (TISCO) was set-up at Jamshedpur,

followed by the Indian Iron and Steel Company, (IISCO) at Burnpur (Burdwan in West Bengal), in 1919 (Bengal Iron Company was merged with IISCO in 1936).

> *Statewise distribution of industries:* There is great regional imbalance in the location of various industries in India. It can be divided into three regions: (1) *Industrially Advanced States:* Maharashtra, Gujarat, Tamil Nadu and West Bengal, (2) *Middle-level Industrial States:* Andhra Pradesh, Karnataka, U.P., Haryana, Punjab, (3) *Industrially backward States:* Rajasthan, Kerala, Orissa, Himachal Pradesh.

Public Sector Steel Plant

The public sector steel plants are managed by the Steel Authority of India Limited (SAIL). The government of India owns about 86% of SAIL's equity and retains voting control of the company but by virtue of its 'Navratna' status, SAIL enjoys significant operational and financial autonomy.

- *SAIL has four integrated steel plants*: (i) Bhilai Steel Plant (BSP), Chhattisgarh; (ii) Durgapur Steel Plant (DSP), West Bengal; (iii) Rourkela Steel Plant (RSP), Orissa and (iv) Bokaro Steel Plant (BSL), Jharkhand.
- *SAIL has three special steel plants*: (i) Alloy Steel Plants (ASP), West Bengal; (ii) Salem Steel Plant (SSP), Tamil Nadu and (iii) Visvesvaraya Iron and Steel Plant (VISP), Karnataka.
- *SAIL has three subsidiaries*: (i) Indian Iron and Steel Company (IISCO), West Bengal; (ii) Maharashtra Elektrosmelt Limited (MEL), Maharashtra and (iii) Bhilai Oxygen Limited (BOL), New Delhi.

Private Sector Steel Plant

The first large-scale steel plant in the private sector is the Tata Iron and Steel Company (TISCO), Jamshedpur.

Other major steel producers are: Essar Steel, NMDC, Jindal Vijaynagar Steels Ltd, Jindal Strips Ltd, JISCO, Lloyds Steel Industries Ltd, Uttam Steels, Ispat Industries Ltd, Mukand Steels Ltd, Mahindra Ugine Steel Company Ltd, Tata SSL Ltd, Usha Ispat Ltd, Saw Pipes Ltd, Kalyani Steels Ltd, Electro Steel Castings Ltd, NMDC and Sesa Goa Ltd,

2. **Engineering industries:** These industries produce, besides machinery, tools, transport equipment and consumer durables. Automobile sector has demonstrated the inherent strengths of Indian labour and capital. Several Indian firms have succeeded in getting integrated into global production chains and realized rapid growth of exports.

3. **Jute industry:** Most of the country's jute mills are in West Bengal. As a foreign exchange earner, it is an important industry.

4. **Textile industry:** It is the oldest industry and ranks largest in terms of employment economy. With the phasing out of quota regime under MFA, from 1 January 2005, developing countries including India with both textile and clothing capacity may be able to prosper.

5. **Pharma and IT industry:** These are two sunrise sectors of India. Among the sectors that have experienced the greatest transformation in India, the pharmaceutical is perhaps the most significant. In Information Technology (IT), India has built-up valuable brand equity in the global markets. In IT-Enabled Services (ITES), India has emerged as the most preferred destination for Business Process Outsourcing (BPO), a key driver of growth for the software industry and the services sector.

Various Organizations Connected with Industries

1. *Bureau of Indian Standards (BIS):* A quasi-government institution established in 1947 for drawing up standards for the products of the Indian industry. It allots quality marks to various products, known as the *ISI Mark*.
2. *National Productivity Council (NPC):* An autonomous body formed in 1958 to increase productivity in industries. NPC has regional offices throughout India and it endeavours to create productivity consciousness by applying modern methods and techniques for increasing production. To encourage productivity, NPC awards are given annually for the highest productivity in various sectors of industry.

Table 4.4   Principal Manufacturing Regions

Regions/ Main Industries	Jharkhand– Bengal Industrial Belt	Mumbai–Pune	Ahmedabad– Vadodara	Madurai Coimbatore– Bangalore
	(a) Hugli: Jute, Cotton, Electrical, Light engineering goods and Chemicals	Cotton (over one-third of workers), Chemicals, Engineering, Food processing, Printing, Consumer goods	Cotton, Chemicals, Pottery	Cotton, Light consumer goods, Light engineering goods
	(b) Chhotanagpur: Iron and Steel, Wire Rolling, Vehicles	Light Engineering, Consumer goods		

Table 4.5   Important Resources

Resource	Jharkhand– Bengal Industrial Belt	Mumbai–Pune	Ahmedabad– Vadodara	Madurai Coimbatore– Bangalore
Coal	Damodar Valley (Jharkhand), West Bengal, Assam, Orissa, Arunachal Pradesh	Maharashtra and Madhya Pradesh		Andhra Pradesh
Iron Ore	Singhbhum (Jharkhand)	—	—	Small iron and steel works at Bhadravati using ores
			extracted from Baba Budan hills	
Power Hydro- Electricity	Damodar Valley	Important supplies from Western Ghats	—	Cauvery, Jog-Nilgiri Project
Other Raw	Bengal Jute by	Cotton	Cotton from	Some cotton

Resource	Jharkhand–Bengal Industrial Belt	Mumbai–Pune	Ahmedabad–Vadodara	Madurai Coimbatore–Bangalore
Materials (Agricultural)	water routes meeting Damodar Coal (but much of the best Jute has gone to Bangladesh)	Groundnuts on regur soil of plateau to the East	surrounding, sugar, soils, salt from salt pans	in Madurai and Coimbatore

Table 4.6 Important Industries

Minor Regions	Important Industries
Assam Valley	Processing of local tea, rice and oilseeds
Darjeeling terrain	Processing of local tea
North Bihar adjoining Uttar Pradesh plains	Manufacturing sugar from local sugarcane
Delhi–Meerut	Manufacturing of sugar from local sugarcane, some textiles, chemicals, engineering goods
Indore–Ujjain	Cotton cloth for local markets, handicrafts (patronized by former royal courts)
Nagpur–Wardha	Small textiles, iron foundries, railway and general engineering goods, glass and pottery works
Dharwar–Belgaum	Cotton textiles for local and other markets, railway and general engineering goods
Godavari–Krishna delta	Local tobacco, sugarcane, rice and oil, cement, small textiles
Kanpur	Textile and clothing, large modern tanneries, leather works, shoe manufacturing, all founded on early military needs
Chennai	Textiles, light engineering, consumer goods of wide varieties
Malabar–Kollam Trissur	Cashew processing, coconut and oilseeds processing, associated industries (coir manufacturing, soaps) some textiles, numerous handicrafts
Sholapur	Important textiles based on cotton grown in local regular soils, engineering centres

Table 4.7 Important Industries in India

Industry	Location
Aircraft industry	Bangalore and Kanpur
Aluminium	Alwaye (Kerala), Asansol (West Bengal), Belur (Karnataka), Hirakud (Orissa), Renukoot (UP), Muri (Jharkhand), Korba (Chhattisgarh)
Automobiles	Mumbai; Burnpur (West Bengal), Calcutta; Jamshedpur (Jharkhand); Chennai
Cables	Rupnarayanpur (West Bengal), Rajpura (Punjab)
Cement	Bhadravati (Karnataka); Churk (UP); Dalmianagar (Bihar); Gwalior; Kymore and Katni (MP); Okha (Gujarat); Sawai Madhopur (Rajasthan); Sahabad (Karnataka); Surajpur (Punjab)
Coir goods	Alleppey and Kalavoor (Kerala)
Cotton textiles	Ahmedabad (Gujarat), Bangalore (Karnataka), Mumbai (Maharasthra), Kolkata (W. Bengal); Coimbatore (Tamil Nadu); Indore (MP); Kanpur (UP); Ludhiana and Amritsar (Punjab), Chennai, Madurai (Tamil Nadu), Nagpur and Sholapur (Maharashtra)

Industry	Location
Cycles	Ludhiana (Punjab)
D.D.T.	Alwaye (Kerala) and Delhi
Glass items	
(a) Bangles	Firozabad (UP) and Belgaum (Karnataka)
(b) Lampware	Kolkata (W. Bengal); Naini (UP)
(c) Thermos flasks	Faridabad (Haryana)
(d) Glass bottles	Amritsar (Punjab)
(e) Glass lenses	Jabalpur (Madhya Pradesh)
(f) Glass sheets	Bahjoi, Balawali, Ghaziabad, Jaunpur (MP); Bangalore (Karnataka), Mumbai (Maharasthra); Kolkata (W. Bengal); Hyderabad (Telangana); Chennai (Tamil Nadu);
Fertilizer	Nangal, Sindri (Jharkhand); Gorakhpur (UP); Nahorkatiya (Assam); Neyveli (Tamil Nadu); Rourkela (Orissa); Trombay (Maharashtra);
Hosiery goods	Amritsar, Ludhiana (Punjab); Kanpur (UP)
Jute goods	Kolkata (W. Bengal); Gorakhpur, Kanpur (UP)
Lac	Jhalda and Kossipore (West Bengal); Mirzapur and Bareilly (UP)
Leather goods	Kanpur and Agra (UP); Batanagar (West Bengal); Mumbai (Maharashtra); Kolkata (W. Bengal), Chennai (Tamil Nadu);, Delhi
Locomotives	Chittaranjan (West Bengal); Varanasi (UP); Jamshedpur (Jharkhand)
Match boxes	Ahmedabad (Gujarat); Bareilly (UP); Mumbai (Maharashtra); Kolkata, Chennai (Tamilnadu), Pune (Maharashtra); Raipur (Chhattisgarh), Srinagar (J&K)
Paper	Bhadravati (Karnataka), Dalmianagar, Jagadhari (Haryana); Lucknow and Saharanpur (UP); Rajahmundry and Sirpur (Andhra Pradesh); Titagarh (West Bengal); Brajrajnagar (Orissa); Dandeli (Karnataka); Amalai (MP); Ahmedgarh and Malerkotla (Punjab); Nepanagar (Madhya Pradesh); Newsprint paper is produced in Nepanagar.
Petroleum (Refinary)	Guwahati (Assam); Barauni (Bihar); Kadi (Gujarat); Haldia (West Bangal); Mathura (U.P); Digboi (Assam); Panipat (Haryana); Bongaigaon (Assam); Mumbai (Maharashtra); Vishkhapatnam (Andhra pradesh); Kozhi (Kerala); Manadi (Tamil Nadu); Nagapatinam (Tamil Nadu); Magalore (Karnataka); Tatipaka (Andhra Pradesh); Bina (Madhya Pradesh); Bathida (Punjab); Jamnagar (Gujarat); Vadinar (Gurarat)
Penicillin	Pimpri (Maharashtra)
Rail coaches	Perambur (Tamil Nadu); Pune (Maharashtra); Kapurthala (Punjab);
Resin industry	Bareilly (UP); Nahan (Himachal Pradesh)
Rubber goods	Ambapur (Tamil Nadu); Mumbai (Maharashtra); Thiruvananthapuram (Kerala); Bareilly (UP)
Salt	Kuchchh (Gujarat); Sambhar lake (Rajasthan)
Sewing machines	Kolkata, Delhi; Ludhiana (Punjab);
Shipbuilding	Visakhapatnam (Andhra Pradesh); Kochi (kerala); Mumbai, Kolkata (W. Bengal)
Silk	Bangalore (Karnataka); Bhagalpur (Bihar); Srinagar (J&K)
Sugar	Gorakhpur, Sitapur, Rampur, Moradabad, Binjor, Saharanpur, Meerut, Muzaffarnagar (UP); Gaya (Bihar); Zira, Jagraon (Punjab)

(Continued)

Industry	Location
Sports material	Agra and Meerut (UP), Batalla and Jalandhar (Punjab), Delhi
Tanks	Avadi (Tamil Nadu)
Telephone	Bangalore (Karnataka); Naini and Rai Bareilly (UP)
Watches	Jalahalli (Bangalore); Pinjore (Haryana)

Note: The Andhra Pradesh information in the table includes information for both Andhra Pradesh and Telangana.

Table 4.8 Public Sector Industrial Undertakings

Name	Location
Chemical and Pharmaceuticals	
1. Hindustan Organic Chemicals Ltd	Rasayani (Maharashtra)
2. Indian Drugs and Pharmaceuticals Ltd	
(a) Antibiotics Plant (IDPL)	Rishikesh (Uttaranchal)
(b) Synthetic Drugs Project	Hyderabad (AP)
(c) Surgical Instruments Plant	Chennai (TN)
3. Hindustan Antibiotics Ltd	Pimpri (Maharashtra)
4. Hindustan Insecticides Ltd	Alwaye (Kerala) and Delhi
Fertilizers	
1. Fertilizer Corporation of India Ltd	Nangal (Punjab)
	Sindri (Jharkhand)
	Trombay (Maharashtra)
	Gorakhpur (UP)
	Namrup (Assam)
	Durgapur (West Bengal)
2. Heavy Water Plants	Neyveli (Tamil Nadu)
	Nahorkatiya (Assam)
	Rourkela (Orissa)
	Trombay (Maharashtra)
Machinery and Equipment	
1. Bharat Dynamics Ltd	Hyderabad (Telangana)
2. Bharat Electronics Ltd	Jalahalli (Karnataka)
	Ghaziabad (UP)
3. Bharat Heavy Electricals Ltd	Ranipur (UP)
	Ramachandrapuram (AP)
	Tiruchirapalli (TN)
	Bhopal (MP)
4. Bharat Heavy Plate and Vessels Ltd	Visakhapatnam (AP)
5. Central Machine Tools	Bangalore (Karnataka)
6. Chittaranjan Locomotive Works	Chittaranjan (West Bengal)
7. Cochin Shipyard	Kochi (kerala)
8. Diesel Locomotive Works	Marwadeeh, Varanasi (UP)
9. Garden Reach Workshop Ltd	Kolkata (W. Bengal)
10. Heavy Electricals Ltd	Bangalore (Karnataka)
11. Heavy Electricals (India) Ltd	Bhopal (MP)
12. Heavy Engineering Corpn Ltd	Ranchi (Jharkand)

(*Continued*)

Name	Location
13. Heavy Machine Building Plant	Ranchi (Jharkand)
14. Heavy Vehicles Factory	Avadi (Tamil Nadu)
15. Hindustan Cables Factory	Rupnarainpur (West Bengal)
16. Hindustan Machine Tools	Jalahalli near Bangalore (Karnataka), Pinjore (Haryana), Hyderabad (AP) Kalamassery, Kochi (Kerala)
17. Hindustan Shipyard	Visakhapatnam (AP) and Kochi
18. Indian Telephone Industries	Bangalore (Karnataka) Naini Rai Bareilly Mankapur Gonda, (UP)
19. Instrumentation Ltd	Kota (Rajasthan) Palakkad (Kerala)
20. Integral Coach Factory	Perambur (Tamil Nadu) Kotkapur (Punjab)
21. Machine Tool Corporation of India	Ajmer (Rajasthan)
22. Machine Tools Prototype Factory	Ambarnath, Mumbai (Maharashtra)
23. Mazagon Docks Ltd	Mumbai (West Bengal)
24. Mining and Allied Machinery Corporation Ltd	Durgapur
25. Nahan Foundry	Sirmur (HP)
26. National Instruments Factory	Kolkata (West Bengal)
27. Praga Tools Corporation	Hyderabad
28. Triveni Structural Limited	Naini (HP)
29. Tungabhadra Steel Products Ltd	Tungabhadra (Karnataka)
Projects	
1. National Mineral Development Corporation	Hyderabad (Telangana)
2. Hindustan Zinc Limited	Udaipur (Rajasthan)
3. Bharat Aluminium Co Ltd	Korba (MP) Ratnagiri (Maharashtra)
4. Hindustan Copper Ltd	Agnigundala (AP) Dariba (Rajasthan) Malanjkhand (MP) Rakha (Jharkhand)
5. Bharat Coking Coal Ltd	Dhanbad (Jharkhand)
6. Bharat Gold Mines Ltd	Kolar (Karnataka)
7. Coal Mines Authority Ltd	Kolkata (West Bengal)
8. Neyveli Lignite Corporation	Neyveli (Tamil Nadu)
9. Zinc Smelter	Zawar (Rajasthan)
Paper	
1. National Newsprint and Paper Mills Ltd	Nepanagar (MP)
Petroleum	
Indian Refineries Ltd	Barauni (Bihar) Noonmati (Assam)
Cochin Oil Refinery	Kochi (Kerala)
Koyali Oil Refinery	Koyali (Gujarat)
Steel Plants	
1. Hindustan Steel Ltd	Bhilai (MP)
2. Hindustan Steel Ltd	Durgapur (West Bengal)
3. Hindustan Steel Ltd	Rourkela (Orissa)
4. Bokaro Steel Ltd	Bokaro (Jharkhand)

(Continued)

Name	Location
Others	
1. India Explosives Factory	Gomia in Hazaribagh (Jharkhand)
2. Hindustan Photo Films Manufacturing Co Ltd	Ootacamund (Tamil Nadu)

Note: The Andhra Pradesh information in the table includes information for both Andhra Pradesh and Telangana.

Table 4.9 Cottage Industries in India

Name of Industry	States and Cities
Handloom Industry	
1. Sarees and dhotis	Tamil Nadu, Madhya Pradesh, West Bengal, Varanasi, Karnataka
2. Prints	Murshidabad, Farrukhabad, Jaipur, Mumbai, Karnataka
3. Carpets, rugs	Mirzapur, Bhadohi, Ellora, Kashmir, Jaipur, Bangalore
Silk	
Silk sarees	Bangalore, Kanchipuram, Karnataka
Tussar silk	Sambalpur, Ahmedabad
Patola silk	Baroda
Metal and Brassware	
Brass utensils with engraving and polishing	Moradabad
Brassware/metalware	Jaipur, Kashmir, Varanasi, Madurai, Tanjore
Ivory Works	Andhra Pradesh, Kerala, Karnataka, Tamil Nadu, Rajasthan

Note: The Andhra Pradesh information in the table includes information for both Andhra Pradesh and Telangana.

Petroleum and Natural Gases

1. *History:* In 1867, the first oil well was sunk in India. The first successful well was sunk at Digboi in 1889. This oil field is still in operation after more than 100 years. Till Independence, Assam was the only oil-producing state in India. Now oil has also been struck recently by the Hindustan Oil Exploration Company in Cambay basin near Palej, Gujarat. The recently discovered seabed oilfields of Mumbai High are also yielding substantial quantities of oil and are now the richest oilfields of the country.

2. *Exploration:* In order to explore the natural resources of oil and natural gas in the country, the Oil and Natural Gas Commission (ONGC) was set up at Dehradun in 1956.

3. *Organization set up:* The Department of Petroleum under the Ministry of Petroleum, Chemicals and Fertilizers, deals with the exploration and production of oil and natural gas, refineries and distribution work of these.

4. *Oil India Limited (OIL):* It is now a Government of India organization which was incorporated in 1959 with headquarters in Duliajan (Assam) in collaboration with the Burmah Oil Company. In 1981, the government took over the share of the Burmah Oil Company, making Oil entirely a public sector company. The main objectives of OIL are:
   (i) exploration and production of crude oil (including natural gas)
   (ii) construction of pipelines to transport crude oil to the government-owned refineries of Noonmati and Barauni.

5. *Important oil-bearing states/areas:* Assam, Tripura, Manipur, West Bengal, Ganga Valley, Himachal Pradesh, Kuchchh, Andhra Pradesh and offshore areas adjoining West Bengal, Orissa, Andhra Pradesh, Tamil Nadu, Karnataka, Maharashtra and Gujarat.

6. *Main oil fields:* Main oil fields where oil-bearing wells have been drilled are at

   Gujarat : Khambhat, Ankleshwar, Kalol and Mehsana
   Assam   : Digboi, Rudrasagar and Sibsagar
   Punjab : Adampur, Janauri and Jwalamukhi

7. *Off-shore drilling:* Bombay High, in the deep waters of the western coast, where drilling operations have been undertaken with the help of the drilling platform, Sagar Samrat.

Corporations

1. *Indian Oil Corporation (IOC):* Established in 1964 by amalgamating Indian Refinery Limited and Indian Oil Company. It has three divisions: Marketing (headquarters in Mumbai); Refining and Pipeline (headquarters in Delhi) and Assam Oil (headquarters in Digboi).

2. *Bharat Petroleum Corporation Ltd (BPCL):* It came into being through the acquisition of Burmah Shell in 1976 as Bharat Refineries Limited, but in 1 August 1977, the name was changed to Bharat Petroleum Corporation Limited. It is an integrated refining (at Mumbai) and marketing company (throughout the country).

3. *Hindustan Petroleum Corporation Ltd (HPCL):* It was established in 1974 by amalgamating ESSO and Caltex. The government has acquired its full ownership since October 1976. Its main activities include refining of crude oil, manufacturing petroleum and lubricating products and marketing and distribution of these products throughout India. It is a mega public sector undertaking of the 'Nav Ratna' status (conferred by the Indian government).

4. *Gas Authority of India Limited (GAIL):* It is the largest natural gas marketing company in India. It was established in 1984 by the government to handle the transportation, processing, distribution and marketing of natural gas. It completed the tough challenge by the government for completing the cross country HBJ (Hazira, Bijapur and Jagdishpur) Pipeline in record time. It now operates more than 4000 km of gas pipelines stretched across the country.

Table 4.10   Oil Refineries

S. No.	Refinery Location	Name of the Company	Name Plate Capacity (MMTPA)*
PSU Refineries			
1.	Guwahati		1
2.	Barauni		6
3.	Koyali		1370
4.	Haldia	Indian Oil Corporation Ltd (global)	7.5
5.	Mathura		8
6.	Digboi		0.65

S. No.	Refinery Location	Name of the Company	Name Plate Capacity (MMTPA)*
7.	Panipat		15
8.	Bongaigaon		2.35
9.	Mumbai	Hindustan Petroleum Corporation Ltd	6.5
10.	Visakhapatnam		8.3
11.	Mumbai	Bharat Petroleum Corporation Ltd	12
12.	Kochi		9.5
13.	Manali	Chennai Petroleum Corporation Ltd	10.5
14.	Nagapattinam		1
15.	Numaligarh	Numaligarh Refinery Ltd	3
16.	Mangalore	MRPL	15
17.	Tatipaka, AP	ONGC	0.66
		Total	**120.066**
JV Refineries			
18.	Bina		6
19.	Bathinda		9
			15
Private Sector Refineries			
20.	Jamnagar	Reliance Industries Ltd	33
21.	SEZ, Jamnagar		27
22.	Vadinar	Essar Oil Ltd	20
		Total	**80**
		Grand Total	**215.066**

Note: *MMTPA is Million Metric Tonnes per annum and equivalent to approx. 20,000 barrels per day.

Expansion of Existing Refineries: Capacity expansion planned during XII Five Year Plan has been indicated in table below:

S. No.	Name of the Company	Increase in Capacity (MMTPA)*
1.	Indian Oil Corporation Ltd (IOCL)	4.3
2.	Indian Oil Corporation Ltd (IOCL)	0.5
3.	Hindustan Petroleum Corporation Ltd (HPCL)	2
4.	Hindustan Petroleum Corporation Ltd (HPCL)	6.7
5.	Bharat Petroleum Corporation Ltd (BPCL)	1.5
6.	Bharat Petroleum Corporation Ltd (BPCL)	6
7.	Chennai Petroleum Corporation Ltd (CPCL)	0.6
8.	Numaligarh Refinery Ltd (NRL)	5
9.	Mangalore Refinery and Petrochemicals Ltd (MRPL)	3
10.	Bharat Oman Refinery Ltd (Bharat Petroleum Corporation Ltd and Oman Oil Company, Joint Venture), Bina	3
11.	Essar Oil Ltd (EOL), Private Sector	18
	Total	**50.6**

Note: *MMTPA is Million Metric Tonnes per annum and equivalent to approx. 20,000 barrels per day.

Table 4.11   Indian Cities and Towns Associated with Industries

Town	Industry
Agra	Shoes and leather goods
Adoni	Cotton textiles
Aligarh	Locks
Alwaye	Rare earths factory
Ambernath	Machines tools prototype factory– Monazite
Ankleshwar	Oil
Anand	Dairy products (AMUL)
Bangalore	Cotton textiles, aircraft, telephone, toys, carpets, motors and machine tools
Bareilly	Resin Industry and wood work
Bhilai	Steel plant
Bokaro	Steel plant
Mumbai	Cotton textiles, films
Kolkata	Jute, electric bulbs and lamps
Chittaranjan	Locomotive
Delhi	Textile, DDT
Dhariwal	Woollen goods
Digboi	Oil
Durgapur	Steel plant
Firozabad	Glass and glass bangles
Gwalior	Pottery and textiles
Jadwal	Sarees
Jaipur	Embroidery, pottery, brassware
Jamshedpur	Iron and steel
Jharia	Coal
Jalandar	Sports goods
Jawalamukhi	Petroleum
Kanpur	Leather goods/Shoes
Katni	Cement
Khetri	Copper
Ludhiana	Hosiery, sewing machines, cycles
Moradabad	Brass utensils, Calico-printing
Mysore	Silk
Nangal	Fertilizers
Nepanagar	Newsprint
Neyveli	Lignite

(*Continued*)

Town	Industry
Perambur	Rail coach factory
Pimpri (Pune)	Penicillin factory
Pinjore	Machine tool
Raniganj	Coal mining
Rourkela	Steel and fertilizers
Rupnarainpur	Cables
Sindri	Fertilizers
Singhbhum	Copper
Surat	Textiles, Diamond
Sivakasi	Fireworks, Matches
Tiruchirapalli	Cigars
Titagarh	Paper
Trombay	Atomic Power Station
Vishakhapatnam	Ship building

Map 4.1   Major Iron-ore Deposits of India

This map is a sketch only, drawn not to scale, presented for reference and to aid understanding of the concept discussed.

Note: The Andhra Pradesh information in the MAP includes combined information for both Andhra Pradesh and Telangana.

Map 4.2   Major Manganese Deposits of India

This map is a sketch only, drawn not to scale, presented for reference and to aid understanding of the concept discussed.

Note: The Andhra Pradesh information in the MAP includes combined information for both Andhra Pradesh and Telangana.
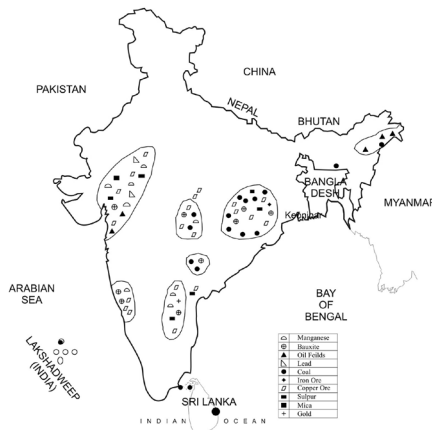
Map 4.3   Major Mineral Deposit Region of India

This map is a sketch only, drawn not to scale, presented for reference and to aid understanding of the concept discussed.

Note: The Andhra Pradesh information in the MAP includes combined information for both Andhra Pradesh and Telangana.
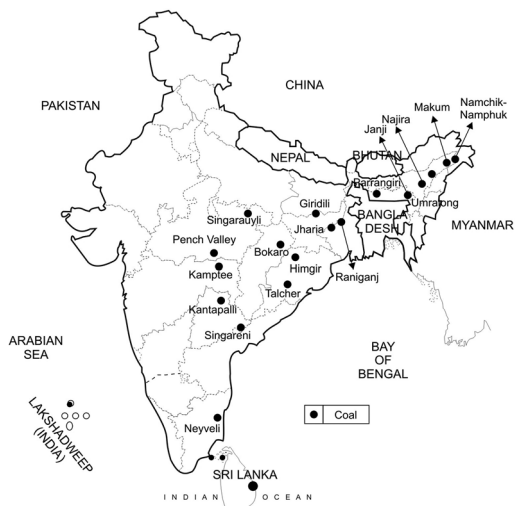
Map 4.4 Location of Coal Fields in India

This map is a sketch only, drawn not to scale, presented for reference and to aid understanding of the concept discussed.

Note: The Andhra Pradesh information in the MAP includes combined information for both Andhra Pradesh and Telangana.

Map 4.5 Location of Oil Refineries of India

This map is a sketch only, drawn not to scale, presented for reference and to aid understanding of the concept discussed.

Note: The Andhra Pradesh information in the MAP includes combined information for both Andhra Pradesh and Telangana.

5 National Insignia and Other Indian Miscellanea

NATIONAL INSIGNIA

National Flag

The National Flag was adopted by the Constituent Assembly of India on 22 July 1947 and presented to India at the midnight session of the Assembly on 14 August 1947.

The ratio of the width of the flag to its length is 2 : 3. All the three bands are of equal width with deep saffron at the top, white in the middle and dark green at the bottom. In the centre of the white band is a wheel in navy-blue colour. The diameter of the wheel (chakra) approximates the width of the white band and it has 24 spokes.

The Flag Code of India 2002

It takes into effect from 26 January 2002 and supersedes the 'Flag Code-Indias' as it existed. As per the provision of the Flag Code of India, 2002, there shall be no restriction on the display of the National flag by members of general public, private organizations, educational institutions, etc., except to the extent provided in the emblems and names (Prevention of Improper Use) Act 1950 and the Prevention of Insults to National Honour Act 1971 and any other law enacted on the subject.

National Emblem

The National Emblem and Seal of the Government of India is a replica of the Capitol of Ashoka's Pillar at Sarnath.

In the original capitol of the stone pillar, four lions are carved out standing back to back. In the emblem, however, only three lions are visible. The capitol is mounted on an abacus (base plate). There is a *Dharma Chakra* (Wheel of the Law) in the centre of the base plate, on the right of which is a figure of a bull and on the left, that of a horse. There is an inscription in Devanagari script which reads *Satyameva Jayate (*from Mundaka Upanishad) which means 'Truth alone triumphs'. The National Emblem was adopted by the Government of India on 26 January 1950.

National Anthem (Jana Gana Mana)

Composer	: Rabindranath Tagore (in 1911)
First Sung on	: 27 December 1911, at the Calcutta Session of the Indian National Congress.
Adopted on	: 24 January 1950, by the Constituent Assembly of India
English Translation	: Rendered by Tagore himself in 1919 under the title 'Morning Song of India'
Playing time	: About 52 seconds for the full version; however, a shorter version comprising the first and the last lines has a playing time of 20 seconds and is played on ceremonial occasions

National Song (Vande Mataram)

Composer   :   Bankimchandra Chatterjee
Adopted on   :   24 January 1950 along with the National Anthem
English Translation :   Rendered by Sri Aurobindo

It has been taken from Bankim Chandra Chatterjee's novel *Ananda Math*, published in 1882. It was composed in Sanskrit and was a source of inspiration to the people in their struggle for freedom. It was first sung during the 1896 session of the Indian National Congress.

National Calendar (Saka)

From 22 March 1957 (Saka 1879) a unified Indian National Calendar to be used for official purposes was introduced based on the Saka era which began with vernal equinox of AD 78. Chaitra is the first month and Phalguna is the last month of the Saka year. Chaitra 1 falls on 22 March in a normal year and on 21 March in a leap year.

National Animal

Since November 1972, the tiger (*Panthera tigris*) has been adopted as the national animal. *Project Tiger:* To check the dwindling tiger population in India, 'Project Tiger' was launched in April 1973. At the moment, there are 49 tiger reserves in India spread in an area of 70,244 km^2.

National Bird

Peacock (*Pavo cristatus*): It is fully protected under the Indian Wildlife (Protection) Act 1972. Adopted as the national bird in 1964, its hunting has since then been banned.

National Flower

Lotus (*Nelumbo nucifera*): It has been an auspicious symbol of Indian culture since time immemorial.

National Tree

The Banyan Tree (*Ficus benghalensis*): It has the widest reaching roots of all known trees, easily covering several acres.

National Fruit

Mango (*Manigifera indica*): It is cultivated throughout India (with exception of hilly areas) since the time immemorial.

Table 5.1   National Days

National	Day and Month	Remarks
Independence Day	15 August	India achieved independence on this day in 1947
Republic Day	26 January	India became a Republic on this day in 1950
Martyrs' Day	30 January	Mahatma Gandhi was assassinated on this day in 1948
Teachers' Day	5 September	Birthday of Dr S. Radhakrishnan, first Vice-President of India
International Literacy Day:	8th September	(To highlight the importance of literacy in life and remind ourselves of the status of literacy and adult learning worldwide.

(*Continued*)

National	Day and Month	Remarks
Gandhi Jayanti	2 October	Birthday of Mahatma Gandhi
National Education Day	11th November	(Birthday of Maulana Abul Kalam Azad, eminent educationist and the first Education Minister of Independent India).
Childrens' Day	14 November	Birthday of Pt. Jawaharlal Nehru

Other Important Days

Other Important Day	Date and Month
Pravasi Bhartiya Divas (NRI Day)	9 January
National Youth Day	12 January
Army Day	15 January
National Voter's Day	25 January
Martyr's Day	30 January (Mahatma Gandhiji's Martyrdom day)
National Rededication Day	28 February
National Science Day	28 February
National Maritime Day	5 April
May Day	1 May
World Environment Day	5 June
Kargil Vijay Diwas	26 July
Quit India Day	19 August
Indian Akshay Urja Day	20 August
National Sports Day	29 August (Marks the birthday of Dhyan Chand, the hockey wizard)
Engineer's Day	15 September
Gandhi Jayanti	2 October
Air Force Day	8 October
Post Office Day	9 October
National Integration Day	9 November
Navy Day	4 December
Flag Day	7 December

Table 5.2   Record Makers (India)

Women	
1. First Prime Minister	Indira Gandhi
2. First Chief Minister of a State	Sucheta Kriplani (Uttar Pradesh)
3. First Cabinet Minister	Vijayalakshmi Pandit
4. First Central Minister	Rajkumari Amrit Kaur
5. First Speaker of Lok Sabha	Shanno Devi

(*Continued*)

Women	
6. First Governor of a State	Sarojini Naidu
7. First President of Indian National Congress	Dr Annie Besant
8. First Indian President of Indian National Congress	Sarojini Naidu
9. First President of UN General Assembly	Vijayalakshmi Pandit
10. First Woman on the throne of Delhi	Razia Sultan
11. First to swim across the English Channel	Arti Saha (now Arti Gupta)
12. First to climb Mount Everest	Bachhendri Pal
13. First to Circumnavigate (Sail round the world)	Ujwala Rai
14. First IAS Officer	Anna George Malhotra
15. First IAS officer of independent India	Isha Basant Joshi
16. First Advocate	Camelia Sorabji
17. First Judge	Anna Chandi
18. First Judge of a High Court	Anna Chandi
19. First Judge of Supreme Court	Justice M. Fathima Beevi
20. First Chief Justice of a High Court	Justice Leila Seth
21. First Doctor	Kadambini Ganguli
22. First to Pass MA	Chandra Mukhi Basu
23. First Editor of English newspaper	Dina Vakil
24. First Chief Engineer	P. K. Thersia Naguli
25. First to receive a Sena Medal	Constable Bimla Devi (88 BN of CRPF)–1990
26. Youngest to Climb Mount Everest	Dicky Dolma (19) from Manali–1993
27. First Magistrate	Omana Kunjamma
28. First woman to climb Mount Everest two times	Santosh Yadav (ITBP officer)–1993
29. First to be crowned 'Miss World'	Reita Faria
30. First to be crowned 'Miss Universe'	Sushmita Sen
31. First to be crowned 'Miss India'	Pratima (1947)
32. First woman cosmonaut from India	Kalpana Chawla
33. First woman President	Pratibha Devisingh Patil
34. First woman to win Nobel Prize	Mother Teresa
35. First Woman pilot	Sarla Thakral
36. First to win Asian Games Medal	Kamaljit Sandhu
37. First Chess Grandmaster	Koneru Humpy
38. First to win Olympic Medal	karnam malleswari
Men	
1. First Indian to swim across the English Channel	Mihir Sen
2. First to Climb Mount Everest	Tenzing Norgay
3. First to climb Mount Everest without Oxygen	Phu Dorjee
4. First to climb Mount Everest twice	Nwang Gombu
5. First Indian to join ICS (now IAS)	Satyendra Nath Tagore

(*Continued*)

Women	
6. First Indian to receive a Nobel Prize	Rabindra Nath Tagore
7. First Indian in Space (first cosmonaut)	Sqn Ldr Rakesh Sharma
8. First British Governor-General	Warren Hastings
9. First Governor-General of Free India	Lord Mountbatten
10. First Viceroy of India	Lord Canning
11. First and the last Indian Governor-General of Free India	C. Rajagopalachari
12. First President of India	Dr Rajendra Prasad
13. First Vice-President of India	Dr S. Radhakrishnan
14. First Muslim President of India	Dr Zakir Hussain
15. First Sikh President of India	Giani Zail Singh
16. First Prime Minister	Pt Jawaharlal Nehru
17. First Speaker of Lok Sabha	G. V. Mavlankar
18. First Chief Justice of India	Justice H. L. Kania
19. First President of Indian National Congress	W. C. Bannerjee
20. First Indian to become member of Viceroy's Executive Council	S. P. Sinha
21. First Indian to become President of International Court of Justice (UN)	Dr Nagendra Singh
22. First Emperor of Mughal Dynasty	Babur
23. First Field Marshal	S. H. F. J. Manekshaw
24. First Indian Commander-in-Chief of India	Gen. K. M. Cariappa
25. First Chief of the Army Staff (India)	Gen. Maharaja Rajendra Singh
Men	
26. First Chief of the Naval Staff (India)	Vice-Admiral R. D. Katari
27. First Chief of the Air Staff (Indian)	Subroto Mukherjee
28. First Air Marshal	Arjan Singh
29. First Indian in British Parliament	Dadabhai Nauroji
30. First Indian to Circumnavigate	Lt Col K. S. Rao
31. First Indian High Court Judge	Justice Syed Mehmood
32. First Indian to make a solo air flight	J. R. D. Tata
33. First Indian leader to visit England	Raja Rammohun Roy
34. First Indian member of House of Lords (Britain)	Lord S. P. Sinha
35. First Bar-at-Law	J. M. Tagore
36. First Chairman of Rajya Sabha	Dr S. Radhakrishnan
37. First Indian Test Cricketer	K. S. Ranjit Singh
38. First Indian to reach the South Pole	Col J. K. Bajaj
39. First Indian recipient of Victoria Cross (highest award before Independence)	Khudada Khan
40. First judge to face impeachment in the Lok Sabha	Justice V. Ramaswami
41. First Indian tennis player to win a grand slam event	Mahesh Bhupathi

WORLD RECORDS HELD BY INDIA

Trade and Industry

1. Largest exporter of tea (over 23,00,000 million tonnes per year).
2. Largest manufacturer of cycles (Hero Cycles).
3. Largest exporter of cut-diamonds (world's 68 % cut diamonds come from India).
4. India tops the world in film production.
5. Reliance Group of Companies in India has the maximum number of shareholders in the world.
6. Brooke Bond Lipton India Ltd. is the world's largest tea manufacturing company.
7. State Bank of India has the maximum number of branches.
8. Indian Railways is the world's largest employer.
9. In 1989 to 1990, India became the largest producer of sugar by producing 85 lakh tonnes.
10. In 1989-90, India become the largest producer of sugar by achieving a production of 85 lakh tonnes.

Agriculture/Natural Resources

1. Largest Producer of millet in the world.
2. Largest producer of tea.
3. Leads the world in irrigated area.
4. Leads the world in cattle population.
5. Largest producer of Cardamom (Kerala produces 60 % of the total world production).
6. Largest exporter of spices in the world.
7. Largest turmeric production in the world.
8. Largest ginger production in the world.
9. Largest sugarcane producer in the world.
10. Largest grower of pulses in the world.
11. Highest yield of potato—46,797 kg/ha.
12. Highest rice yield—17,862 kg/ha.
13. Highest productivity of grapes (22 tonnes/ha).
14. Largest producer of milk.
15. Largest producer of mangoes.

Buildings/Roads/Bridges

1. Khardungla Road in Leh–Manali sector is the world's highest road (5602 m above sea level).
2. All India Radio, Leh, is the world's highest radio station.
3. Qutab Minar is India's tallest minaret.
4. Mahatma Gandhi Setu (over Ganga at Patna) is the world's longest river bridge.
5. Kharagpur Railway Platform in West Bengal is the world's longest railway platform (833 m).
6. Farakka River Barrage (Kolkata) is the world's largest river barrage.
7. Yuva Bharati Stadium, Kolkata, is the world's largest covered stadium.
8. First hospital on wheels in the world—Jeevan Rekha (Life Line) Express.

Miscellaneous

1. The Ganges and Brahmaputra Delta (Sunderbans) form the world's largest delta (7500 km^2).

2. Indira Gandhi National Open University (IGNOU) has emerged as the world's largest open university.
3. India has the world's largest reserves of iron (approx. one-fourth of the world's known reserves).
4. India has the largest deposits of mica in the world.
5. South Point High School, Kolkata, is the world's largest school.
6. World's highest post office is at Spiti Valley in HP.

Individual Achievements

1. Shakuntla Devi holds the world record for fastest computing—faster than a computer.
2. Dr Rajinder Singh of Himachal Pradesh holds the world record for accurate and fastest typing (96.8 wpm, 1998).
3. Shambhoo Govind Anbhawane holds the world record for marathon typing (non-stop typing) (123 hours).
4. Dr M. C. Modi holds the world record for performing maximum eye operations at the rate of 40 operations per hour.
5. Mihir Sen of Kolkata holds the world record for long distance swimming.
6. Capt. Durga Bannerjee is the world's first woman air pilot holding the record for logging maximum flying hours.
7. Lata Mangeshkar holds the world record for maximum number of recordings.
8. Dicky Dolma from Manali holds the world record for being the youngest climber of Mount Everest at the age of 19 years.
9. Ms Santosh Yadav holds the record for climbing Mount Everest twice (among women).

Table 5.3   India's Superlatives

Structures	
Highest Tower (Minaret)	Qutub Minar
Highest Gateway	Buland Darwaza (Fatehpur Sikri)
Highest Dam	Bhakra Dam
Highest Bridge	Chambal Bridge
Largest Residence	Rashtrapati Bhawan
Largest Cinema Hall	Thangam (Madurai)—Capacity over 2500 seats
Largest Museum	Indian Museum, Kolkata
Largest City	Kolkata
Largest Tunnel	Jawahar Tunnel
Largest River Barrage	Farakka Barrage
Longest Dam	Hirakud Dam
Largest Auditorium	Sri Shanmukhanda Hall, Mumbai (3012 seats)
Largest Zoo	Zoological Garden, Alipur (Kolkata)
Largest Cave Temple	Ellora
Largest Gurudwara	Golden Temple, Amritsar
Biggest Church	The St John's Cathedral, Goa
Largest Mosque	Jama Masjid, Delhi
Largest Dome	Gol Gumbaz, Bijapur (Karnataka)

(*Continued*)

Structures	
Largest Cantilever Bridge	Howrah Bridge
Longest River Bridge	Mahatma Gandhi Setu, Patna
Longest Corridor	Rameshwaram Temple Corridor
Longest Platform (Railway)	Kharagpur (World's longest)
Longest Road Bridge	Sone Bridge, Bihar
Longest Road	G. T. Road
Biggest Fort	Red Fort, Delhi
Tallest Light House	Prongs Reef, Mumbai
Tallest Statue	Gomateshwar Statue, Mysore
Tallest Chimney	Thermal power station of Tata Electric Co., Mumbai (275 m high)
Largest man-made Lake	Govind Sagar (Bhakra)

Natural	
Highest Mountain Peak	Nanga Parbat
Longest River	Ganges
Largest Desert	Thar (Rajasthan)
Largest Delta	Sunderbans (West Bengal)
Largest Lake	Wular Lake

States	
Largest State	Rajasthan
Smallest State	Goa
Largest Union Territory	Andaman and Nicobar Islands
Smallest Union Territory	Lakshadweep
State having Maximum Number of Cities	Uttar Pradesh
Most Densely Populated State	West Bengal
Most Populous State	Uttar Pradesh
State with Maximum Forest Area	Madhya Pradesh
State with Highest Cattle Population	Uttar Pradesh
State having Highest Literacy Rate	Kerala
Union Territory having Highest Literacy Rate	Chandigarh
State with Highest Mineral Output	Jharkhand
State having Maximum Paper Mills	Uttar Pradesh
State producing Maximum Sugar	Uttar Pradesh
State producing Maximum Wheat	Uttar Pradesh
State producing Maximum Rice	West Bengal
State producing Maximum Tea	Assam
State producing Maximum Cotton	Gujarat
State producing Maximum Sugarcane	Uttar Pradesh

Important National Awards

Bharat Ratna is the highest civilian honour of the country. It is awarded in recognition of exceptional service/performance of the highest order in any field of human endeavour. Instituted in the year 1954, this Award has been conferred on 41 persons so far. It was last conferred on Sachin Tendulkar and Prof. Chirtmani Nagesa Ramachandra Roa (C. N. R. Rao) for the year 2014.

Padma Awards are conferred in three categories, namely, 'Padma Vibhushan', 'Padma Bhushan' and 'Padma Shri'. The Awards are given in all disciplines/fields of activities, *viz.*, art, social work, public affairs, science and engineering, trade and industry, medicine, literature and education, sports, civil service and others. The Padma Vibhushan is awarded for exceptional and distinguished service in any field; Padma Bhushan for distinguished service of a high order in any field and Padma Shri for distinguished service in any field.

DANCES OF INDIA

Bharatanatyam

A solo dance, originating from the temples of South India, it is based on *Natya Shastra*, written by Bharat Muni in around 4000 BC. It is a highly traditional dance form comprising items such as *alarippu*, *varnam*, *padam*, *thillana*, etc.

Odissi

It is a dance form which originated in Orissa during second century BC. It is also based on the principles of *Natya Shastra*.

Chakyarkoothu

It is a highly orthodox dance form believed to have been introduced to *Kerala* by the earlier Aryan immigrants. It is performed by the members of Chakyar caste inside the temples and is only witnessed by the Hindus of higher castes.

Manipuri

Manipuri is a dance form popular in the north-east. It is a highly lyrical and ritualistic dance but lacks dramatic facial and gestural expressions.

Kuchipudi

Kuchipudi is a solo dance popular in Andhra Pradesh. It is also based on the principles of *Natya Shastra*. Traditionally it was performed by men attired like women.

Kathak

It is a popular dance of North India which originated in temples in the form of Radha and Krishna lilas. With the advent of muslim rule, it came out of the temples to Mughal courts. Lucknow, Jaipur and Varanasi became its centres.

Kathakali

It is a popular dance from Kerala, which is more dramatic than narrative in form. It is considered to be the most scientific dance form. The body gestures, hand movement and eye/eyeball movements comprise its language.

Mohiniattam

It is a solo dance form from Kerala. It is also the heir to Devdasi dance heritage similar to Bharatanatyam, Odissi and Kuchipudi.

Ottamthullal

Also known as *poor man's Kathakali*, it is a solo dance which originated in Kerala.

Table 5.4   Other Popular Dances

Dance	State
Bhangra	Punjab and Haryana
Bidesia	Bihar
Bihu	Assam
Chakri	Jammu and Kashmir
Chamar Gindad	Rajasthan
Chau	West Bengal
Chiraw (Bamboo dance)	Mizoram
Dandiya Raas	Rajasthan
Danda Nata	Orissa
Dasi Attam	Kerala
Garba	Gujarat
Ganpati Bhajan	Gujarat
Gangore	Rajasthan
Gidda	Punjab and Haryana
Giddha/Parhaun	Himachal Pradesh
Gopiki Leela	Rajasthan
Jata Jatin	Bihar
Jatra	West Bengal
Ghoomar	Rajasthan
Kajir	Uttar Pradesh
Kayanga Bakayanga	Himachal Pradesh
Karyala	Himachal Pradesh
Kammi	Tamil Nadu
Khayal	Rajasthan
Khel Gopal	Assam
Kolattam	Tamil Nadu
Koodiyattam	Kerala
Kottam	Andhra Pradesh
Krishnavattam	Kerala
Lagui	Bihar
Lai Haroba	Manipur
Lota	Madhya Pradesh
Luddi Dance	Himachal Pradesh

(*Continued*)

Dance	State
Munzra	Himachal Pradesh
Nachari	Bihar
Nautanki	Uttar Pradesh
Pandavani	Madhya Pradesh
Raslila	Gujarat
Roof	Jammu & Kashmir
Swang	Haryana
Tamasha	Maharashtra
Therukkoothu	Tamil Nadu
Tobal Chougbi	Assam
Veeti Bhagavatam	Andhra Pradesh
Wangala Laho	Meghalaya
Yakshagana	Karnataka

TRANSPORT AND COMMUNICATION

Postal Service

- First postal service started in: 1837
- First postal stamp issued (provincial): 1852 in Karachi
- First all-India postal stamp issued: 1854
- Establishment of Postal Department: 1854
- Money Order service started in: 1880
- Postal Life Insurance (PLI) introduced on Feb 1, 1884.
- Airmail Service: 1911 (Allahabad to Nainital)
- PIN Code started: 1972
- Number of post offices in India: 1,54,939 as on March 2015 [Rural Area: 1,39,222 (89.86%); Urban Area: 15,717 (10.14%)]
- On an average a post office in India serves a geographic area of about 21.25 sq. km and a population of 7811 people.
- India has the largest postal network in the world and it has 3 catergories of post offices: Head Post offices, Sub-Post Offices and Extra Departmental Branch Post Offices.
- Indian postal network has grown 7 times since independence.
- In addition to post offices the basic postal facilities are also offered through Franchise Outlets and Panchayat Sanchar Seva kendras. As on March 2013, there are 2,066 Franchise Outlets and 2,658 Panchayat Sanchar Seva Kendras (PSSKs) in India.

Telecommunication

- First telephone line: 1851, between Kolkata and Diamond Harbour
- First telephone service: 1881 Kolkata
- First telephone exchange: 1881 Kolkata (50 lines only)

- First international telephone line: 1870 between London and Mumbai
- First automatic telephone exchange: Shimla, 1913–14 (Capacity—700 lines)
- Number of telephone subscribers in India (as on June 2015)
  - 100.743 crores total (Landline: 2.620 crore and Mobile/Wireless: 98.123 crores)
  - Number of telephones (Rural 42.342 crores; Urban: 58.400 crores)
  - Villages covered with VPT is 5.82 lakh (98.13%) as on March 2015.
  - Number of Broadband subscribers is 10.496 crores
  - Number of Internet subscribers incl. Broadband (as on March 2015) 30.235 crores.
- First automatic telephone exchange—Shimla, 1913–14 (Capacity—700 lines)
- Department of Telecommunications (DoT) has four PSUs:
  - (i) MTNL (Mahanagar Telephone Nigam Ltd.)
  - (ii) BSNL (Bharat Sanchar Nigam Ltd.)
  - (iii) ITI Ltd.
  - (iv) TCIL (Telecommunications Consultants India Ltd.)
- Average Teledensity in India—80.02% (as on June 2015) (Rural 48.78% and Urban 149.34%)

Indian Railways

Important Facts

First train in India   :   On 16 April 1853–Mumbai to Thane
Fastest Train   :   The Gatiman Express (Between Delhi and Agra)
First Electric Train   :   Deccan Queen (Between Kalyan and Pune)

Other Facts About Indian Railways

- The Indian Railway system is the third largest in Asia and fourth in the world after US, China and Russia.
- It is the eighth biggest employer in the world and largest single undertaking in the country.
- It has the third biggest electrified system in the world after China and Russia.

Table 5.5   Railway Tracks

Rail Tracks	Distance between Rails	Route (kms)
1. Broad Gauge	1676 mm	58,825
2. Metre Gauge	1000 mm	4,908
3. Narrow Gauge	762 mm/610 mm	2.297
Total		**66,030**

Special Notes:

1. Total Running Track (as of 31.03.2015) is 90,803 kms; whereas total Track is 1,17,996 kms.
2. Out of total route kilometers as on 31.03.2015 was 66,030 kms, out of which, 31.25% is double/multiple track.
3. By 31.03.2015 total of 22,224 kms of the route was electrified (which means, the percentage of electrified to total route kms is now 33.66%)

Railway Zones

There are seventeen zones:

PSUs of Indian Railways
1. RITES (Rail India Technical and Economic Services Ltd.)
2. IRCON (Indian Railway Construction) International Ltd.
3. IRFC (Indian Railway Finance Corporation Ltd.)
4. CONCOR (Container Corporation of India Ltd.)
5. KRCL (Konkan Railway Corporation Ltd.)
6. MVRL (Mumbai Railway Vikas Corporation Ltd.)
7. IRCTC (Indian Railway Catering and Tourism Corporation Ltd.)
8. Rail Tel (Railtel Corporation of India Ltd.)
9. MRVNL (Mumbai Rail Vikas Nigam Ltd.)
10. RVNL (Rail Vikas Nigam Ltd.)
11. DFCCIL (Dedicated Freight Corridor Corporation of India Ltd.)
12. BWFL (Bharat Wagon and Engineering Company Ltd.)
13. BCL (Braithwaite and Company Ltd.)

Plus, CRIS (Centre for Railway Information Systems)—a registered society to design and implement various railway computerization projects and RDSO (Research and Development Standards Organization) at Lucknow is the R&D wing of Indian Railways.

Table 5.6 Railway Zones

Zone	Date when created	Headquarters
1. Southern	14 April 1951	Chennai
2. Central	5 November 1955	Mumbai CST
3. Western	5 November 1951	Mumbai
4. Northern	14 April 1951	New Delhi
5. North-Eastern	14 April 1952	Gorakhpur
6. Eastern	1 August 1955	Kolkata
7. South-Eastern	1 August 1955	Kolkata
8. North-East-Frontier	15 January 1958	Maligaon-Guwahati
9. South-Central	2 October 1966	Secunderabad
10. East Central	1 October 2002	Hajipur
11. East Coast	1 April 2003	Bhubaneswar
12. North Central	1 April 2003	Allahabad
13. North Western	1 October 2002	Jaipur
14. South East Central	1 April 2003	Bilaspur
15. South Western	1 April 2003	Hubli
16. West Central	1 April 2003	Jabalpur
17. Metro Railways	24 October 1984	Kolkata

Table 5.7 Railway Manufacturing Units

Name	Location	Estd in	Items Manufactured
1. Chittaranjan Locomotive Works	Chittaranjan	1950	Locomotives
2. Diesel Locomotive Works	Varanasi	1964	Locomotives
3. Integral Coach Factory	Perambur	1955	Coaches

Name	Location	Estd in	Items Manufactured
4. Rail Coach Factory	Kapurthala	1988	Coaches, wagons and special containers
5. Rail Wheel Factory	Bangalore	2004	Wheels and axles

Roads

Expressways	200 km
National Highways/Expressways	96,262.72 km
State Highways	01,31,899 km
Major District Roads	4,67,763 km
Rural Roads	26,50,000 km

National Highways (% Age in Terms of Width)

Single lane	19,430 km (24%)
Double Lane	40,658 km (52%)
Four lane/Six lane/Eight lane	19,155 km (24%)

Other Facts about Roads in India
- Indian road network of 33 lakh kilometers is the second largest in the world.
- National Highways comprise about 1.7% of the length of roads.
- National Highways carry over 40% of the total traffic across the length and breadth of India.
- About 65% of freight and 80% passenger traffic is carried by the roads.
- Number of vehicles have been growing at an average pace of 10.16% per annum over the last five years.

List of State-wise Important National Highways in India

Sl. No.	Name of State	National Highway No.	Total Length (in km)
1.	Andhra Pradesh	4, 5, 7, 9, 16, 18, 18A, 43, 63, 202, 205, 214, 214A, 219, 221, 222 and 234	5231.74
2.	Arunachal Pradesh	52, 52A, 153, 229, 52B Ext. and 37 Ext.	2513.05
3.	Assam	31, 31B, 31C, 36, 37, 37A, 38, 39, 44, 51, 52, 52A, 52B, 53, 54, 61, 62, 151, 152, 153 and 154	3811.67
4.	Bihar	2, 2C, 19, 28, 28A, 28B, 30, 30A, 31, 57, 57A, 77, 80, 81, 82, 83, 84, 85, 98, 99, 101, 102, 103, 104, 105, 106, 107 and 110	4678.79
5.	Chandigarh	21	15.28
6.	Chhattisgarh	6, 12A, 16, 43, 78, 200, 202, 216, 217, 111 and 221	3078.40
7.	Dadar Nagar Haveli	848A New	31.00
8.	Daman & Diu	848B New & 251 New	22.00
9.	Delhi	1, 2, 8, 10, 24 and 236	80
10.	Goa	4A, 17, 17A and 17B	262

(*Continued*)

Sl. No.	Name of State	National Highway No.	Total Length (in km)
11.	Gujarat	NE-1, 6, 8, 8A, 8B, 8C, 8D, 8E, 14, 15, 59, 113 and 228	4970
12.	Haryana	1, 2, 8, 10, 21A, 22, 64, 65, 71, 71A, 72, 73, 73A, 71B, 236 and NE-II	2622.48
13.	Himachal Pradesh	1A, 20, 20A, 21, 21A, 22, 70, 72, 72B, 88, and 73A	2622.48
14.	Jammu and Kashmir	1A, 1B, 1C and 1D	2593
15.	Jharkhand	2, 6, 23, 31, 32, 33, 75, 78, 80, 98, 99 and 100	2653.64
16.	Karnataka	4, 4A, 7, 9, 13, 17, 48, 63, 67, 206, 207, 209, 212, 218 and 234	6502.29
17.	Kerala	17, 47, 47A, 47C, 49, 208, 212, 213 and 220	1811.52
18.	Madhya Pradesh	3, 7, 12, 12A, 25, 26, 26A, 26B, 27, 59, 59A, 69, 69A, 75, 76, 78, 86 and 92	5193.57
19.	Maharashtra	3, 4, 4B, 4C, 6, 7, 8, 9, 13, 16, 17, 26B, 50, 69, 69A, 75, 76, 78, 86 and 92	7434.79
20.	Manipur	39, 53, 150 and 155	1745.74
21.	Meghalaya	40, 44, 51 and 62	1204.36
22.	Mizoram	44A, 54, 54A, 54 B, 150 and 154	1381.0
23.	Nagaland	36, 39, 61, 150 and 155	1150.0
24.	Orissa	5, 5A, 6, 23, 42, 43, 60, 75, 200, 201, 203, 203A, 215, 217 and 224	4644.52
25.	Pudducherry	45A and 66	64.03
26.	Punjab	1, 1A, 10, 15, 20, 21, 22, 64, 70, 71, 72 and 95	2769.15
27.	Rajasthan	3, 8, 11, 11A, 11B, 11C, 12, 14, 15, 65, 71B, 76, 79, 79A, 89, 90, 113, 112, 114 and 116	7906.2
28.	Sikkim	31A	309
29.	Tamil Nadu	4, 5, 7, 7A, 45, 45A, 45B, 45C, 46, 47, 47B, 49, 66, 67, 68, 205, 207, 208, 209, 210, 219, 220, 226, 226E, 227, 230 and 234	5006.15
30.	Telangana	7, 9, 16, 202, 221, 222, 223, 326 New, 167 New, 150 New, 363 New, 365 New, 161, 765 New, 50 New, 563 New, & 365 A New	2635.84
31.	Tripura	44 and 44A	577
32.	Uttarakhand	58, 72, 72A, 72B, 73, 74, 87, 94, 108, 109, 123, 119, 121, 87 Ext. and 125	2841.92
33.	Uttar Pradesh	2, 2A, 3, 7, 11, 12A, 19, 24, 24A, 24B, 25, 25A, 26, 27, 28, 28B, 28C, 29, 56, 56A, 56B, 58, 72A, 73, 74, 75, 76, 86, 87, 91, 91A, 92, 93, 96, 97, 119, 231, 232, 232A, 233, 235 and NE-II	8483.00
34.	West Bengal	2, 2B, 2B Ext., 6, 31, 31A, 31C, 31D, 32, 34, 35, 41, 55, 60, 60A, 80, 81 and 117	2909.80
35.	Andaman and Nicobar Islands	223	330.70

(Ext–Extension; NE–National Expressway)

Shipping

Shipping plays a significant role in the transport sector of India's economy. India's merchant shipping fleet ranks 20th in the world. Shipping Corporation of India (SCI): Established on 2 October 1961, SCI became a Public Limited entity on 18 September 1992 and was subsequently conferred 'Mini Ratna' status on 24 February 2000. SCI in India is a pioneer for: (a) STS operations for crude PDL and dry cargoes; (b) Crifogenic Operations (LNG/LPG); (c) Joint Ventures and other type of collaborations in Shipping and (d) Shipping Consultancy services.

> **Major Shipyards**
> - Cochin Shipyard Ltd. (CSL)
> - Hindustan Shipyard Ltd. (HSL)
> - Hooghly Dock and Port Engineers Ltd. (HDPEL)

Other Facts About Shipping in India
- About 90% of India's trade volume (70% in terms of value) is moved by sea.
- Indian merchant shipping fleet ranks 16th in the world and is the largest among the developing nations.
- Average age of Indian merchant shipping fleet is 18.03 years only.
- The 7517 km long Indian coastline is studded with 12 major ports and 187 non-major ports.
- The strengthened aids to navigation consists of 1 lightship, 178 lighthouses, 64 Racons, 21 Deep Sea Lighted Buoys, 2 Wrek Marking Buoys and 23 Differential Global Positioning Systems (DGPS).

Table 5.8 12 Major Ports of India

Sea Port	State	Sea	Coast Side
1. Mumbai	Maharashtra	Arabian Sea	West
2. Kolkata	West Bengal	Bay of Bengal	East
3. Kochi	Kerala	Arabian Sea	West
4. Kandla	Gujarat	Gulf of Kutch	West
5. Chennai	Tamil Nadu	Bay of Bengal (Indian Sea)	East
6. Mormugao	Goa	Arabian Sea	West
7. Mangalore	Karnataka	Arabian Sea	West
8. Tuticorin	Tamil Nadu	Indian Ocean	East
9. Visakhapatnam	Andhra Pradesh	Bay of Bengal	East
10. Paradeep	Orissa	Bay of Bengal	East
11. Nhava Sheva	Mumbai	Arabian Sea	West
12. Ennore	Maharashtra	Arabian Sea	East

India, with a coastline of 7500 km, has 12 major ports which are directly under Government of India's administration. There are about 187 minor and intermediate ports in the country.

National Waterways

Among world's longest navigable and inland water networks, spanning over 14000 kms length of navigable river, are Indian waterways. However, cargo transport through these

inland waterways is, presently less not even 1% of the total cargo payment in the country. Waterways declared as 'National Waterways (NW)' are:

1. *Allahabad-Haldia stretch* (1620 km) of the Ganga-Bhagirathi-Hoogly river system (NW-I) in 1986;

2. *Sadiya-Dhubri stretch* (891 km) of Brahmaputra river (NW-2) in 1988;

3. *Kottapuram-Kollam stretch of West Coast Canal* alongwith Chempakara Canal and Udyogmandal Canal (205 km) N -3 in 1993;

4. *Kakinada-Puducherry* stretch of Canal and Kalurelly Tank, stretches of river Godavari and Krishna river (1995 km); and

5. *Takher Dhamra Stretch of river Brahmani*, Geonkhali Charbatia stretch of East Coast Canal, Charbatia-Dhamra stetch of Matai river alongwith Mahanadi delta river system (62 km)

Inland Waterways Authority of India (IWAI) was set up in 1986 for regulation of shipping and navigation. It is primarily responsible for development, maintenance and regulation of national waterways.

Air Transport

First Solo Flight: J. R. D. Tata, from Mumbai to Karachi (now in Pakistan) in 1931.

There are 449 airports/airstrips in the country, out of which Airports Authority of India (AAI) manages a total of 115 airports, which include 11 International Airports, 08 Customs Airports, 73 Domestic Airports and 23 Civil Enclaves at Defence Airfields. AAI also provides Air Traffic Management Services (ATMS) over entire Indian Air Space and adjoining oceanic areas with ground installations at all Airports and 25 other locations to ensure safety of Aircraft operations.

The airports at Ahmedabad, Amritsar, Calicut, Guwahati, Jaipur, Trivandrum, Kolkata and Chennai, which have been established as International Airports, are open to operations even by Foreign International Airlines. Besides, the International flights, National Flag Carriers operate from Coimbatore, Tiruchirappalli, Varanasi and Gaya Airports. Not only this but also the Tourist Charters now touch Agra, Coimbatore, Jaipur, Lucknow, Patna Airports, etc. AAI has entered into a Joint Venture at Mumbai, Delhi, Hyderabad, Bangalore and Nagpur Airports to upgrade these Airports and emulate the world standards.

Indian Civil Aviation completed 100 years on 18th February, 2011. The year 2011–12 is declared as the Civil Aviation Centenary Year, starting from 18th February, 2011 and ending on the same date in 2012. On this date in 1911, the first commercial plane flew in India between Allahabad and Naini. Since then, aviation in India has grown from strength to strength. Today India is the 9th largest civil aviation market in the world and this forward march is likely to culminate in India becoming one of the three largest markets in the world by 2020.

All major air-routes over Indian landmass are radar covered (29 radar installations at 11 locations) along with VOR/DVOR coverage (89 installations) co-located with Distance Measuring Equipment (90 installations). 52 runways are provided with ILS installations

with Night Landing Facilities at most of these Airports and Automatic Message Switching System at 15 Airports.

Air transport in India operates at three levels: (1) Air India (International level); (2) Air India (domestic level) and (3) Private Airlines and charters such as 8 private scheduled operators—Jet, Go Airways, Go Airlines and Inter Globe (Indigo).

However, recently Indian and some private airlines have been allowed to fly across some select international destinations.

The merger of Air India (erstwhile) and Indian Airlines was approved by the Government on 1 March, 2007 and a new company *viz.*, National Aviation Company of India Limited (NACIL) was incorporated on 30 March, 2007 with the brand name of 'Air India'. The merger of two airlines was envisaged to provide, among other benefits, an integrated international/domestic footprint which will significantly enhance customer proposition and allow easy entry into one of the three global airline alliances. Also, it will enable optimal utilization of existing resources through improvement in load factors and yields, on commonly used service routes as well as deploy 'freed up' aircraft capacity on alternate routes.

The Airports in India are Presently Classified as:

1. *International Airports:* The airports are available for scheduled international operations by Indian and foreign carriers.
2. *Custom Airports:* Custom Airports have customs and immigration facilities for limited international operations by national carriers and for foreign tourist and cargo charter flights. These include the airports at Bangalore, Hyderabad, Ahmedabad, Kozhikode, Kochi, Goa, Varanasi, Patna, Agra, Jaipur, Amritsar and Tiruchirapalli.
3. *Model Airports:* Model Airports are domestic airports which have a minimum runway length of 7500 feet and adequate terminal capacity to handle Airbus A320 type of aircraft and can cater to limited international traffic, if required. These include the airports at Lucknow, Bhubaneswar, Guwahati, Nagpur, Vadodara, Coimbatore, Imphal and Indore.
4. *Other Domestic Airports:* All other airports are covered in this category.
5. *Civil Enclaves in Defence Airports:* There are 28 civil enclaves in Defence Airfields.

Major Airports of India

1. Amritsar International Airport (Raja Sansi Airport)	Amritsar
2. Indira Gandhi International Airport	New Delhi
3. Lokpriya Gopinath Bordolio International Airport	Guwahati
4. Sardar Vallabhbhai Patel International Airport	Ahmedabad
5. Netaji Subhash Chandra Bose International Airport	Kolkata
6. Chhatrapati Shivaji International Airport	Mumbai
7. Rajiv Gandhi International Airport	Shamshabad (Hyderabad)
8. Goa Airport	Dabolim (Goa)
9. Chennai International Airport (Meenambakkam Airport)	Chennai
10. Bengaluru International Airport	Devanhalli (Bengaluru)
11. Cochin International Airport	Kochi
12. Trivandrum International Airport	Thiruvananathapuram
13. Kozhikode Airport	Calicut
14. Pune Airport	Pune

Major Domestic Airlines of India

1. Indigo
2. Jet Airways and Jetlite
3. Spicejet
4. Air India
5. GoAir
6. AirAsia India
7. Air Costa
8. Vistara Airlines

Pawan Hans Helicopters Limited (PHHL): Incorporated in 1985, PHHL commenced its operations within one year to provide helicopter services to the oil sector, in hilly and inaccessible areas and to make available charter flights for promotion of travel and tourism. PHHL has a fleet of 35 helicopters and operates from 39 destinations covering 64 sectors by 148 weekly flights under the aegis of the State Governments of Meghalaya, Tripura, Sikkim and Arunachal Pradesh.

Seaplane Operations: On 27 December 2010, the Seaplane service was operationalized in Andaman and Nicobar Islands as per MOU signed between Andaman and Nicobar Administration and Pawan Hans Helicopters. This is the first time that Seaplane operations are being introduced in India. The service shall be provided with a Cessna 208A (capacity 2+8 passengers) Amphibian seaplane.

Project GAGAN

GAGAN (GPS Aided Geo Augmented Navigation) is an augmentation system to enhance the accuracy and integrity of GPS signals to meet precision approach requirements in Civil Aviations and it is being implemented jointly by AAI and ISRO. The footprint of this satellite will cover a vast geographical area from Africa to Australia and hence would facilitate the expansion of the service of GAGAN far beyond Indian airspace. This ambitious project of the satellite based air navigation system (GAGAN) will also help in the growth of the sector by enabling to handle more air traffic in a much more safer manner.

DEFENCE AND SECURITY

India's Defence Set-Up

Supreme Commander—President of India
Administrative Control—Ministry of Defence

Army

Headed by—Chief of Army Staff
Headquarters—New Delhi

The Chief of the Army Staff is assisted by:

1. Vice-Chief of Army Staff
2. Seven Principal Staff Officers:
   - (a) Deputy Chief-2
   - (b) Adjutant General
   - (c) Master General of Ordinance
   - (d) Quarter-Master General
   - (e) Military Security
   - (f) Engineer-in-Chief

Integrated Defence Staff

Integrated Defence Staff (IDS) Headquarters was raised on October 1, 2001 based on the recommendations of Group of Ministers to review 'Higher Defence Management'. Under the aegis of Chairman, Chiefs of Staff Committee, the organization has been working towards achievement of jointness and synergy amongst the services. The IDS is headed by Chief of IDS to the Chiefs of Staff Committee (COSC) and reports to the Chairman, Chiefs of Staff Committee (COSC).

Table 5.9   Number of Commands–Seven

Command	Headquarters
Western Command	Chandimandir
Eastern Command	Kolkata
Northern Command	Udhampur
Southern Command	Pune
Central Command	Lucknow
Training Command (added in 1991)	Mhow
South-western Command (added in 2005)	Jaipur

Readiness of Future Wars

Indian Armed Forces are robust, equipped, trained and operation ready for future conflict scenarios that against a nuclear backdrop, are likely to be a combination of low intensity operations, asymmetric warfare, and all-out general war for a range of warfare methods from sub-conventional warfare to all-out war against a nuclear breakdown. The vision of the armed forces of India is to fight as highly motivated, optimally equipped and modernized, operationally ready force, capable of working in a synergized joint service environment, across all varieties of conflict. For that, there is a need to have a force projection and expeditionary capabilities, which are necessary traits of a regional stronghold.

Nuclear War Readiness

It is a known fact that Asian nations, as far as nuclear war is concerned, are not satisfactorily prepared to endure the effects of nuclear incursions. However, Indian Armed Forces are working to a strategy as regards executing the nuclear weapons capability with efforts on domains such as, command and control structures, communication networks, survivable basing of nuclear delivery means, and deterrence capabilities etc. The fail-safe procedures for management of anti-ballistic missile defence and training on execution of tactical nuclear strike, both defensive and offensive, has been an important domain of readiness in an eventual nuclear attack scenario.

South-western Command (Added in 2005)

Each command is under a General Officer Commanding-in-Chief. There is a Nuclear and Strategic force Command.

- **Indian Army in numbers, organizationally:**
    — 13 Corps (including 3 strike Corps);
    — 3 Armoured Corps,
    — 4 RAPID Divisions each with mix of Infantry and Armoured Brigades;
    — 18 Infantry Divisions;

— 10 Mountain Divisions;
— 2 Artillery Divisions;
— 8 Independent Armoured Brigades;
— 7 Independent Infantry Brigades;
— 1 Parachute Brigade;
— 5 (Surface-to-Surface) SSM Regiments [2 × Prithvi; 1 × Agni; 2 × BrahMos]
— 6 Air Defence Brigade and 4 Engineer Brigades

● **Indian Army in numbers, Summarized Combatant Units (Regiment/Battalion Level):**
— 67 Armoured Regiments
— 297 Infantry Battalions [25 Mechanized and 5 Parachutes, 6 Special Forces Commando]
— 297 Artillery Regiments
— 2 SAM groups and 12 SAM Regiments
— 14 Helicopter Squadrons [incl. 5 anti-tank and 8 Air Observation]
— 6 Air Defence Brigades [5 AD Regiments (Zu-23-2); 30 AD Regiments (L40/70); 35 AD Regiments]

Mountain Strike Corps

In July 2013, the Indian Cabinet Committee on Security (CCS) approved to raising a mountain strike corps along the China border as India's fourth strike corps and first dedicated corps for offensive mountain warfare. By authorizing the military to raise the new formation the government is committed on additional expenditure of 64,000 crore (US$ 13.6 billion)—over a seven-year period.

India's Combat Vehicles

1. Main Battle Tanks (MBTs)—T-90S Bhishma, Arjun Mk1, upgraded T-72M1 Ajeya. Vijayanta and T-55 MBTs are being phased out. New tank 'Tank-Ex' fitted with GPS system navigation.
2. Light Battle Tanks (LBTs)—PT-76 (amphibious) and AMX-13 light tanks.
3. Combat vehicles—Ferret armoured cars, BRDM-2 amphibious reconnaissance vehicles, BMP-1 and BMP-2 Sarath (mechanized infantry combat vehicles).
4. Radar Systems – Indra I and Indra II

India's Missiles and Other Artillery

1. Medium-range ballistic missiles—Agni-II (Intermediate Range ballistic missile) and Agni-IIAT (advanced version of Agni-II). Agni-II will always be in a ready-to-fire mode and can be launched within 15 minutes.
2. Short-range ballistic missiles—SS-150/Prithvi-I and SS-250/Prithvi-III and Agni-I.
3. Multiple Rocket Launch Systems—Smerch 9K58 (300 mm); Pinaka (214 mm); BM-21 (122 mm) [BM-21 are being phased out).
4. Howitzers—Abbot (105 mm) and M-46 Catapult (130 mm) (being replaced by 150 mm self-propelled howitzers), Bofors FH-77B, upgraded Soltam M-46 155 mm towed howitzers, IFG Mk 1/2/3 field guns being replaced by Soltom M-46 (130 mm filed guns), and D-30 (122 mm) towed howitzers.
5. Man-portable air-defence systems (MANPAD) shoulder-launched surface-to-air missiles (SAMs).

India's Air Defence Artillery

1. Tunguska M1 and upgraded ZSU-23-4MSchilka self-propelled air defence guns.
2. Bofors L40/70 (40 mm) AA guns replacingL40/60, and ZSU-23-2 twin 23 mm guns.
3. ZRK-SD Kvadrat/SA-6A Gainful air defencesystem being upgraded (soon to be replaced by fully developed Akash missile programme).
4. OSA-AKM/AS-8b Gecko air defence system being upgraded (soon to be replaced by fullydeveloped Trishul missile programme).

Air Force

Headed by—Chief of Air Staff

Headquarters—New Delhi

The Chief of the Air Staff is assisted by:

1. Vice-Chief of Air Staff
2. Deputy Chief of Air Staff
3. Central Air Command
4. Officer Incharge, Maintenance
5. Inspector General, Flight Safety and Inspection

Table 5.10 Number of Commands–Five

The Indian Air Force has seven commands, out of which five are operational and two functional, namely:
- HQ Central Air Command, Allahabad
- HQ Eastern Air Command, Shillong
- HQ Western Air Command, New Delhi
- HQ Southern Air Command, Thiruvananthapuram
- HQ South-western Air Command, Gandhi Nagar
- HQ Maintenance Command, Nagpur (Functional)
- HQ Training Command, Bangalore (Functional)

Aircraft

Helicopters
- MI-26 (heavy lift helicopter)
- MI-17s and MI-8s (rotor crafts)
- ALOUETTE III, renamed *Chetak* (anti-tank) and *Cheetah* (general duties)
- Advanced Light Helicopter (ALH) named DHRUV, developed by Hindustan Aeronautics Ltd.

Trainer
- HT-2 primary trainers (with the HPT-32 named *Deepak*, the HJT 16 named *Kiran*)

Fighter/Ground Attack
- SU-30 (Russian)
- Mirage-2000 (French, rechristened as *Vajra*)
- MiG-29 (rechristened as Baaz), MiG-27, MiG-23 MF and MiG-21 BIS (all Russian)
- Jaguar (Anglo-French)
- IL-76 and AN-32 (Russian)
- VRO (British)
- Dornier (German)
- Boeing 737–200 (American)

- MI-26, MI-25 and MI-17 (Russian)
- Chetak and Cheetah (French)
- *Lakshya* (a Pilotless Target Aircraft developed by DRDO)

Modernization Plan

IAF plans to induct more Su-30 aircrafts, the Light Combat Aircraft (LCA) the Medium Multi Role Combat Aircraft (MMRCA) and augment the helicopter and transport fleets. It has initiated the process for acquisition of additional Mi-17 IV helicopters, heavy lift helicopters, Advanced Light Helicopters and Light Combat Helicopters. For the transport fleet, induction of Boeing Business Jets (BBJ), Flight Refuelling Aircraft (FRA) and Airborne Warning and Control Systems (AWACS), Heavy Transport Aircraft (HETAC), C-130J Hercules and Medium Transport Aircraft (MTA) is also planned. Among trainer aircraft, the Hawk Advanced Jet Trainer has been inducted and the Intermediate Jet Trainer (IJT) would be acquired. The IAF is also in the process of acquiring radars in various categories to meet the Air Defence requirements, accurate and advanced weapons, Network Centric Warfare systems, etc., to meet its assigned tasks. In December 2013, the Ministry of Defence, GOI cleared for induction into the IAF. India's own LCA Tejas (MIG-21FL).

Navy

Headed by—Chief of Naval Staff

Headquarters—New Delhi

The Chief of the Naval Staff is assisted by five Principal Staff Officers:

1. Vice-Chief of Naval Staff
2. Chief of Personnel
3. Chief of Material
4. Deputy Chief of Naval Staff
5. Controller of Logistic Support

Table 5.11   No. of Commands—Three

Command	Headquarters
Western Naval Command	Mumbai
Eastern Naval Command	Vishakhapatnam (operational command)
Southern Naval Command	Kochi (used for training)

Each Command is headed by a Flag Officer Commanding-in-Chief.

Fleets: (i) Western Fleet and (ii) Eastern Fleet

A Peek into India's Naval Fleet

Surface Ships

Air Craft Carriers: INS Viraat (UK Hermes)

Destroyers:

— 3 Delhi Class: Delhi, Mumbai and Mysore.

— 5 Rajput Class: Rajput, Rana, Ranvir, Ranjit and Ranvijay.

Frigates:

— 3 Godavari Class: Ganga, Godavari and Gomati.

— 3 Talwar Class: Talwar, Trishul and Tabar.

Aircraft Carriers

INS Vikrant was India's first aircraft carrier and it retired from Indian Navy in 1997. Presently, INS Viraat is the largest aircraft carrier. INS Vikramaditya (ex-Soviet Admiral Gorshkov) which has been procured and modified by India, was commissioned on 16 Nov. 2013. It is projected to replace India's only currently serving aircraft carrier, INS Viraat which is to be decommissioned in 2016.

— 3 Brahmaputra Class: Brahmaputra, Betwa, Beas.

— 4 Nilgiri Class: Dunagiri, Udaygiri, Taragiri, Vindhyagiri.

Corvettes:

— 4 Khukri Class: Khukri, Kuthar, Kirpan, and Khanjar;

— 4 Kora Class: Kora, Kirch, Kulish, and Karmuk;

— 12 Veer Class (Soviet Tarantul/Prabal): Veer, Nirbhik, Nipat, Nishank, Nirghat, Vibhuti, Vipul, Vinash, Vidyut, Nashak, Pralaya, and Prabal;

— 4 Abhay Class: Abhay, Ajay, Akshay, and Agray

Offshore Patrol Vessels:

— 6 Sukanya Class: Sukanya, Subhadra, Suvarna, Savitri, Sharada, and Sujata

Minesweepers:

— 10 Pondicherry/Karwar Class: Pondicherry, Porbandar, Bedi, Bhavnagar, Allepey, Ratnagiri, Karwar, Cannonore, Cuddalore, Kakinada,

Kozhikode, Konkan;

— 2 Mahe Class: Mahe, and Malpe Landing Ships:

— 5 Magar Class (LST): Magar, Gharial, and 3 modified Magar;

— 7 Kumbhir Class (LST-M): Ghorpad, Cheetah, Guldar, Sharabh, Mahish, Kumbhir LCU-L33, L35-L39

Missile Boats:

— 2 Chamak Class: Chamak and Chapal Training Ships:

— 1 Tir Class: Tir

— 1 Leander Class: Krishna

— 1 Sail Training Ships: Tarangini

Fleet Auxilliaries:

— 3 Fleet Tankers—Jyoti, Aditya, and Shakti

— 1 Diving Support Ship: Nireekshak

— 2 Torpedo Recovery Vessel: Astravahini, TRVA-72;

— 2 Oceangoing Tugs: Matanga and Gaj.

Survey And Research Ships:

— 1 Sagardhwani Class: Sagardhwani

— 8 Sandhayak Class: Sandhayak, Nirdeshak,Nirupak, Investigator, Jamuna, Sutlej, Darshak, Sarvekshak

Seaward Defence Forces:
— 2 Tarasa Class FAC(G): Tarasa, and Trinkat;
— 2 Seaward Defence Boats: T 54-59, Mithun FACs– T80–84

Aircrafts and Helicopters

1. MIG-29-K (Fighter)
2. *Sea Harrier* (British Aerospace-Sea Harrier FRS MK 51/T)
3. *Sea King* (Sea King 42/42A/42B/42C)
4. *Chetak* (Aerospatiale—HAL)
5. Kamov (Kamov Ka-28/ Helix B, and Kamov-31)
6. *UH-3H Sikorsky Aircraft*
7. *Advanced Light Helicopter* (HAL Advanced Light Helicopter)
8. *Dornier* (Dornier 228)
9. IL 38 (Ilyushin II-38)
10. *TU-142* (Tupolev Tu -142 M-Bear F)
11. *Kiran* (HJT 16)
12. UAV Heron and UAV Searcher
13. Hawk AJT
14. Boing P-81
15. *Dhruv* In November, 2013 Indian Navy commissioned its first Advanced Light Helicopter Squadron at Kochi

Submarines

(*All Submarines are prefixed with letters INS when being referred to by their Indian Navy designated names*)

— *4 Shishumar Class* (German T-209/1500): Shishumar (S-44), Shankush (S-45), Shalki (S-46), Shankul (S-47)
— *10 Sindhughosh Class* (Soviet Kilo): Sindhughosh (S-55), Sindhudhvaj (S-56), Sindhuraj (S-57), Sindhuvir S-58), Sindhuratna (S-59), Sindhukesari (S-60), Sindhukirti (S-61), Sindhuvijay (S-62), Sindhurakshak (S-63), Sindhushastra (S-65)
— *1 Chakra* (Nepra S-71, active in 2012) nuclear powered
— *Submarine-based Missiles*: India has a deployed number of foreign-made cruise missile systems (such as Klub SSN-27), and some indigenous cruise missiles systems such as Lakshya PTA. Under development are some SLCMs (Submarine-Launched Cruise missile) systems (such as the Sagarika and Lakshya variants), and an Antiship Missile system (BrahMos).

INS Kursura: It was commissioned at Riga, erstwhile USSR, on 18 December 1969 and its induction showcased the augmentation of the 3rd dimension of the Indian Navy. During her 31 glorious year of service the submarine participated in almost all type of Naval operations and played a vital role in the 1971 Indo–Pak war. INS Kursura was decommissioned on 27th February 2001.

INS Arihant: It is the lead ship of India's Arihant class of nuclear-powered submarines build at the Ship Building Centre in Visakhapatnam. The completion of INS Arihant will make India one of six countries in the world with the ability to design, build, and operate its own nuclear submarines. It was launched on on 26th July 2009 INS Visakhapatnam, the country's largest and latest stealth destroyer, was launched on April 20, 2015 at Mazgaon dock.

INS Vishakapatnam is the first of the four guided missile stealth destroyers of Project 15-B of Kolkata class. Once commissioned in July 2018, the INS Visakhapatnam will be the largest destroyer in India and will be equipped with (MF-Star) the Israeli multi-function surveillance threat alert radar. This will provide targeting information to 32 Barak 8 long range surface to air missiles onboard warship.

INS Vikramaditya INS Vikramaditya is a modified Kievclass aircraft carrier which entered into service with the Indian Navy in 2013. Originally built as a Baku and commissioned in 1987, it was purchased by India on 20 January 2004. It was formally commissioned on 16 November 2013 at a ceremony held at Severodvinsk, Russia. On 14 June 2014, Indian Prime Minister Narendra Modi formally inducted INS Vikramaditya into the Indian Navy and dedicated it to the nation.

Submarine Museum: After decommissioning, INS Kursura has been converted into a submarine museum (in 2002) on RK Beach, Visakhapatanam.

Commissioned Ranks

Following are the commissioned ranks in the three armed Services, each rank is shown opposite to its equivalent of the other service:

Table 5.12

Army	Air Force	Navy
General	Air Chief Marshal	Admiral
Lieutenant General	Air Marshal	Vice-Admiral
Major General	Air Vice-Marshal	Rear Admiral
Brigadier	Air Commodore	Commodore
Colonel	Group Captain	Captain
Lieutenant Colonel	Wing Commander	Commander
Major	Squadron Leader	Lieutenant Commander
Captain	Flight Lieutenant	Lieutenant
Lieutenant	Flying Officer	Sub-Lieutenant

Table 5.13 Location of Defence Establishments

Army	
Indian Military Academy	Dehradun
Army Officers' Training School	Pune
Army Officers' Training School	Chennai
The Armoured Corps Centre and School	Ahmednagar
The College of Military Engineering	Kirkee (Pune)
The School of Signals	Mhow
The School of Artillery	Deolali
The Infantry School	Mhow
The Army Ordinance Corps School	Jabalpur
The Service Corps School	Bareilly
The Remounts, Veterinary and Farms Corps Centre and School	Meerut
The School of Physical Training	Pune

(*Continued*)

Army	
The School of Mechanical Transport	Bangalore
The Corps of Military Police Centre and School	Faizabad
The Army Education Corps and Training College	Pachmarhi
The Military School of Music	Pachmarhi
The Electrical and Mechanical Engineering School	Trimulgherry
The Electrical and Mechanical Engineering School	Secunderabad
The Integrated Test Range	Chandipur
Navy	
Indian Naval Academy	Kochi
INS Venduruthy	Kochi
Naval Air Station	Kochi
INS Shivaji	Lonavla
INS Valsura	Jamnagar
INS Circars	Vishakhapatnam
INS Hamla	Mumbai
INS Agrani	Coimbatore
INS Agrani (Petty Officers' School)	Mormugao
INS Jarawa	Port Blair
Naval Gunnery School	Kochi
Torpedo/Anti-Submarine School	Kochi
Navigation Direction School	Mormugao
Air Force	
Pilot Training Establishment	Allahabad
Air Force Administrative College	Coimbatore
School of Aviation Medicine	Bangalore
Jet Training and Transport Training Wings, Air Force Station	Hyderabad
Air Force Technical Training College	Jalahali
Air Force School	Jalahali
Air Force School	Tambaram
Paratrooper's Training School	Agra
Inter-Services Institutes	
National Defence Academy	Khadakvasla
National Defence College	New Delhi
Defence Services Staff College	Wellington
School of Land/Air Warfare	Secunderabad
School of Foreign Language	New Delhi
Rashtriya Indian Military College	Dehradun
Armed Forces Medical College	Pune
Himalayan Mountaineering Institute	Darjeeling

The Department of Defence Production

The Department of Defence Production (DDP) was set up in November 1962 with the objective of developing a comprehensive production infrastructure to produce the weapons/ systems/ platforms/ equipments required for defence. Over the years, the Department has established wide ranging production facilities for various defence equipments through the Ordnance Factories and Defence Public Sector Undertakings (DPSUs). The products manufactured include arms and ammunition, tanks, armoured vehicles, heavy vehicles, fighter aircrafts and helicopters, warships, submarines, missiles, ammunition, electronic equipment, earth moving equipment, special alloys and special purpose steels.

The following are the main organizations under the Department of Defence Production:

- Ordnance Factory Board (OFB)
- Hindustan Aeronautics Limited (HAL)
- Bharat Electronics Limited (BEL)
- Bharat Dynamics Limited (BDL)
- Bharat Earth Movers Limited (BEML)
- Mishra Dhatu Nigam Limited (MIDHANI)
- Mazagon Dock Limited (MDL)
- Garden Reach Shipbuilders & Engineers Limited (GRSE)
- Goa Shipyard Limited (GSL)
- Hindustan Shipyard Limited (HSL)
- Directorate General of Quality Assurance (DGQA)
- Directorate General of Aeronautical Quality Assurance (DGAQA)
- Directorate of Standardization (DOS)
- Directorate of Planning & Coordination (Dte. of P&C)
- Defence Exhibition Organization (DEO)
- National Institute for Research & Development in Defence Shipbuilding (NIRDESH)

INDIA'S INTERNAL SECURITY

Central Police Organizations

Intelligence Bureau (IB)   Formed in : 1887 (in 1947 it was recast as the Central Intelligence Bureau) [Headed by : Director; Headquarters : New Delhi]

Objectives: Intelligence Bureau has always been masked entity and operates in confidentiality gathering intelligence for the use of Indian authorities. It is also entrusted with tasks such as executing counter-intelligence and counter-terrorism operations.

Central Bureau of Investigation (CBI)   Formed in : 1963 [Headed by : Director; Headquarters : New Delhi]

Objectives: The CBI is mandated with a view to investigate serious crimes related to Indian security, scams and corruption in high places, serious fraud, cheating and embezzlement and social crime, particularly of hoarding, black-marketing and profiteering in essential commodities, having all-India and inter-state ramifications. The CBI succeeded Delhi Special Police Establishment and it derives its legal powers to investigate crime from the DSPE Act, 1946.

Bureau of Police Research & Development (BPRD)   Established in : 28th August 1970 [Headed by : Director-General; Headquarters : New Delhi]

Objectives: The Bureau of Police Research and Development (BPRD) was set up on 28th August 1970 in furtherance of the objective of the Government of India for the modernization of police forces. It has evolved as a multifaceted, consultancy organization. At present it has 5 divisions: (1). Research and Correctional Administration Division; (2). Modernization/ Development Division; (3). Training Division; (4). Administration Division; (5). National Police Mission Division

National Crime Records Bureau (NCRB)   Established in : 1986 [Headed by : Director-General Headquarters : New Delhi]

Objectives: Mainly NCRB is mandated to function as a clearing house of information on crime and criminals including those operating at National and International levels so as to assists the investigators, and others in linking crimes to their perpetrators. It also stores, coordinates and disseminates information on inter-state and international criminals from and to respective states, national investigating agencies, courts and prosecutors in India without having to refer to the police station records.

National Investigation Agency (NIA)   Established in : December 2008 [Headed by : Director-General; Headquarters : New Delhi]

Objectives: The NIA is mandated, at the national level, to investigate and prosecute offences affecting the sovereignty, security and integrity of India, friendly relations with foreign states and offences under acts enacted to implement international treaties, agreements, conventions and resolutions of the United Nations and other international organizations and for matters connected therewith or incidental thereto.

Sardar Vallabhbhai Patel National Police Academy (NPA)   Established in : 15 September 1948 Headquarters: Hyderabad; Headed by : Director (Rank of DG-Police)]

Objectives: The National Police Academy (NPA), trains officers of the Indian Police Service, who have been selected through an All India-based Civil Services Examination.

North Eastern Police Academy, Shillong   Established in: July 1978 [Headquarters : Shillong (Ri-Bhoi district of Meghalaya); Headed by : Director (Rank of DG-Police)]

Objectives: To impart one year basic training to the directly recruited police officers of the rank of sub inspector and DySP of N E States.

National Institute of Criminology & Forensic Science (NICFS)   Established in : 1972 [Headquarters : New Delhi; Headed by: Director (Rank of DG-Police)]

Objectives: To act as a national institute towards advancement of the subjects of criminology and forensic science and to act as a centre of in-service training of officers in police, judiciary and correctional services and also other engaged in the criminal justice system and its allied fields.

Assam Rifles (AR)   Established in: 1835 [Headed by : Director-General; Headquarters : Shillong] *Motto*: Friends of the Hill People.

Objectives : Vigilance of international borders in north-east and countering insurgency operations in Arunachal Pradesh, Manipur, Mizoram and Nagaland. It is the oldest paramilitary force in the country. Among its special roles are the paramilitary law enforcement, counter insurgency, armed response to civil unrest, counter terrorism, special weapons operations.

Central Armed Police Forces

Border Security Force (BSF) Established in : 1965 [Headed by : Director-General; Headquarters : New Delhi] *Motto* : Duty unto Death.

Objective: Vigilance on India's international borders during peace time, and during war assume supplementary role with the army. In the last few years, the BSF has, in addition to their duties, been deployed for counter insurgency and internal security duties. Its peace time roles include: (i) Promoting a sense of security among the people living in the border areas. (ii) Preventing trans-border crimes, unauthorized entry into or exit from the territory of India, and (iii) Preventing smuggling and any other illegal activity.

Central Industrial Security Force (CISF) Established in : 1969 [Headed by : Director-General; Headquarters : Delhi] *Objective*: Protection and Security.

Objectives: Originally mandated to provide security to industrial undertakings owned by the government, the CISF has transformed into a premier multi-skilled security agency of the country, mandated to provide security to major critical infrastructure installations of the country in diverse areas. CISF is currently providing security cover to nuclear installations, space establishments, airports, seaports, power plants, sensitive government buildings and ever heritage monuments. Among the important responsibilities recently entrusted to the CISF are the Delhi Metro Rail Corporation, VIP security, disaster management and establishment of a Formed Police Unit (FPU) of the UN at Haiti. The CISF reports to Home Ministry.

Central Reserve Police Force (CRPF) Established in : 1949 (came into existence as Crown Representative's Police in 1939). [Headed by : Director-General; Headquarters : New Delhi] *Motto*: Service and Loyalty.

Objectives: To assist the state/union territory police in maintenance of law and order. The broad gamut of duties performed by the CRPF are: crowd control; riot control; counter militancy/insurgency operations; dealing with left wing extremism; overall co-ordination of large scale security arrangement especially with regard to elections in disturbed areas; protection of VIPs and vital installations; checking environmental de-gradation and protection of local Flora and Fauna; fighting aggression during war time; participating in UN Peace Keeping Mission; rescue and relief operations at the time of natural calamities and special role during elections in India. The CRPF is also known as the 'Peace Keepers of the Nation'. Internal Security Academy, the training establishment of CRPF, is located at Mount Abu.

Indo-Tibetan Border Police (ITBP) Established in : 1962 [Headed by : Director-General; Headquarters : New Delhi]. *Motto*: Valour—Determination—Devotion to Duty (Shaurya—Dridtata—Karm Nishtha).

Objectives: Guarding approximately 1221 km of Indo-Tibetan border, extending from Karakoram Pass in Ladakh to Lipulekh pass at Indo-Tibet junction and Nepal border. Also, included in its roles are VIP security, law and order and bank security.

Sashastra Seema Bal (SSB) Established in : 1963 [Headed by : Director-General; Headquarters : New Delhi (Three frontier Headquarters at Lucknow, Patna and Guwahati)] *Motto*: Service, Security and Brotherhood.

Objectives: (a) To promote sense of security among the people living in the border areas; (b) To prevent trans-border crimes, and unauthorized entries into or exit from the territory of India; (c) To prevent smuggling and other illegal activities.

National Security Guard (NSG)   Established in : 1984 [Headed by : Director-General; Headquarters : New Delhi] *Motto*: Sarvatra Sarvottam Suraksha.

Objectives: It is modelled as a Federal Contingency Deployment Force to tackle all facets of terrorism in India with the primary role to combat terrorism in areas where activity of terrorists assumes serious proportions, and the state police and other central police forces cannot cope up with the situation. The NSG is a force specially equipped and trained to deal with specific situations and is therefore, to be used only in exceptional situations. The force is not designed to undertake the functions of the state police forces or other para military forces of the Union of India.

State and UT Police

Police is a state subject under the constitution. The head of a police force in a state is the Director-General of Police (DGP) or Inspector-General of Police (IGP). For administrative purposes, each state is divided into ranges headed by the Deputy-Inspector General of Police (DIG) and a range is further divided into districts, each under the control of a Superintendent of Police (SP).

All senior police posts in various states are included in the Indian Police Service (IPS) cadres, recruitment for which is made on an all-India basis. However, for lower ranks up to Deputy Superintendent (DSP), the recruitment is done at the state levels.

In big cities like Delhi, Kolkata, Mumbai, Chennai, Bangalore, Hyderabad, Ahmedabad and Nagpur, police is headed by a Commissioner of Police, who enjoys magisterial powers.

Other Important Defence and Security Institutions

Coast Guard   Established in : 1978. *Objectives*: To protect the maritime and other national interests in the maritime zones of India. They come under the control of Ministry of Defence.

National Cadet Corps (NCC)   Established in : 1948. *Objectives*: To stimulate interest among the youth in the defence of the country in order to build-up a reserve manpower to expand armed forces. Divisions: (i) Senior, (ii) Junior and (iii) Girls. It is composed of students from educational institutions.

Territorial Army   Established in : 1948. *Objective*: A voluntary part-time (between 18 and 35 years) force build with civilians (not professional soldiers) who wish to assist in defence of the country.

Home Guards   Established in : 1962. *Objectives*: To assist the police in maintaining security, to help defence force local authorities in case of epidemics and to undertake such other services as may be required by the government from time to time.

Rapid Action Force (RAF)   The newly formed 'zero response' time central outfit. The RAF, became operational on 7 October 1992. It is basically a central police organization and is under the operational command of the CRPF. Ten battalions of the CRPF have been reoriented for tackling communal riots in the country.

Rashtriya Rifles   A new paramilitary arm under the command of the Indian Army called 'Rashtriya Rifles' (RR) has been created. The Rashtriya Rifles has been organized with three battalions grouped into one sectoral unit. To ensure that the best personnel opt for the new unit, the Chief of the Army Staff will be the colonel of the unit. The RR will replace all the army formations being deployed for internal security in Kashmir and other states.

Narcotics Control Bureau (NCB)   The Narcotics Control Bureau (NCB) is the National Nodal Agency created under the Narcotics Drugs and Psychotropic Substances Act, 1985 for combating illicit trafficking in narcotic drugs and psychotropic substances. NCB with its headquarters at New Delhi has three Regional Deputy Director General offices, i.e., Northern Region at (Delhi), South Western Region (Mumbai), and Eastern Region (Kolkata).

SCIENCE AND TECHNOLOGY

India's Missile Programme

India's Integrated Missile Development Programme (IGMDP) was started in 1982–83 by the Defence Research and Development Organization (DRDO) under the chairman-ship of Dr A. P. J. Abdul Kalam. Agni, Prithvi, Trishul, Akash, Nag and Astra also form part of the IGMDP and DRDO is working on development of specialized missiles such as Brahmos, Sagarika, etc.

1. Agni

The Agni missile family is envisaged to be the mainstay of the Indian missile-based strategic nuclear deterrence. The Agni family will continue to grow its stable, providing a breadth of payload and range capabilities. The Agni-I is a short range ballistic missile (SRBM) with a single stage engine. While the Agni-II is an intermediate range ballistic missile (IRBM) with two solid fuel stages and a Post Boost Vehicle (PBV) integrated into the missile's re-entry Vehicle (RV).

Variants

Agni-TD   Two stage, solid booster and liquid fuelled second stage. IRBM Technology Demonstrator.

Agni-I (A-1)   Single-stage, solid fuel, road and rail mobile, Short-Range Ballistic Missile (SRBM). [Payload 1000 kg; Range 700–800 km]

Agni-II (A-2)   Two stage, solid fuel, road and rail mobile, Intermediate Range Ballistic Missile (IRBM). [Payload 750–1050 kg; Range 2000–3000 km]

Agni-IIAT (A-2AT)   Improved A-2 variant using more advanced and lighter material. Two stage, solid fuel, road and rail mobile IRBM.

Agni-III   Two stage, solid fuel, submarine, road and rail mobile, IRBM/ICBM (inducted in June 2011), [Payload 2000–2500 kg; Range 3500.5000 km]

Agni-IV   Three stage, solid fuel, road and rail mobile, ICBM (launch failed in 2006, but succeeded in 2014). India's most advance long range missile capable of carrying nuclear warhead.

Agni-V   Scientists are working on this variant, an upgraded version of Agni-III [Range 5000–6000 km; status-under testing, its first test launch was done On 19 April 2012 from Wheeler Island, Odisha].

Agni-VI   It is an inter-continental missile undergoing development as of 2015. It is the most advanced version of Agni-system of missiles with a range of 8000–12,000 km and having inertial navigation system with ring laser gyroscope optionally augmented by GLOSNASS/IRNSS. This is the India's longest range missile.

2. Brahmos

World's fastest supersonic cruise missile was jointly developed by India and Russia. It was names over two great rivers of both the nations: 'Brahamaputra' (Indian river) + Moskva (Russian river). It can be launched from submarine, ship, aircraft and landbased Mobile Autonomous Launchers (MAL). The missile is launched from a Transport-Launch Canister (TLC), which also acts as storage and transportation container. Primarily Brahmos is anti-ship missile. Indian Army has also inducted three regiments of Brahmos supersonic cruise missile. Ship-based Weapon Complex (Inclined and Vertical configuration) was inducted in Indian navy in 2005 and Land-based Weapon Complex (Vertical launch configuration from MAL) was inducted in Indian Army in 2007. The Air launch version (on Su-30 MkI aircrafts) and Submarine launch versions are under development as in 2015. BRAHMOS is world's fastest anti-ship cruise missile in operation.

Variants

- *BRAHMOSD01:* The first flight-test of the BRAHMOS missile was conducted on 12 June 2001 at the Interim Test Range, in Orissa state of India.
- *BRAHMOS D02:* The second flight test (D02) of the BRAHMOS supersonic cruise missile was conducted successfully, from Interim Test Range in Orissa, on 28 April 2002.
- *BRAHMOS D03:* The BRAHMOS (D03) missile was successfully flight tested on 12 February 2003 from one of the warships off the eastern coast.

3. Prithvi

India launched the Integrated Guided Missile Development Program (IGMDP) in 1983 to concurrently develop and produce a wide range of missiles for surface-to-surface and surface-to-air roles. Prithvi was the first missile developed as part of IGMDP. Prithvi-II, the first indigenous surface to surface strategic Missile, capable of attacking targets at ranges of 350 kms, was successfully tested in June 2011.

Variants

SS-150/Prithvi-I   It is a battlefield support system for the army [Payload 1000 kg; Range 150 km]. It is a single stage, dual engine, liquid fuel, road-mobile, short-range surface-to-surface missile (inducted in Indian Army in 1988).

SS-250/Prithvi-II   It is dedicated to the Indian Air Force [Payload 350-750 kg; Range 350 km]. It is a single stage, dual engine, liquid fuel, road-mobile, short-range surface-to-surface missile. DRDO has decided to increase the payload capability of the SS-250/Prithvi-II variant to 1000 kg by using boosted liquid propellant to generate higher thrust-to-weight ratio (inducted in Indian Army in 1996).

SS-350/Prithvi-III   It is a solid fuelled version with a 350 km range and a 1000 kg payload. It is a two stage, solid fuel, road-mobile, short-range, surface to- surface missile. Sagarika is the submarine launched variant of Prithvi-III intended for nuclear-powered submarines. A related programme, known as Project K-15, is in development and will enable the missile to be launched from a submerged submarine [Payload 500–1000 kg; Range 350–600 km; in service since 2004].

Dhanush   (Sanskrit/Hindi word meaning bow) It is a system consisting of a stabilization platform (bow) and the missile (arrow). The system can fire either the SS-250 or the SS-350 variants. There may likely be certain customizations in missile configuration to certify

it for sea worthiness [Payload 1000 kg; Range 350 km].

Pradyumna Ballistic Missile Interceptor   The Prithvi Air Defence missile has been named as Pradyumna Ballistic Missile Interceptor.

4. Akash

It is a medium-range, theatre defence, surface-to-air missile. The Akash's first flight occurred in 1990, with development flights up to March 1997. It operates in conjunction with the Rajendra surveillance and engagement radar. This system will replace the SA-6/ Straight Flush in Indian service and is also expected to be integrated with the S-300V (SA-10 Grumble) low-to-high altitude SAM in an integrated air defence system to counter SRBM/IRBM threats along the Pakistani and Chinese borders.

5. Trishul

It is a short range, quick reaction, all weather surface-to-air missile designed to counter a low-level attack. It has been flight tested in the sea-skimming role and also against moving targets. It has a range of 9 km and is fitted with a 5.5 kg HE-fragmented warhead. It's detection of target to missile launch is around 6 seconds. But due to the enormous development costs of the missile India had officially decided to shut down Trishul Missile project in 2008. Trishul missile had been delinked from user service, although it continues as a technology demonstrator.

6. NAG System

It is a third generation, all weather, top-attack, fire- and- forget anti-tank-guided missile. It is one of five missile systems developed by the DRDO under the IGMDP. Design work on the missile started in 1988, and the first tests were carried out in November 1990. It is among the five indigenously planned 'Fire-and-Forget' anti-tank missile developed using an Imaging Infrared (IR) technology that ensures a high-hit accuracy levels. It weighs around 42 kg and can have 8 kg warhead.

Variants
NAMICA   (NAG Missile Carrier on a modified BMP-2 ICV produced as 'Sarath' in India) It is a 'lock-on Before Launch' system where target has to be defined before the launch of missile.

HELINA   (Helicopter-launched NAG, designed to be used on HAL's Dhruv Helicopter, Light Combat Helicopters) It is a 'lock-on After Launch' system that extends its range by 7 km, and the operator can identify its range after the missile has been launched. New variants are being under initial stages of development where NAG will be launched from (i) Raised Platform (Land-version); (ii) from Jaguar IS Aircrafts (Air-launch version), and (iii) portable version (Man Portable Nag).

Astra Missile

Astra is a state-of-the-art Beyond Visual Range Air to Air Missile (BVRAAM) developed by DRDO. It is designed for a range of over 80 km in head-on mode and 20 km in tail-chase mode. It weighs 154 kg and has a warhead capability of 15 kg as used detonation mechanism of 'Radar Proximity Fuse'. Its first test flight was conducted in May 2003 and

in 2014 tested for Su-30 MKI aircraft. Astra can engage highly manoeuvring targets. Su-30MKI, HAL Tejas, HALAMCA, PAK FA/Sukhoi/HAL FGFA, Mirage 2000 and Mig-29 are the approved platforms for launching Astra missiles as of February 2015.

Other Missiles

Prahaar   A solid-fuel rocket surface-to-surface guided short-range tactical ballistic missile by the DRDO of India.

Nirbhay   A long range, subsonic cruise missile developed in India by the DRDO. It is expected to start production in late 2016.

Shaurya   A canister launched hypersonic surface-to-surface missile. It has a range of 750 to 1,900 km.

Rajendra Radar System

It is a multifunctional radar capable of surveillance, tracking and engaging low radar cross-section targets. It is an integral part of Akash Missile System (surface-to-air) and each Akash battery has one Rajendra Radar, which is linked to up to 4 Akash launchers, each with 3 missiles. The same radar system has been developed as an indigenous Weapon Locating Radar (WLR) called the BEL-WLR which can detect and track artillery shells fired in the battlefield, thereby, allowing you to figure out location of the enemy tanks and weaponry systems.

Nuclear Capability

According to the 2013 SIPRI Yearbook, the Indian arsenal comprises 90 to 110 warheads. Estimates in 2012 put India's Highly Enriched Uranium (HEU) stockpile at 2.4 ± 0.9 tons and its weapons-grade plutonium stockpile at 0.54 ± 0.18 tons. Although India is increasingly concentrating on developing missiles for nuclear delivery roles, aircraft such as the Mirage 2000 and the Jaguar remain integral parts of its nuclear delivery force.

Biological and Chemical Armory

Biological Warfare   India does not possess any biological weapons or has a biological weapon development programme. India's Defence Research and Development Establishment has conducted research on detecting and countering various diseases. India also has an extensive dual-use capability in its advanced pharmaceutical industry. India ratified the Biological and Toxin Weapons Convention (BTWC) in 1974. India and the United States maintain ongoing discussions on compliance with the BTWC and export control issues.

Chemical   In March 2009, India announced that it had destroyed all of its chemical weapons stocks in accordance with the CWC.

India's Space Programme

The Indian Space Programme began in 1962. In 1969, the Indian Space Research Organization (ISRO) was set up with headquarters in Bangalore. The Space Commission was established in 1972. In 1975, India launched its first satellite, Aryabhata and thus entered the space age.

Space Missions

1. Aryabhata

India launched its first experimental satellite on 19 April 1975 from a Soviet cosmodrome to perform scientific X-ray experiments in space and send back data to earth.

2. Bhaskara-I

India's second 436 kg satellite was launched on 7 June 1979 to collect information on India's land, water, forest and ocean resources.

3. Rohini

The Rohini series of satellites were designed and built for Indian scientific programs. Four satellite were launched in the the Rohini series; Rohini-1A, -1B, -2 and -3. The Rohini-1B was also the first Indian satellite launched by an Indian rocket.

Rohini 1B: Launched on 18 July 1980 from Sriharikota aboard the SLV-3. It was India's first successful launch. This experimental satellite followed the failure of the Rohini-1A. Launched on 10 August 1979. It re-entered orbit on 20 May 1981.

Rohini 2: Launched on 31 May 1981 by SLV-3 from Sriharikota.

Rohini 3: Launched on 17 April 1983 from Sriharikota aboard the SLV-3. It carried two cameras and L-band beacon. This satellite returned around 5000 earth images before being de-activated on 24 September 1984. It re-entered orbit on 19 April 1990.

4. APPLE (Ariane Passenger Payload Experiment)

India's first experimental, geostationary satellite weighing 673 kg was launched on 19 June 1981.

5. Bhaskara-II

India's second satellite for earth observation was launched on 20 November 1981.

6. SLV Mission (Satellite Launch Vehicle)

India's first satellite launch vehicle SLV-3 was successfully launched on 18 July 1980 from Sriharikota. Rohini-2 (RS-D2) was put into orbit on 17 April 1983, using SLV-3 and this completed the planned developmental flights of the SLV-3.

7. IRS Mission (Indian Remote Sensing Satellite)

IRS-1A   India's first IRS was launched on 17 March 1988 for monitoring and management of natural resources.

IRS-1B   India's second remote sensing satellite was launched on 29 August 1991 to replace IRS-IA which was nearing the end of its life.

The IRS system has been further enhanced by IRS-IC, IRS-P3, IRS-ID and IRS-P4, the last three having been launched on 28 December 1995 by a Russian rocket and IRS-ID launched by PSLV on 29 September 1997.

IRS-P3 was launched by the third developmental flight of PSLV-D3 on 21 March 1996.

IRS-P4 (OCEANSAT) another satellite was launched by PSLV on 26 May 1999.

IRS-P5 and IRS-P6, two more satellites, for cartography and agricultural resources survey respectively are planned for launch in next three years.

8. ASLV Mission (Augmented Satellite Launch Vehicle)

ASLV is designed to augment indigenous satellite launching capability and put 150 kg class satellite into low earth orbit.

9. SROSS (Stretched Rohini Satellite Series)

After failure of two ASLV launches, SROSS-III, a 105 kg satellite was successfully placed in a 450 km high orbit via the launching of ASLV-D3, on 20 May 1992 though the life-span of the satellite was only 55 days. The fourth developmental flight was made on 4 May 1994 and SROSS-C4 was successfully placed into the earth orbit from Sriharikota.

ASLV is the forerunner of the more powerful Polar Satellite Launch Vehicle (PSLV) and the Geosynchronous Launch Vehicle (GSLV).

The first developmental flight of the PSLV, called PSLV-Dl, on 20 September 1993, failed. However, according to ISRO it was a partial success which established India's capabilities in liquid propulsion system.

10. INSAT Mission (Indian National Satellite System)

The Indian National Satellite (INSAT) system is a joint venture of the Department of Space, Department of Telecommunications, Indian Meteorological Department, All India Radio and Doordarshan. The overall coordination and management of INSAT system rests with the Secretary-level INSAT Coordination Committee. Established in 1983, INSAT is one of the largest domestic communication satellite systems in the Asia Pacific Region with nine satellites in operation—INSAT-2E, INSAT-3A, INSAT-3B, INSAT-3C, INSAT-3E, KALPANA-1, GSAT-2, EDUSAT and INSAT-4A. The latest, INSAT-4A, which was launched successfully from Kourou in French Guyana on 22 December 2005, has given further boost to INSAT capability, especially, for Direct-To-Home (DTH) television broadcast. Launch of INSAT-4C was unsuccessful on 10 July 2006.

A quick look at INSAT launches is given below:

INSAT-1A   On 10 April 1982—it failed prematurely

INSAT-1B   On 30 August 1983—it was successful

INSAT-1C   On 22 July 1988—it became redundant in 1989

INSAT-10   On 17 July 1990—it was successful and completed the mission

INSAT-2 Projects

INSAT-2A   India's first indigenously built second generation satellite. It was launched on 10 July 1992. It is equipped with 50 % more capacity than the INSAT-I series.

INSAT-2B   India's second indigenously built satellite. It was launched by the European Space Agency from Kourou, French Guinea on 23 July 1993. INSAT-2B took place of INSAT-1B whose functioning ended following the completion of its ten-year life.

At present, the system is served by ISRO-built satellites, INSAT-2C, INSAT-2E, INSAT-3B and INSAT-2DT procured from ARABSAT in October 1997.

Five Satellites, INSAT-3A to INSAT-3C have been launched in 1999–2003 time frame.

INSAT-3B was launched in March 2000, carried 12 extended C-band transponders, 3 ku-band transponders and CxS mobile satellite service transponders.

The Press Trust of India (PTI) has implemented a system to provide its news and information services at high speed and increased volume by utilizing broadcast facilities of INSAT satellite.

With the availability of INSAT-2C, INSAT-2E and INSAT-3B business communication in ku-band and mobile satellite service are being tried out.

INSAT has enabled a vast expansion in the television services with over 1079 TV transmitters linked through INSAT.

The fourth developmental flight of ASLV-4 was made on 4 May 1994 and the SROSS-C4 was successfully placed into the near earth orbit from Sriharikota.

Today, India has realized the operational launch vehicle, PSLV, capable of launching 1200 kg IRS class of remote sensing satellite into polar sun synchronous orbit.

The first successful developmental launch (PLSV-D2) took place on 15 October 1994 when it placed the IRS-P2 remote sensing satellite into polar orbit.

The second and final developmental test (PSLV-D3) was conducted on 21 March 1996 when IRS-P3 was placed into the intended polar orbit.

Space Research Programme

Chandrayan Mission

Chandrayan-I   India sent an unmanned probe to explore the moon in 2008 and the mission ended on 29 August 2009. The Chandrayan-1 mission carries X-ray and gamma-ray spectrometers and sends back data that scientists on Earth use to produce a high-resolution digital map of the lunar surface. The Chandrayan-I, anmanned mission, carried out a physical and chemical mapping of the moon.

Chandrayaan-2   It is planned to be launched by end of 2016 or beginning of 2017. This Geosynchronous Satellite Launch Vehicle (GSLV), includes a lunar orbiter, a lander and a lunar rover, all developed by India will use and test various new technologies and conduct new experiments. The wheeled rover will move on the lunar surface and will pick up soil or rock samples for on-site chemical analysis. The data will be relayed to Earth through the Chandrayaan-2 orbiter.

Mars Orbiter Mission (Mangalyaan)

India launched its first interplanetary mission, the Mars Orbiter spacecraft, successfully on Sep 5, 2013 on-board PSLV-C25. The journey of the spacecraft towards Mars, following crucial orbital manoeuvre of Trans-Mars Injection on Dec 1, 2013, included India in the elite group of four nations in the world to send space mission to planet Mars. Mars Orbiter spacecraft has been realized on fast track in a record time of less than 18 months to make use of the earliest launch opportunity (the next opportunity would have been only after 26 months). Mars Orbiter Mission is intended to establish the Indian technological capability to reach Martian orbit and to explore Mars surface features, morphology, mineralogy and Martian atmosphere by indigenous scientific instruments. Besides the scientific and technological challenges, Mars Orbiter Mission is an important step in inspiring the younger generation in the country in scientific research, particularly in planetary exploration.

The first operational flight, PSLV-C1 placed IRS-1D in orbit.

PSLV-C2 places IRS-P4 (OCEANSAT), a Korean satellite KITSAT-3 and a German satellite TUBSAT into 727 km polar sun synchronous orbit on 26 May 1996.

Other Space Science Missions

Astrostat

An astronomical observatory in space, aimed at studying the distant celestial sources. Astrosat is currently proposed as a multi-wavelength astronomy mission on an IRS-class satellite into a near-Earth, equatorial orbit by the PSLV.

Aditya I

A scientific mission for solar studies and carries a chronograph. Aditya is proposed to be sent to space by 2017–18 to study the solar corona. This part of the Sun has temperatures of over one million degrees, with raging solar winds that reach a velocity of up to 1000 km a second. The satellite will carry as its payload an advanced solar coronagraph.

SATNAV Programme

Satellite Navigation (SATNAV) Programme is an important activity of the ISRO where it syncs with the Airport Authority of India (AAI) to take up GPS aided Geo-augmented Navigation (GAGAN) Technology Demonstration System (TDS) as a fore-runner for the operational satellite-based Augmentation System (SBAS) over the India space.

GPS-Aided Geo Augmented Navigation

GAGAN (as discussed in SATNAV above) is the first SBAS over Indian region. Its signals augment those of global positioning system (GPS) of the USA in order to provide users precise positioning and reliability. GAGAN offers navigation services for safety-of life applications like civil aviation applications with required accuracy and integrity and to provide better Air Traffic Management over Indian Air Space.

Indian Regional Navigation Satellite System (IRNSS)

On 1 July 2013, IRNSS-1A, India's first of the 7 satellites of the Indian Regional Navigation Satellite System (IRNSS) Constellation, was successfully launched in PSLV-C22 and the satellite started its navigation activities from Aug 2013. In its thirty fifth flight (PSLV-C33), ISRO's Polar Satellite Launch Vehicle successfully launched the 1425 kg IRNSS-1G, the seventh satellite in the Indian Regional Navigation Satellite System (IRNSS) on April 28, 2016 from Satish Dhawan Space Centre SHAR, Sriharikota. This is the thirty fourth consecutively successful mission of PSLV and the thirteenth in its 'XL' configuration.

IRNSS-1G is the seventh of the seven satellites constituting the space segment of the Indian Regional Navigation Satellite System. IRNSS-1A, 1B, 1C, ID, IE and 1F, the first six satellites of the constellation, were successfully launched by PSLV on July 02, 2013, April 04, 2014, October 16, 2014, March 28, 2015, January 20, 2016 and March 10, 2016 respectively. All the six satellites are functioning satisfactorily from their designated orbital positions.

The IRNSS is an independent regional navigation satellite system being developed by India. It will provide precise navigation services within India and regions beyond 1500kms to Indian International borders. The IRNSS has two types of services,

 (i) Standard Positioning Services (SPS)—for the public use, and

(ii) Restricted Services (RS)—for military and other national security users, where it will be accurate to better than 20 m in primary service areas.

IRNSS system consists of three systems—space segment, ground segment and user system. The space system is designed to be a constellation of seven satellites. There will be three geo-stationary satellites, and remaining four will be located in geo-synchronous orbits with their required inclination and equatorial crossings in two different planes. All seven satellites of this constellation are configured identically. Ground segment is responsible for the maintenance and operation of the IRNSS constellation.

PSLV-C3 is planned to launch IRS-P5 and Belgium satellite PROBA

The development of Geosynchronous Satellite Launch Vehicle (GSLV), incorporating a cryogenic stage, which will be capable of placing 2000 kg INSAT class of satellites in geosynchronous transfer orbit, is at first developmental test stage.

PSLV C-7 carries four satellites—the 680 kg Indian Remote Sensing Satellite CARTOSAT-2, the 550 kg Space Capsule Recovery Equipment, Indonesia's LAPAN-TUBSAT and Argentina's 6 kg nanosatellite, PEHUENSAT-1.

Antrix Corporation Limited (Antrix)   Antrix was incorporated on 28 September 1992 (under the Companies Act, 1956), is a Government of India Company under the administrative control of Department of Space (DOS). Antrix is the commercial arm of Indian Space Research Organisation (ISRO). Antrix promotes and commercially markets the products and services emanating from the Indian Space Programme. In the year 2008, the Company was awarded 'MINIRATNA' status. The current business activities of Antrix include:

a) Provisioning of communication satellite transponders to various users,

b) Providing launch services for customer satellites,

c) Marketing of data from Indian and foreign remote sensing satellites,

d) Building and marketing of satellites as well as satellite sub-systems,

e) Establishing ground infrastructure for space applications, and

f) Mission support services for satellites.

ISRO projects are conducted at following five space centers:

- SHAR—Sriharikota Launching Range
- VSSC—Vikram Sarabhai Space Center
- ISAC—ISRO Satellite Center (under development)
- SAC—Space Applications Center (under development)
- ISTRAC—ISRO Telemetry Tracking and Command Network (under development)

India has developed the following space launch vehicles:

- SLV—Satellite Launch Vehicle
- ASLV—Augmented Satellite Launch Vehicle
- PSLV—Polar Satellite Launch Vehicle
- GSLV—Geosynchronous Satellite Launch Vehicle

India is also developing the following space launch vehicles:

- GSLV Mk-I
- GSLV Mk-II
- GSLV Mk-III

The launcher and propulsion represents the ISRO's largest single development area. The launcher program has seen a gradual evolution (from the all-solid SLV-3 to solid, liquid and cryogenic fuelled stages currently used in PSLV series (Delta class launcher) and GSLV (Ariane-class).

LVM3-X/CARE MISSION

LVM3-X/CARE Mission, the first experimental suborbital flight of India's latest generation Launch Vehicle- LVM3, lifted off from Satish Dhawan Space Centre SHAR, Sriharikota, on December 18, 2014 and injected the Crew Module CARE at an altitude of 126km. This flight of LVM3 had a passive cryogenic stage with higher capacity than GSLV. It will allow India to achieve complete self reliance in launching satellites as it will be capable of placing 4 tonne class Geosynchronous satellites into orbit.

Table 5.14   Indian Space Programme

Satellite	Launch Date	Launch Vehicle	Type of Satellite
IRNSS-1G	28.04.2016	PSLV-C33	Navigation
IRNSS-1F	10.03.2016	PSLV-C32	Navigation
IRNSS-1E	20.01.2016	PSLV-C31	Navigation
TeLEOS-1 Mission	16.12.2015	PSLV-C29	Earth Observation Satellite
GSAT-15	11.11.2015	Ariane-5 VA-227	Communication
ASTROSAT	28.09.2015	PSLV-C30	Multi Wavelength Space Observatory
GSAT-6	27.08.2015	GSLV-D6	Communication Satellite
DMC3	27.08.2015	PSLC-C28	Earth Observation Satellite
IRNSS-1D	28.03.2015	PSLC-C27	Navigation
LCM3-X/CARE Mission	18.12.2014	LVM3	Geosynchronous Satellite
GSAT-16	07.12.2014	Ariane-5 VA-221	Communication
INRSS-1C	16.10.2014	PSLC-C26	Navigation
SPOT 7	30.06.2014	PSLV-C23	French Earth Observation Satellite
INRSS-1B	04.04.2014	PSLV-C24	Navigation
GSAT-14	05.01.2014	GSLV-D5	Communication
Mars Orbiter Mission Spacecraft	05.11.2013	PSLV-C25	Space Mission
GSAT-7	30.08.2013	Arine-5; VA-215	Geo-Stationary Satellite
INSAT-3D	26.07.2013	Arine-5; VA-214	Geo-Stationary/Meteorological Satellite
IRNSS-1A	01.07.2013	PSLV-C22	Navigation Satellite
SARAL	25.02.2013	PSLV-C20	Earth Observation Satellite (World's First Phone-operated Nano-satellite)
CARE Mission	18.12.2014	GSLV MK-III(x)	Experimental

Satellite	Launch Date	Launch Vehicle	Type of Satellite
GSAT-16	07.12.2014	Ariane-5VA221	Geo-Stationary Satellite
IRNSS-1C	16.10.2014	PSLC-C26	Navigation Satellites
SPOT-7	30.06.2014	PSLV-C23	Earth Observation Satellites
IRNSS-1B	04.04.2014	PSLV-C24	Navigation Satellite
GSAT-14	05.01.2014	GSLV-D5 Geo	Stationary Satellite
Mars Orbiter Mission (MOM)	05.11.2013	PSLV-C25	Space Mission
GSAT-7	03.08.2013	Ariane-5VA215	Geo-Stationary Satellite
INSAT-3D	26.07.2013	Ariane-5 VA214	Geo-Stationary/Meteorological Satellite
IRNESS-1A	01.07.2013	PSLV-C22	Navigation Satellite
SARAL	25.02.2013	PSLV-C20	Worlds First Phone operated Nano-satellite
GSAT-10	29.09.2012	Ariane-5VA209	Geo-Stationary Satellite
SPOT-6	09.09.2012	PSLV-C21	Earth Observation Satellite
PROITERES	09.09.2012	PSLV-C21	Experimental/Small Satellite
RISAT-1	26.04.2012	PSLV-C19	Earth Observation Satellite
GSAT-10	29.09.2012	Ariane-5VA209	Geo-Stationary Satellite
SPOT-6	09.09.2012	PSLV-C21	Earth Observation Satellite
PROITERES	09.09.2012	PSLV-C21	Experimental/Small Satellite
RISAT-1	26.04.2012	PSLV-C19	Earth Observation Satellite
Jugnu	12.10.2011	PSLV-C18	Experimental/Small Satellite
SRM Sat	12.10.2011	PSLV-C18	Experimental/Small Satellite
Megha-Tropiques	12.10.2011	PSLV-C18	Earth Observation Satellite
GSAT-12	15.07.2011	PSLV-C17	Geo-Stationary Satellite
GSAT-8	21.05.2011	Ariane-5	Geo-Stationary Satellite
RESOURCESAT-2	20.04.2011	PSLV-C16	Earth Observation Satellite
YOUTHSAT	20.04.2011	PSLV-C16	Experimental/Small Satellite
GSAT-5P	25.12.2010	GSLV-F06	Geo-Stationary Satellite
STUDSAT	12.07.2010	PSLV-C15	Experimental/Small Satellite
CARTOSAT-2B	12.07.2010	PSLV-C15	Earth Observation Satellite
GSAT-4	15.04.2010	GSLV-D3	Geo-Stationary Satellite
Oceansat-2	23.09.2009	PSLV-C14	Earth Observation Satellite
ANUSAT	20.04.2009	PSLV-C12	Experimental/Small Satellite
RISAT-2	20.04.2009	PSLV-C12	Earth Observation Satellite
Chandrayaan-1	22.10.2008	PSLV-C11	Space Mission
CARTOSAT-2A	28.04.2008	PSLV-C9	Earth Observation Satellite
IMS-1	28.04.2008	PSLV-C9	Earth Observation Satellite
INSAT-4B	12.03.2007	Ariane-5ECA	Geo-Stationary Satellite
CARTOSAT-2	10.01.2007	PSLV-C7	Earth Observation Satellite
SRE-1	10.01.2007	PSLV-C7	Experimental/Small Satellite
INSAT-4CR	02.09.2007	GSLV-F04	Geo-Stationary Satellite
INSAT-4C	10.07.2006	GSLV-F02	Geo-Stationary Satellite
INSAT-4A	22.12.2005	Ariane-5GS	Geo-Stationary Satellite
HAMSAT	05.05.2005	PSLV-C6	Experimental/Small Satellite

(Continued)

Satellite	Launch Date	Launch Vehicle	Type of Satellite
CARTOSAT-1	05.05.2005	PSLV-C6	Earth Observation Satellite
EDUSAT (GSAT-3)	20.09.2004	GSLV-F01	Geo-Stationary Satellite
Resourcesat-1 (IRS-P6)	17.10.2003	PSLV-C5	Earth Observation Satellite
INSAT-3A	10.04.2003	Ariane-5G	Geo-Stationary Satellite
INSAT-3E	28.09.2003	Ariane-5G	Geo-Stationary Satellite
GSAT-2	08.05.2003	GSLV-D2	Geo-Stationary Satellite
KALPANA-1 (METSAT)	12.09.2002	PSLV-C4	Geo-Stationary Satellite
INSAT-3C	24.01.2002	Ariane-42L H10-3	Geo-Stationary Satellite
Technology Experiment Satellite (TES)	22.10.2001	PSLV-C3	Earth Observation Satellite
GSAT-1	18.04.2001	GSLV-D1	Geo-Stationary Satellite
INSAT-3B	22.03.2000	Ariane-5G	Geo-Stationary Satellite
Oceansat (IRS-P4)	26.05.1999	PSLV-C2	Earth Observation Satellite
INSAT-2E	03.04.1999	Ariane-42P H10-3	Geo-Stationary Satellite
INSAT-2DT	January 1998	Ariane-44L H10	Geo-Stationary Satellite
IRS-1D	29.09.1997	PSLV-C1	Earth Observation Satellite
INSAT-2D	04.06.1997	Ariane-44L H10-3	Geo-Stationary Satellite
IRS-P3	21.03.1996	PSLV-D3	Earth Observation Satellite
IRS-1C	28.12.1995	Molniya	Earth Observation Satellite
INSAT-2C	07.12.1995	Ariane-44L H10-3	Geo-Stationary Satellite
IRS-P2	15.10.1994	PSLV-D2	Earth Observation Satellite
Stretched Rohini Satellite Series (SROSS-C2)	04.05.1994	ASLV	Space Mission
IRS-1E	20.09.1993	PSLV-D1	Earth Observation Satellite
INSAT-2B	23.07.1993	Ariane-44L H10+	Geo-Stationary Satellite
INSAT-2A	10.07.1992	Ariane-44L H10	Geo-Stationary Satellite
Stretched Rohini Satellite Series (SROSS-C)	20.05.1992	ASLV	Space Mission
IRS-1B	29.08.1991	Vostok	Earth Observation Satellite
INSAT-1D	12.06.1990	Delta 4925	Geo-Stationary Satellite
INSAT-1C	21.07.1988	Ariane-3	Geo-Stationary Satellite
Stretched Rohini Satellite Series (SROSS-2)	13.07.1988	ASLV	Earth Observation Satellite
IRS-1A	17.03.1988	Vostok	Earth Observation Satellite
Stretched Rohini Satellite Series (SROSS-1)	24.03.1987	ASLV	Space Mission
INSAT-1B	30.08.1983	Shuttle [PAM-D]	Geo-Stationary Satellite
Rohini (RS-D2)	17.04.1983	SLV-3	Earth Observation Satellite
INSAT-1A	10.04.1982	Delta 3910 PAM-D	Geo-Stationary Satellite
Bhaskara-II	20.11.1981	C-1 Intercosmos	Earth Observation Satellite
Ariane Passenger Payload Experiment (APPLE)	19.06.1981	Ariane-1 (V-3)	Geo-Stationary Satellite
Rohini (RS-D1)	31.05.1981	SLV-3	Earth Observation Satellite
Rohini (RS-1)	18.07.1980	SLV-3	Experimental/Small Satellite

(Continued)

Satellite	Launch Date	Launch Vehicle	Type of Satellite
Rohini Technology Payload (RTP)	10.08.1979	SLV-3	Experimental/Small Satellite
Bhaskara-I	07.06.1979	C-1 Intercosmos	Earth Observation Satellite
Aryabhata	19.04.1975	C-1 Intercosmos	Experimental/Small Satellite

Rakesh Sharma

Born on 13 January 1949, a test pilot and cosmonaut, Rakesh Sharma was the first Indian to venture into space as part of Intercosmos programme. On 3 April 1984, Rakesh Sharma flew into space aboard Soviet aircraft Soyuz T-11 and spent 8 days travelling in space around the Earth's orbit.

Kalpana Chawla (1 July 1961–1 February 2003)

Kalpana Chawla was an Indian-born American astronaut and space shuttle mission specialist. She was one of seven crew members who died aboard Space Shuttle Columbia during mission STS-107 when the shuttle disintegrated upon re-entry into the Earth's atmosphere on 1 February 2003.

On 5 February 2003, India's Prime Minister announced that the meteorological series of satellites, 'METSAT', will be named as 'KALPANA'. The first satellite of the series, 'METSAT-1', launched by India on 12 September 2002 will be now known as 'KALPANA-1'. 'KALPANA-2' was expected to be launched by 2007. Asteroid 51826 Kalpanachawla is named for her.

She died a hero and a role model for many young women, especially in India and particularly those in her hometown of Karnal, where her life serves to encourage young people to follow her footsteps.

Sunita L. Williams

Sunita L. Williams was born on 19 September 1965, in Euclid, Ohio. She was awarded the Navy Commendation Medal (2), Navy and Marine Corps Achievement Medal, Humanitarian Service Medal and various other service awards. Williams was commissioned as an Ensign in the United States Navy from the United States Naval Academy in May 1987. She was designated as a Naval Aviator in July 1989. Sunita has logged over 2770 flight hours in more than 30 different aircraft.

Selected by NASA in June 1998, she reported for training in August 1998. Williams has worked in Moscow with the Russian Space Agency on the Russian contribution to the International Space Station (ISS) and with the first Expedition Crew to the ISS. After the return of Expedition-1, Williams worked within the Robotics branch on the ISS Robotic Arm and the follow on Special Purpose Dexterous Manipulator. As a NEEMO2 crew member, she lived underwater for 9 days in the Aquarius habitat. Sunita Williams currently lives and works aboard at the International Space Station. She launched with the crew of STS-116 on 9 December 2006, docking with the station on 11 December 2006. Williams joined Expedition-14 in progress and served as a flight engineer during her 195 days tour of duty aboard the ISS. Williams returned to earth on 22 June 2007, at the end of STS-117 mission.

INDIA'S ATOMIC RESEARCH

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VSSC   LPSC   SDSC-SHAR   ISAC   NRSC   SAC

IISU   DECU   MCF   ISTRAC   LEOS   IIRS
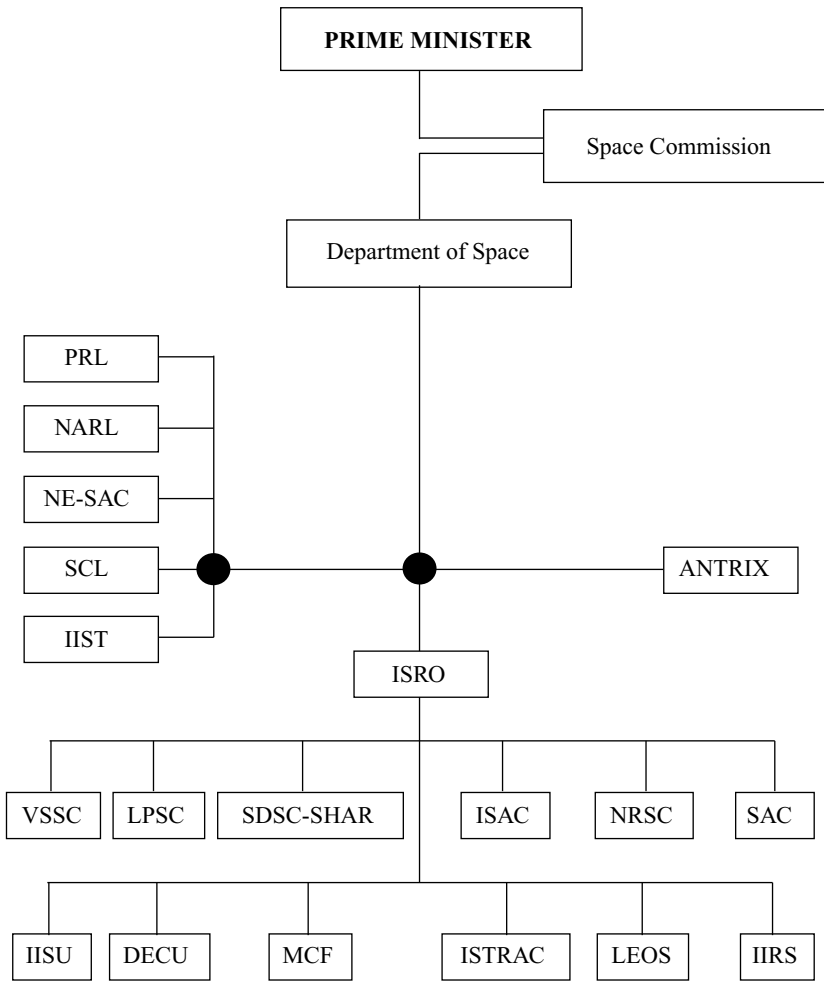
NRSC: National Remote Sensing Centre,   PRL: Physical Research Laboratory, NARL: National Atmospheric Research Laboratory,   NE-SAC: North Eastern Space Applications Centre,   SCL: Semi-Conductor Laboratory,   ISRO: Indian Space Research Organization,   Antrix Corporation Limited,   VSSC: Vikram Sarabhai Space Centre,   LPSC: Liquid Propulsion Systems Centre,   SDSC: Satish Dhawan Space Centre,   ISAC: ISRO Satellite Centre,   SAC: Space Application Centre,   IISU: ISRO Interial Systems Unit, DECU: Development and Educational Communication Unit,   MCF: Master Control Facility,   ISTRAC: ISRO Telemetry Tracking and Command Network,   LEOS: Laboratory for Electro-optic Systems,   IIST: Indian Institute of Space Science and Technology,   IIRS: Indian Institute of Remote Sensing.

The Centres of Indian Space Pragramme

CHANDIGARH
- Semi-Conductor Laboratory

JODHPUR
- Western RRSC

UDAIPUR
- Solar Observatory

Mt. ABU
- Infrared Observatory

AHMEDABAD
- Space Application Centre
- Physical Research Laboratory
- Development and Educational Communication Unit

MUMBAI
- ISRO Liaison Office

BHOPAL
- Master Control Facility - B

BENGALURU
- Space Commission
- Department of Space and ISRO Headquaters
- INSAT Programme Office
- NNRMS Secretariat
- Civil Engineering Programme Office
- Antrix Corporation
- ISRO Satelite Centre
- Laboratory for Electro-Optic Systems
- ISRO Telemetry, Tracking and Command Network
- Southern RRSC
- Liquid Propulsion Systems Centre

ALUVA
- Ammonium Perchlorate Experimental Plant

HASSAN
- Master Control Facility

BYALALU
- Indian Deep Space Network
- Indian Space Science Data Centre

NEW DELHI
- DOS Branch Secretarial
- ISRO Branch Office
- Delhi Earth Station

DEHRADUN
- Indian Institute of Remote Sensing
- Northern RRSC
- Centre for Space and Technology Education in Asia-Pacific

LUCKNOW
- ISTRAC Ground Station

SHILLONG
- North Eastern-Space Application Centre

KHARAGPUR
- Eastern RRSC

NAGPUR
- Central RRSC

HYDERABAD
- National Remote Sensing Centre

SRIHARIKOTA
- Satish Dhawan Space Centre SHAR

TIRUPATI
- National Atmospheric Research Laboratory

PORT BLAIR
Down Range Station

THIRUVANANTHAPURAM
- Vikram Sarabhai Space Centre
- Liquid Propulsion Systems Centre
- ISRO Inertial Systems Unit
- Indian Institute of Space Science and Technology

MAHENDRAGIRI
- Liquid Propulsion Test Facilities

First Nuclear Explosion

India embarked on a nuclear energy program in 1948 and a nuclear explosives program in 1964. It later culminated into a 'peaceful nuclear explosion' on 18th May 1974, at Pokhran in Rajasthan (Thar) desert.

First Nuclear Implosion

Carried out on 18 May 1974, at Pokhran in Rajasthan (Thar) desert. The main objective was use of atomic energy for peaceful purposes, such as, digging canals, reservoirs, oil exploration as well as to study rock dynamics. This successful implosion made India the sixth nuclear nation of the world.

First Rice Straw Power Plant

A 10 MW power plant using surplus rice straw as fuel, the first project of its kind in the world, has been set up at Jalkheri (Punjab). It is a joint venture of the department of non-conventional energy sources, Punjab State Electricity Board and Bharat Heavy Electrical Limited. The plant became operational from November 1992.

Ocean Waves Energy Project

India's first ocean waves energy project was launched in 1991, at Vizhinjam near Thiruvananthapuram. It is implemented jointly by Ocean Engineering Centre, IIT Madras and State Harbour Engineering Department. It is claimed that the wave energy unit is the first of its kind in the world because it is a multipurpose project and floats on the seabed. As power generation depends on the inexhaustible ocean waves, it is possible to generate power throughout the year.

Pokhran Tests

On 18 May 1974, India had conducted a peaceful underground nuclear experiment at Pokhran in Rajasthan desert. After a gap of 24 years, India has successfully conducted 5 nuclear tests on 11 and 13 May 1998 at the Pokhran Range. The first three detonations took place simultaneously at 15:45 hrs IST on 11 May 1998. These included a thermonuclear device and a sub-kiloton nuclear device. The two nuclear devices, fired on 13 May at 12:21 hrs IST, were also sub-kiloton yield range. Many experiments were fielded for equation of state measurements and also for calibration of ground motion and hydrodynamic yield measuring set-up.

India is not a member of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) or the Comprehensive Nuclear Test Ban Treaty (CTBT), though it is a state party to the Partial Test Ban Treaty (PTBT).

India perceives its nuclear weapons and missile programs as crucial components of its strategic doctrine. New Delhi rejects the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) on the grounds that it perpetuates—at least in the short-term—an unjust distinction between the five states that are permitted by the treaty to possess nuclear weapons, while requiring all other state parties to the treaty to remain non-nuclear weapon states.

Advanced Knowledge and Rural Technology Implementation

Advanced Knowledge and Rural Technology Implementation (AKRUTI) programme has potential to encourage 'village technopreneurship' based on BARC technologies. Under this programme, several AKRUTI nodes are set up and operational since 2006 and more are being set up in self-financed mode by NGOs in different states. AKRUTI nodes through NGOs are demonstrating the usefulness of BARC technologies for rural sector leading to societal benefit. Further, it has demonstrated that technically oriented HR in rural sector is capable to deploy technologies for their use under the guidance of BARC scientists and engineers. The DAE has launched DAE-Societal Initiative for utilization of

Non-Power Applications (NPAs) and Spin-off technologies in the area of water, agriculture, food processing and agri-land improvement through urban and rural waste management. Within this frame work, the structured programme called 'Akruti-Krutik-Force' has been formulated by BARC, Trombay, Mumbai.

India has also been highly critical of the pace of the nuclear weapon states' disarmament progress, arguing that they have not fulfilled their commitments under Article VI of the NPT. However, India has recently taken steps to integrate into the broader nonproliferation regime, receiving a waiver in 2008 from the Nuclear Suppliers Group (NSG), entering into bilateral civilian nuclear agreements and expressing interest in joining the major export control regimes.

Atomic Energy Commission
Established in 1948, with Dr H. J. Bhabha as its first Chairman, to look after India's atomic energy programmes.

Department of Atomic Energy (DAE)
Set-up in August 1954 for implementation of atomic energy programmes and headed by the Prime Minister of India. It has five research centers:

1. *Bhabha Atomic Research Centre (BARC)* Established in 1957, it is located in Trombay (Maharashtra) and is India's largest atomic research centre.
2. *Indira Gandhi Centre for Atomic Research* Established in 1971, it is located at Kalpakkam (Tamil Nadu).
3. *Centre for Advanced Technology (CAT)* Established in 1984, it is located at Indore.
4. *Variable Energy Cyclotron Centre (VECC)*, Kolkata.
5. *Atomic Minerals Directorate for Exploration Research (AMD),* Hyderabad.

It has three Industrial Organizations:

1. *Heavy Water Board (HWB),* Mumbai.
2. *Nuclear Fuel Complex (NFC),* Hyderabad.
3. *Board of Radiation and Isotope Technology (BRIT),* Mumbai.

Four Public Sector Undertakings:

1. *Nuclear Power Corporation of India Limited (NPCIL),* Mumbai.
2. *Uranium Corporation of India Limited (UCIL),* Jaduguda (Jharkhand).
3. *Indian Rare Earth Limited (IRE),* Mumbai.
4. *Electronics Corporation of India Limited (ECIL),* Hyderabad.

Four Service Organizations:

1. *Directorate of Purchase and Stores (DPS),* Mumbai.
2. *Construction, Services and Estate Management Group,* Mumbai.
3. *General Services Organization (GSO),* Kalpakkam (Tamil Nadu).
4. *Atomic Energy Education Society (AEES),* Mumbai.

DAE also financially supports seven autonomous national institutes:

1. *Tata Institute of Fundamental Research (TIFR),* Mumbai.
2. *Tata Memorial Centre (TMC),* Mumbai.
3. *Saha Institute of Nuclear Physics (SINP),* Kolkata.
4. *Institute of Physics (IOP),* Bhubaneswar.
5. *Harish-Chandra Research Institute (HRI),* Allahabad.
6. *Institute of Mathematical Studies (IMS),* Chennai.
7. *Institute of Plasma Research (IPR),* Ahmedabad.

The Board of Research in Nuclear Sciences (BRNS) and the National Board for Higher Mathematics (NBHM) promote research in nuclear and allied fields and mathematics respectively. India and the United States initiated a nuclear cooperation initiative in July 2005 that permitted New Delhi to participate in international nuclear trade, under certain conditions. In 2008, New Delhi negotiated a limited safeguards agreement with the International Atomic Energy Agency (IAEA). Subsequently, in September 2008 the Nuclear Suppliers Group removed the ban on India's participation in nuclear trade with its members. In October 2008, India and the United States signed a bilateral '123' nuclear cooperation agreement. India has since signed nuclear cooperation agreements with several countries, including Canada, Russia, France, Argentina, Kazakhstan and Namibia. India is working to conclude agreements Australia and Japan.

NUCLEAR POWER PROJECTS IN INDIA

The Nuclear Power Corporation of India Ltd. (NPC), set up in September 1987, is responsible the year for the design, construction and operation of nuclear power plants in

Table 5.15 Atomic Power Plants

Name	Location	Feature
1. Tarapur Atomic Power Station (TAPS)—4 units	Tarapur (Maharashtra)	Asia's 1st atomic power station commissioned in 1969. TAPS 1 & 2 are BWR, while TAPS 3 & 4 are PHWR. [Capacities TAPS—1 & 2: 160 MWe each; TAPS—3 & 4 : 540 MWe each]
2. Madras Atomic Power Station (MAPS)—2 units	Kalpakkam (T. N.)	India's 1^{st} indigenously built atomic power station. MAPS 1 & 2 are both PHWR. [Capacities MAPS 1&2: 220 MWe each]
3. Rajasthan Atomic Power Station (RAPS)—6 units.	Rawatbhata (Rajasthan)	RAPS-1, 2, 3, 4, 5 and 6 are all PHWR. [Capacities of RAPS1: 100 MWe; RAPS—2: 200 MWe; RAPS 3,4,5 & 6—220 MWe each]
4. Narora Atomic Power Station (NAPS)—2 units	Narora (UP)	1st unit commissioned in March 1989, and 2nd unit in October 1991. NAPS 1 & 2 are both PHWR. [Capacities of NAPS—1 & 2: 220 MWe each]
5. Kakrapara Atomic Power Station (KAPS)—2 units	Kakrapara (Gujarat)	Both KAPS 1 & 2 are PHWR. [Capacities of KAPS 1 & 2: 220 MWe each]
6. Kundankulam Nuclear Power Plant (KNPP)—1 unit	Kundankulam (T. N.)	Unit 1 was synchronized with the southern power grid on 22 October 2013, and operational in Dec 2014. It is a VVER-1000 (PWR) unit.[Capacity is 1000 Mwe]
7. Kaiga Atomic Power Station (KGS)—4 units	Kaiga (Karnataka)	The fourth unit went critical on 27 Nov 2010 and operationalized in Jan 2011. KGS 1, 2, 3 & 4 are all PHWR. [Capacities of KGS—1,2,3 & 4: 220 MWe each]

BWR → Boiling Water Reactor; PHWR → Pressurized heavy-water Reactor; VVER → Russian-version of Pressurized Water Reactor (PWR).

the country. It is envisaged that by the year 2000, India's atomic power generation would be 10,000 MW. Nuclear power is cheaper than thermal power. A unit of electricity from a nuclear power plant cost around 4–60 paise, whereas thermal power costs 60–90 paise. Till 2011, India had approximately 20 nuclear power plant. India's domestic uranium reserves are small and the country is dependent on uranium imports to fuel its nuclear power industry. Since early 1990s, Russia has been a major supplier of nuclear fuel to India and recently government has entered into agreement with Australia for purchasing Uranium. India's future plans for nuclear energy are based on thorium which is found in plenty in the monazite sands of India's seashore.

As of June 2015, the present installed capacity of nuclear power capacity in the country, of 5780 MWe comprises 5160 MWe based on the indigenous technology and 620 MW [Tarapur Atomic Power Station Units 1&2 (TAPS 1&2) – 2 × 160 MWe and Rajasthan Atomic Power Station Units 1&2 (RAPS 1&2) – 100 MWe + 200 MWe] based on foreign technical cooperation. In addition, five reactors with an aggregate capacity of 3300 MWe are at various stages of construction/commissioning. On progressive completion of these reactors the installed capacity of nuclear power in the country is expected to reach 9080 MWe, of which, 2620 MWe (TAPS 1&2 – 2 × 160 MWe, RAPS 1&2 – 100 MWe + 200 MWe and Kudankulam Nuclear Power Project Units 1&2 (KNPP 1&2) –1000 MWe + 500 MWe), or about one fourth would be based on foreign cooperation. Kudankulam Nuclear Project is being built with assistance from France.

As of June 2015, of the total capacity of 5680 MW in operation, a capacity of 3280 MW is fuelled by imported fuel and is being operated at rated capacity. The remaining 2400 MW capacity, fuelled by indigenous fuel is being operated close to the rated capacity, matching the fuel availability. The present share of nuclear power generation in the total electricity production in the country is of the order of 3.45%

Table—Atomic Power Plants (Under Construction)

There are five reactors which are presently under various stages of construction with a total capacity of 3300 MW.

Name	Location	Feature
1. Rajasthan Atomic Power Station (RAPS)—2 units	Rawatbhata (Rajasthan)	RAPS—7 (Operational in Nov 2017) 700 MW RAPS—8 (Operational in May 2018) 700 MW
2. Kakrapara Atomic Power Station (KAPS)—1 unit	Kakrapara (Gujarat)	KAPS—3 (Operational in Feb 2017) 700 MW KAPS—4 (Operational in Oct 2017) 700 MW
3. Kundankulam Nuclear Power Plant (KNPP)	Kundankulam (T. N.)	KNPP—2 (Operational in Sep 2015) 500 MW, it is a Prototype Fast Breeder Reactor implemented by Bhartiya Vidhyut Nigam Ltd. (BHAVINI)

Table—Nuclear Power Projects for Starting of Work during XII Five-Year Plan

There are many new nuclear projects approved which will further the installed nuclear plant capacity in India by 17,400 MWe, thus, bringing it to the total of 27,480 MWe in coming decade. The details of such new projects are:

Name	Location	Feature
• Indigenous Reactors		
Gorakhpur Haryana Anu Vidhyut Pariyojana (GHAVP 1 & 2)	Gorakhpur, Haryana	GHAVP—1 (Planned Capacity) 700 MW GHAVP—1 (Planned Capacity) 700 MW
Chutka Madhya Pradesh Atomic Power Plant Project (CMPAPP 1&2)	Chutka Madhya Pradesh	CMPAPP—1 (Planned Capacity) 700 MW CMPAPP—1 (Planned Capacity) 700 MW
Mahi Banswara, Plant 1 & 2	Mahi Banswara Rajasthan	Plant—1 (Planned Capacity) 700 MW Plant—2 (Planned Capacity) 700 MW
Kaiga Atomic Power Station (KGS)—2 units (KGS 5 & 6)	Kaiga, Karnataka	KGS—5 (Planned Capacity) 700 MW KGS—6 (Planned Capacity) 700 MW
Fast Breeder Reactor (FBR 1 & 2)	Kalpakkam, Tamil Nadu	FBR—1 (Planned Capacity) 500 MW FBR—2 (Planned Capacity) 500 MW
Advanced Heavy Water Reactor (AHWR)	Location to be decided	AWHR—1 (Planned Capacity)—300 MW
• Reactors with Foreign Cooperation		
Kundankulam Nuclear Power Project (KKNP —3 & 4)	Kundankulam, Tamil Nadu	KKNPP—3 (Planned Capacity 1000 MW) KKNPP—4 (Planned Capacity 1000 MW)
Jaitapur Nuclear Power Project (JNPP—1 & 2)	Jaitapur, Maharashtra	JNPP—1 (Planned Capacity 1650 MW) JNPP—2 (Planned Capacity 1650 MW)
Kovvada (Plant 1 & 2)	Kovvada, Andhra Pradesh	Plant—1 (Planned Capacity 1500 MW) Plant—2 (Planned Capacity 1500 MW)
Chhaya Mithi Virdi Jaspara Plant—1 & 2	Chhaya Mithi Virdi, Gujarat	Plant—1 (Planned Capacity 1100 MW) Plant—2 (Planned Capacity 1100 MW)

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6 Physical and World Geography

SOLAR SYSTEM

Galaxies

- There are many more galaxies similar to our galaxy.
- The diameter of the Milky Way is about 105 light years.
- The solar system revolves around the centre of the Milky Way at a speed of 285 km/s and completes one revolution in 224×106 light years.
- The galaxy closest to the Milky Way is Andromeda Nebula, which is about 6.8×105 light years away from our galaxy.

Milky Way

- It rotates around its centre and the Sun takes 225 million years to complete one circuit.
- It is 1,00,000 light years in diameter.
- The central bulge is 10,000 light years across and 20,000 light years thick. It contains only old stars.
- The disc formed by the spiral arm is 3000 light years thick.
- The Sun lies 30,000 light years from the centre of the galaxy, in the Orion Arm.
- The centre of the galaxy is Sagittarius A, a source of powerful radio waves that could be a black hole.

Our solar system comprises the sun and eight planets which orbit around it. It also includes:

- The natural satellites accompanying the planets.
- Several thousand minor planets called *asteroids*.
- A large number of comets.

The Collision Theory

At the beginning of the 20th century, Sir James Jeans (England) suggested that gravitational pull of a passing star, or perhaps a grazing collision, had distorted the shape of the Sun, drawing out filaments of gas that later broke into great droplets to form planets. A major objection to this Collision Theory is that the composition of planets such as the Earth is very different from that of Sun. Also, the orbits of the planets are remarkably rounded, whereas a chance of collision would be expected to throw the material into wildly elongated orbits. Another scientist, Otto Schmidt, in 1944 suggested that the Sun might have passed through one of the many clouds of dirt and gas in our galaxy, and collected a disc of matter that later evolved into planets. All these earlier theories and many others about origin of planets in the solar system were ruled out due to some reasons.

The Sun

Sun is made up of extremely hot gases. Its glowing surface is called the photosphere. Above the photosphere is the chromosphere (being reddish in colour), and beyond this layer is the corona that is visible during eclipses. The visible white light of the Sun is made up of seven colours: violet, indigo, blue, green, yellow, orange, and red. Superimposed on these are hundreds of dark lines called the Fraunhofer lines. Like all other stars, the Sun is also composed mainly of hydrogen.

Important Data About the Sun

Facts	Values
Average distance of the Sun from the Earth	14,95,98,900 km
Temperature of outer surface	6000°C
Interior temperature	1,50,00,000°C
Equatorial diameter	1,3,91,980 km
Rotation period (spinning)	25 days 9 h 7 min
Travelling speed of the Sun's rays	30,000 km/s
Time taken by the Sun's rays to reach the Earth's surface	496.6 s (8 min and 16.6 s)
Age	About 5 billion years. Expected life About 10 billion years
Chemical composition	Hydrogen 71% Helium 26.5%; Other elements 2.5%

What powers the Sun?

As already mentioned, in the Sun's core lies a giant nuclear furnace, which converts hydrogen to helium at a rate of 600 million tonnes per second. The energy released by these reactions seeps from the core as radiation—mostly powerful X-rays—in all directions and heats the surrounding medium. It is this energy that powers the Sun. A similar process produces the energy as of a hydrogen bomb, but Sun is so massive that the force of its own gravity counteracts the expansive forces inside it.

Planets

The bodies revolving around the sun (at the same time rotating on their own axis) are called planets. There are eight[*] known planets:

1. *Mercury*: It is the planet closest to the sun. It rotates on its own axis in 58.65 days and takes 88 days to complete one revolution around the sun. Thus, it is also the fastest planet in our solar system.

2. *Venus*: It is the brightest object in the sky after the sun and the moon. It is also the hottest planet in our solar system. It rotates backwards (unlike other planets) on its axis.

Pluto[*] From its discovery in 1930 until 2006, it was considered the ninth and smallest planet. However, on 24 August 2006, the International Astronomical Union (IAU) has reclassified Pluto as a dwarf planet. Therefore, we now have eight planets in our solar system.

Table 6.1 Important Data Pertaining to Planets in Our Solar System

PLANET	Mean Distance from the Sun (million km)	Equatorial Diameter (km)	Period of Revolution Round the Sun or Side Red Rotation (Orbital Period)	No. of Rotation on Own Axis or Axis Rotation	No. of Satellites	Mass: Times of Earth	Mean Temp. of Surface	Other Details	Mass (kg)	Density as Compared to Earth (Earth = 1)	Density (g/c m³)	Inclination to Ecliptic
MERCURY	57.9	4880	88 days	58 days, 15 h, and 30 min	0	0.055	+350°C	Nearest to the Sun and fastest planet	3.3×10^{23}	0.06	5.4	7.0°
VENUS	108.2	12,104	22.7 days	243 days and and 14 h	0	0.815	+475°C	Brightest, hottest, and closest to Earth Most dense	4.9×10^{24}	0.81	5.2	3.4°
EARTH	149.6	12,756	61/4 days	23 h, 56 min, and 40 s	1	–	+22°C	Most dense	$5,976 \times 10^{24}$	1.00	5.5	0.0°
MARS	227.9	5787	687 days	24 h, 37 min, and 22 s	2	0.108	–23°C	It has largest mountains and deepest valleys	6.4×10^{23}	0.11	3.9	1.9°
JUPITER	778.3	142,800	12 years	9 h, 50 min, and 30 s	63	317.9	–123°C	Largest planet: largest Moon in solar system.	1.9×10^{27}	317.33	1.3	1.3°
SATURN	1427	120,000	30 years	10 h and 14 min	47	95.2	–180°C	Least dense: smallest Moon in solar system.	5.7×10^{26}	95.15	0.7	2.5°
URANUS	2869.6	51,800	84 years	16 h and 1 min	27	14.6	–218°C	Planet most tilted on its axis (axis tilt of 98° from its orbital plane)	8.7×10^{25}	14.65	1.3	0.8°
NEPTUNE	4496.6	49,500	165 years	18 h	13	17.2	–228°C	Its Moon Nereid has the most eccentric orbit	1×10^{60}	17.23	1.7	1.8°

3. *Earth*: Details follow.

4. *Mars*: It is the fourth planet from the sun and is next after the earth. It is also known as the *red planet*. Because of its similarities with earth, astronomers have been speculating on the existence of some kind of life on this planet.

5. *Jupiter*: Is the largest planet in our solar system. Its diameter is 11 times the diameter of the earth. It has 63 satellites.

6. *Saturn*: Is the outermost planet visible to the naked eye and second largest in size after Jupiter. The most spectacular feature of Saturn is its system of rings.

7. *Uranus*: Is the seventh planet from the sun and is not visible to the naked eye. It was discovered in 1781 by William Herschel.

8. *Neptune*: It is the eighth in position from the sun. It was discovered by J. G. Galle in 1846.

Extrasolar Planets

Scientists and science fiction writers have long hypothesized the existence of extrasolar planets, but none were discovered until the 1990s. Today, over 100 extrasolar planets have been found and new ones are discovered each year. Extrasolar planets are too distant and too faint compared to the stars they orbit to be detected by telescopes. However, there are two powerful means of detecting them. The transit method detects a planet's shadow when it transits (moves in front of) its host star. Alternatively, planet hunters employ the Doppler effect. As a planet orbits a star, the star experiences a slight gravitational pull towards the planet, causing the star to wobble as the planet moves. The tell-tale wobble is revealed by alternating red-shifts and blue-shifts in a host star's spectral emissions.
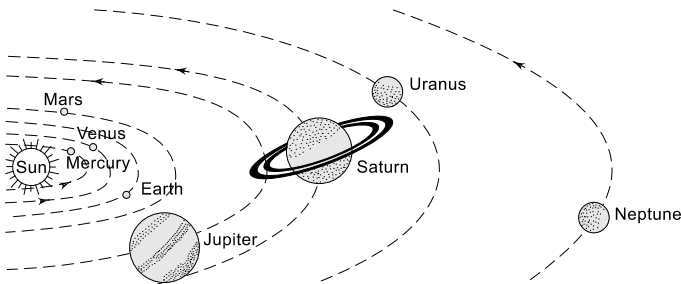

Figure 6.1

Which Is Farthest, Neptune or Pluto?

Pluto revolves farther from the sun than any of the planets for most of its orbit. However, because of its orbital eccentricity, Pluto moves closer to sun for approximately 20 years, leaving Neptune at a farther distance. From 23 January 1979, Pluto moved closer to the sun and remained in that position till 15 March 1999. After 1999, it is now Pluto's turn to go further and Neptune will remain closer to the sun for approximately 228 years.
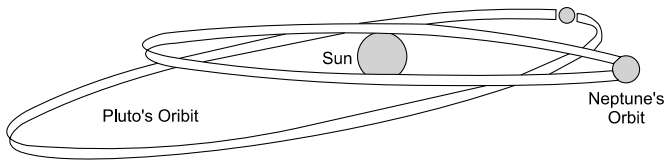
Figure 6.2

Satellites

Satellites are bodies which revolve around the planets. There are approximately 180 satellites in our solar system:

Table 6.1

Planet	No. of Satellites
Mercury	0
Venus	0
Earth	1
Mars	2
Jupiter	63
Saturn	47
Uranus	27
Neptune	13

*Pluto a dwarf planet has five moons.

Notable Moons of Solar System
Martian Moons: (Mars) Deimos and Phobos
Jovian Moons: (Jupiter) Ganymede, Europa, Callisto, Io, Amalthea, Euporie, Aitne, Autonoe, Sponde, Kalyke, Megaclite, Isonoe
Saturn's Moons: Titan, Tethys, Dione, Mimas, Iapetus, Enceladus, Hyperion, Phoebe, Pan
Uranian Moons: Setebos, Prospero, Sycorax, Stephano, Caliban, Oberon, Titania, Umbriel, Ariel, Miranda, Puck
Neptune's Moons: Triton, Nereid, Proteus, Larissa, Despina, Galatea, Thalassa, Naiad

Moon

The Moon is earth's natural satellite and is its nearest neighbour in space. It revolves around the earth while rotating on its own axis. The moon is about 1/6th the size of the earth. The moon takes 27 days, 7 hours, 43 minutes and 11.47 secs to complete one revolution of the earth. It rotates on its axis in exactly the same time. Hence, we see only one side of the moon.

Important Data on the Moon
Distance from the earth (centre to centre)—3,84,400 km
Distance from the earth (surface to surface)—3,76,284 km
Diameter (Period of option units axis 28 days)—3475 km
Orbital Speed—2,288 miles per hour (3,683 km/hr)
Period of rotation on its axis—27.3 days

Moon is the first member of our solar system to have been visited by man. Neil Armstrong and Edwin Aldrin created history on 21 July 1969, when they first set foot on the moon.

Asteroids

It is believed that asteroids are debris left over from the formation of the inner planets. They are too small to retain any atmosphere of their own. Asteroids are also called *planetoids* or small planets. They circle around the sun between the orbits of Mars and Jupiter. There are about 50,000 known asteroids in our solar system. The largest is *Ceres* with a diameter of 1025 km.
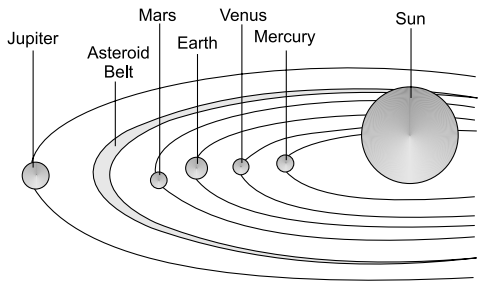

Figure 6.3

Meteors

Meteors are small bodies often seen in the sky, shooting with great speed from one point to another and producing a trail of light. Meteors may burn up or fall on earth (known as *shooting stars*) in the form of dust or fragments (called *meteorites*).

Comets

Comets are celestial bodies that move around the sun. A prominent feature of a comet is its long tail and hence, its name which comes from the Greek word *kometes*, meaning 'hair-like'. Some important comets are: Halley's D'Arrest, Encke, Borrelly, Pons-winnecke, Finlay, Faye, Smith-tuttle, etc.

EARTH AND ITS BASIC FACTS

The earth is in the third position from the sun and is the fifth largest planet in the solar system.

Shape of the Earth

The earth is an oblate spheroid (ball flattened at the poles), i.e., almost spherical, flattened a little at the poles and with a slight bulge at the centre (equator). The spinning (rotation)

Important Comets

Halley's Comet is perhaps the most famous comet, named after the British astronomer, Edmund Halley, who discovered it in 1705. He stated that the comets seen in 1531, 1607 and 1683 were in fact the same body which circles the sun every 76 years. Halley's comet last appeared in 1986 and it may reappear again after 76 years.

Comet 'Smith-Tuttle' is a huge comet heading on a collision course with earth on 17 August 2116. It was first sighted in 1862 and rediscoverd in 1992. It could kill most forms of life with an explosion more powerful than the explosion of a million nuclear bombs put together.

Comets in 2015:

– Comet Pons-Winnecke (Jan 30, 2015)
– Comet d' Arrest (Mar 2, 2015)
– Comet Churyumov-Grasimenko (Aug 13, 2015)

of the earth at a high speed has caused its mass to bulge at the equator and sinking at the poles.

Structure of the Earth

The earth is made-up of a number of concentric layers of material as in the bulb of an onion.

Composition of the Earth

The earth is made-up of more than 100 different elements.

The important ones are:

Oxygen	46.6%
Silicon	27.72%
Aluminium	8.13%
Iron	5.01%
Calcium	3.63%
Sodium	2.85%
Potassium	2.62%
Magnesium	2.09%

The earth has four distinct spheres:

1. *Lithosphere*: Top crust which includes land surface and ocean floor.

2. *Hydrosphere*: Water surface which includes oceans, seas, rivers and lakes.

3. *Atmosphere*: The cover of air that envelops the earth's surface.
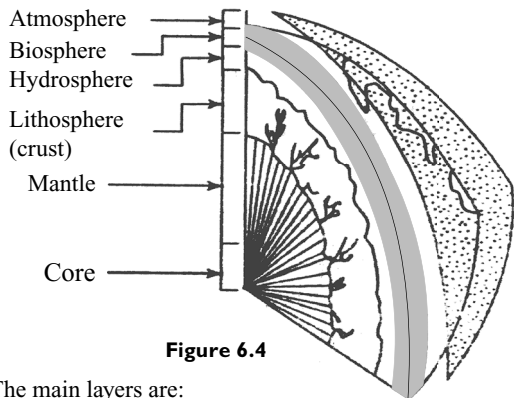
4. *Biosphere*: The region where life exists.

Figure 6.4

The main layers are:

Crust—8–40 km in thickness (avg.);
Mantle—2895 km in thickness (avg.)
Outer core—2100 km of molten material (avg.);
Inner core—1255 km of solid mass (avg.).

Important Data About the Earth

Mass	6.5832×10^{21} short tons
Equatorial Radius	6371 km
Equatorial Diameter	12,742 km
Polar Diameter	12,756 km
Mean Diameter	12,756 km
Equatorial circumference	40,075 km
Polar Diameter	40,007 km
Total Surface Area	510,072,000 km^2
Total Land Area (29.08%)	148,400,000 km^2
Total Water Area (70.92%)	361,300,000 km^2
Mean Distance from the Sun	149,407,000 km
Time for Rotation on its own Axis	23 h, 56 min and 4.09 s
Talk about Tropical year and sidereal year	
Period for Revolution around the Sun	365 days, 6 h, 9 min and 9.54 sec
Total Coastlines	356,000 km
Total Mass of Earth	5880×1021 tonnes
Total volume of Earth	10,83,20,88,40,000 km^3
Mean Depth of Hydrosphere	3554 m
Approx. Age of Earth	46,000 million years
Lowest point (on Earth's surface)	Shores of Dead Sea (Israel Jordan) 396 m below sea level
Highest Point	Mt Everest
Deepest Part in the Ocean	'Mariana Trench' east of Phillipines 10,900 m below sea level

Large Harden Collider (LHC)

As of today, the LHC remains the largest and most complex experimental facility ever built. LHC will re-create the conditions just after the Big Bang in an attempt to answer fundamental questions of science and universe itself. LHC can operate at high energy levels and generate mini-black holes.

It is **Large** due to its size (approximately 27 km in circumference), **Hadron** because it accelerates protons or ions, which are hadrons, and **Collider** because these particles form two beams travelling in opposite directions, which collide at four points where the two rings of the machine intersects.

The suggestions that LHC could generate black holes had stocked fears that one of these micro-black holes could swell in size, swallowing up the Earth. However, the physicists stressed that any such phenomena would be short-lived, and thus would pose no threat to our planet. In March 2008, plaintiffs requested an injunction in a US court stopping LHC from switching on. However, on 10 September 2008, LHC housed inside a 27-km tunnel in Cern, Switzerland, was activated and preliminary round of experiments carried out successfully. On 19 September 2008, an electric fault caused the LHC operations to halt due to a helium gas explosion. It was only after a year, on 20 November 2009 that the LHC started working again, and later on 30 March 2010, it recorded the

highest-energy (3.5 TeV) manmade-collision experiment. LHC worked at its peak energy levels (4 TeV) till end of 2012. The discovery of a particle matching the Higgs boson was confirmed by data from the LHC in 2013. LHC has been shut down for upgrades to increase beam energy to 6.5 TeV per beam (13 TeV collision energy) and it got back to work in June 2015.

Fact Bytes

➤ Earth rotates continually on an axis that penetrated Earth's surface at the North Pole and the South Pole. ➤ The shape of the Earth is that of an oblate spheroid or solid of revolution whose meridian sections are ellipses, while the sections at right angles are circles. ➤ The equatorial circumference is divided into 360° of longitude, which is measured in degrees, minutes and seconds east or west of the Greenwich meridian 0° to 180°, the meridian 180° E. ➤ Distance from north to south of the equator is measured in degrees, minutes and seconds of latitude. ➤ The equator is 0°, the North Pole is 90°N and the South Pole is 90°S. ➤ The tropis lie at 23° 27'S (tropic of capricorn). ➤ The Arctic Circle lies at 66°33'N and the Antarctic Circle at 66°33'S. ➤ The tropics and the Arctic and Antarctic circles are affected by the slow decrease in obliquity of the ecliptic, of about 0.47 arcseconds per year. ➤ The effect of this is that the Arctic and Antarctic circles are currently moving towards their respective poles by about 14 m per annum, while the tropics move towards the equator by the same amount. ➤ The radial velocity on the Earth's surface at the Equator is about 1670 km/h. ➤ The Earth's mean velocity in its orbit around the Sun is 107,229 km/h. ➤ The Equator divides the Pacific Ocean into the North and South Atlantic. ➤ The dateline was internationally ratified on 13 October 1884. ➤ The position of dateline has been modified on occasions, most recently on 1 January 1995 when it was moved to the east of Kiribati.

Earth's Movements
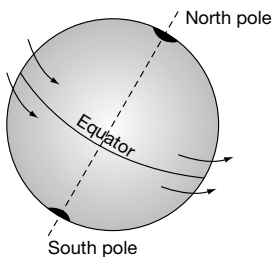
The earth has two types of movements:

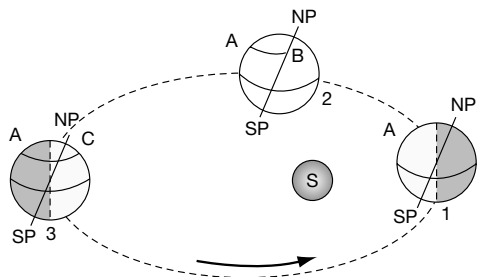**Figure 1.9**   Earth's Movement on its Axis

Figure 1.12   Direction of Revolution of the Earth

1. *Rotation*: The earth spins on its own imaginary axis from west to east once in 24 hours. It is also called *diurnal* or *daily motion*, which causes the formation of day and night.

Longest Days and Nights	Northern Hemisphere	Southern Hemisphere
Longest day (shortest night)	21 June	22 December
Shortest day (longest night)	21 December	21 June

Days and nights are equal at the equator throughout the year because the circle of illumination always divides the equator into two equal parts.

2. *Revolution*: While rotating on its axis, the earth also revolves around the sun, along an almost circular path (elliptical) called its orbit. It is also called *annual motion* or *yearly motion* because it takes one solar year to complete the journey i.e., 365 1/4 days or 365 days, 6 hours 9 minutes and 9.54 seconds. The earth's revolution causes a change in season.

How Seasons Change?

The earth's axis is inclined at an angle of 66.5° to the plane of its orbit. As a result of this, the earth is in different positions while revolving around the sun. During the first half of the year the northern hemisphere tilts towards the sun resulting in the season of summer in the region. During the second half of the year the southern hemisphere tilts towards the sun and thus experiences summer and the northern hemisphere experiences winter during this period. The revolution causes the four seasons:

Figure 1.13 Seasons Throughout the World

1. *Spring*   When the sun is directly overhead the equator.
2. *Summer*   When the sun is directly overhead the Tropic of Cancer—the north temperate zone experiences summer.
3. *Autumn*   When the sun returns to the equator and the north temperate zone experiences the season of autumn.
4. *Winter*   The sun is at the Tropic of Capricorn and the north temperate zone experiences winter.

Equinoxes are dates when the nights and days are equal. During these days the sun shines directly over the equator. 21 March is called *vernal equinox* and 23 September is called *autumnal equinox.*

Solstice the time of the year when the difference between the length of days and nights is the largest it is referred to as solstice.

On, or around 21 June, the North Pole tilts towards the sun and the sun shines directly over the Tropic of Cancer which is called *summer solstice*. On or around 22 December, the earth is at the opposite end of its orbit, as a result, the South Pole tilts towards the sun and the North Pole away from it. This is called *winter solstice.*

Eclipses when the light of the sun or the moon is obscured by another body the sun or moon is said to be in eclipse.

Figure 1.15   Earth at the Solstice

Lunar Eclipse when the earth comes between the moon and the sun, the shadow cast by the earth on the moon results in a lunar eclipse. Lunar eclipse occurs only on a full moon day but not on every full moon day.

Solar Eclipse when the moon comes between the sun and the earth, it causes obstruction of the sun's light when viewed from the earth and is called *solar eclipse*. A solar ec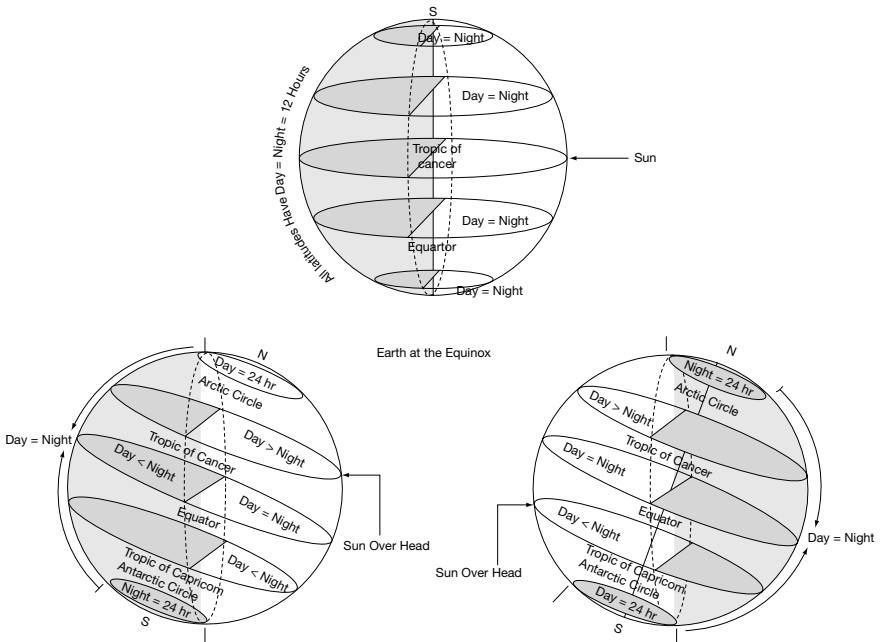lipse occurs on a new moon day when the moon is in line with the sun. However, solar eclipse does not occur on every new moon day.

Global Positioning Systems (GPSs)

Determining the location of a place on Earth's surface has become much easier with the development of *global positioning systems (GPS)*. The GPSs are a navigational tool originally developed by the US government for military use, but now available for civilian purposes worldwide. The system consists of a fleet of satellites that orbit Earth, broadcasting digital codes. A portable receiver 'listens' to these signals. By measuring very small differences in arrival times of the signals, it determines its own location. GPS is revolutionizing many business operations, especially those related to transportation and mapping. Many new automobiles now offer GPS-based mapping systems that continually track the vehicle's location and display a moving digital map on the console. Hikers carry GPSs to avoid getting lost and surveyors determine their locations by GPS instead of using optical devices that are useful only for distances of 1–2 kilometers at best, assuming a clear line of sight.
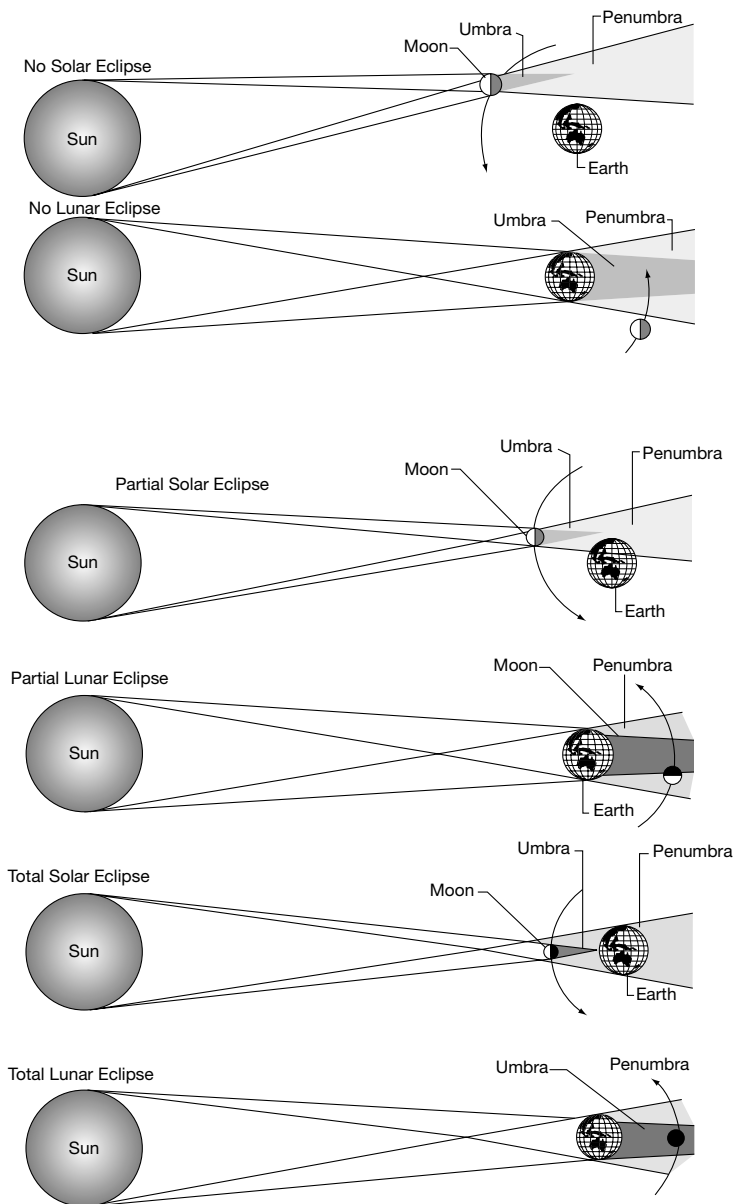
Figure 1.16   Eclipse

ATMOSPHERE

The atmosphere is a gaseous envelop that surrounds the earth. The composition of atmosphere changes as we go higher from the earth's surface. Up to about a height of 50 km from the earth, the atmosphere is composed of:

Nitrogen	78.09%
Oxygen	20.95%
Argon	0.93%
Minor gases (carbon dioxide, hydrogen, neon, helium, methane, xenon, krypton, etc.)	0.03%

Atmospheric Layers

The atmosphere of earth is arranged into four layers, *viz.,*

1. *Troposphere*: The layer nearest to earth's surface up to a height of about 15 km.
2. *Stratosphere*: The region of uniform temperature extending from an altitude of about 15 km above the earth to about 50 km.
3. *Mesosphere:* The very cold region which extends from 50 to 90 km above the earth's surface.
4. *Ionosphere*: Lies immediately above the mesosphere and extends from 80 to 400 km above the earth's surface. The middle layer of this region is called the *thermosphere* where the temperature is above 100°C. The outer limit of the atmosphere is called *exosphere* where the gravity of the earth is exceedingly weak.

WINDS

Whenever there is a horizontal difference in air pressure, air from high pressure areas flows to the low pressure areas. This horizontal movement of air causes formation of winds. The force, which results due to horizontal pressure differences and drives the winds is called *pressure gradient force.*

Types of Winds

1. **Local Winds**   Local winds are generated due to local differences in the temperature and air pressure. Mostly local winds develop by depressions. If the air is drawn in from the tropical region in front of the depression—hot winds are produced and if air is drawn in from polar regions in the rear of the depression—cold winds are produced. Some of the local winds are:
   - *Hot winds*: Santa Ana (Mexico), Brickfielder (Australia), Sirocco, Leveche (Sahara), Harmattan (W. Africa), Khamsin (Egypt), Simoom (Sahara), Zonda (Paraguay)
   - *Cold Winds*: Bora (Yugoslavia), Southerly Buster (Australia), Buran (Europe), Panyero (Argentina), Mistral (France).
2. **Trade Winds**   These winds blow from the sub-tropical high pressure areas (about 30° North and South) towards the equatorial low pressure belt. They blow constantly and steadily in the same direction, on the North-eastern trades in the Northern hemisphere and the South-eastern trades in the Southern hemisphere. Due to rotation of earth, these winds do not cross the isobars at right angles, but are deflected to the right in the Northern hemisphere and to the left in the Southern hemisphere. When these winds meet at equator and clash, they cause heavy rainfalls at the line of convergence.

Monsoon in summer, due to changing pattern of solar heating of earth, the sub-tropical high pressure belt and the thermal equator are displaced northwards. In response to this, the equatorial westerlies also move northwards. The route they take is from the oceans to the lands as they blow over the Asian continent bringing the South-West Summer Monsoons. In winters, the subtropical high pressure belts and thermal equator are displaced to south direction, thus, re-establishing the normal trade winds causing the winter monsoon. Actually, the monsoons are seasonal modifications of the general planetary wind system. They blow over the regions of India, Pakistan, Sri Lanka, Bangladesh, Myanmar, China, Northern Australia.

3. **The Westerlies**   These winds blow from the subtropical high pressure belts towards the sub-polar low-pressure belts. In the Northern hemisphere, they blow from South-West to North-East and in the Southern hemisphere they blow from North-West to South-East.

4. **Land and Sea Breeze**   These winds or breezes are formed across the coastal strip, due to pressure gradient at the sea and land. During day time, the land becomes more heated up as compared to sea, thus developing higher pressure at sea. The air from sea starts flowing towards land which has less pressure, which is called the *sea breeze*. During nights, due to heat radiation land becomes cooler than sea and develops higher pressure than sea. The air which blows from land to sea during night is called *land breeze*.

5. **Periodic Winds**   Some winds change their directions due to change in seasons, these winds are called *periodic winds*. Monsoons are also a type of periodic wind.

6. **Planetary Winds**   The latitudinal differences in air pressure cause these winds to blow throughout the year from one latitude to the other.

7. **Mountain and Valley Breeze**   During day time, the air pressure in the valley is more than on the mountain slopes as the mountain slopes get heated up more compared to the valley floor. This causes formation of breeze from valley to the slopes in upward direction, called *valley breeze*.

   During nights, the pattern is reversed and the air starts breezing from the mountain slopes, lower down to the valley floor, causing mountain breeze.

8. **Jet Streams**   These are the narrow meandering bands of swift winds which blow from West to East in the upper troposphere near the tropopause. They get embedded into the westerlies on this course and encircle the whole globe. There are two types of jet streams: (i) Sub-tropical jet streams and (ii) Polar Front jet streams. The average speed of jet stream is 350 km per hour in summers and as high as 450 km per hour during winters.

9. **Tropical Winds**   The air masses which are created at the tropical regions, extending over hundreds of kilometers and made-up of several layers are called *tropical winds*. These are further subdivided into two types:

   • Maritime tropical
   • Continental tropical

10. **Polar Winds**   The air masses, much of the type of Tropical winds, which are generated at the polar regions are called *polar winds*. They are again subdivided in two types:

   • Maritime Polar
   • Continental Polar

11. **Warm and Cold Fronts**   When the warmer and lighter air masses move along the colder and more dense air mass, the warm air mass rides above the colder one. The boundary zones of convergence separating the two air masses are called *warm fronts*. If the cold air mass forces its way under the mass of warmer air and tends to push the warm air mass upward, then this form is called a *cold front.*

Intertropical Convergence Zone (ITCZ)   The zone where air from two hemispheres meets is called ITCZ. It is also referred by names such as, 'equatorial front' (a front is an area where unlike air masses come together), or 'intertropical front', and 'doldrums' (this name is attributed to the fact that sailing ships were often becalmed in these latitudes). The ITCZ is a zone of convergence and weak horizontal airflow characterized by feeble and erratic winds. The ITCZ often appears as a well-defined, relatively narrow cloud band over the oceans. Over continents, however, it is likely to be more diffused and indistinct, although thunderstorm activity is common.

El Nina   During the normal conditions in the Pacific Ocean basin there is lower pressure conditions in Darwin (northern Australia) and higher pressure conditions in Tahiti. However, every few years the high pressure develops over northern Australia and low pressure develops to the east near Tahiti. This 'seesaw' of pressure is known as Southern Oscillation. It was first recognized by Gilbert Walker in the first decade of the 20th century. By the 1960s the meteorologists recognized a connection between Southern Oscillations and occurrences of strong El Nino warming near South America. This overall coupled ocean-atmospheric pattern is now known as the El Nino-Sothern Oscillation (ENSO).

La Nina   Adding to the complexity is a more recently recognized component of the ENSO cycle, La Nina. In some ways, La Nina is simply the opposite of the El Nino: the water off South America becomes usually cool; the trade winds are stronger than usual; the water off Indonesia are usually warm; the south-western United States is drier than usual while southeast Asia and northern Australia are humid. However, La Nina conditions are not as prominent or as predictable as those of El Nino.

LITHOSPHERE

The lithosphere is the topmost crust of the earth. The continents and oceans rest on it.

Sima and Sila Layers

Sima (because of its two most prominent mineral compounds, silica and magnesium), is the layer which forms the deep ocean basin floors and underlies small portion of some continents as well. Sila is the layer that is believed to underlie only the continents, where it sits as immense bodies of rock partially embedded in the denser layer below. This continental curst (sometimes called sial after its common constituent silica and aluminium).

Principle of Isostasy

It is related to the recognition of differences between oceanic crust, continental crust and the mantle is the principle of isostasy. In the simplest terms, the crust is floating on the denser, deformable,mantle below. Isostasy means that the addition of a significant amount of mass on to a portion of the curst, that causes the crust to sink, whereas the removal of a large mass allows the crust to rise.

Theory of Continental Drift

The generally derived theory of continental drift, notably expounded by Alfred Wegener in early 1900s, was revived in the second half of the 20th century and has become almost universally accepted as the concept of plate tectonics.

It postulates a massive supercontinent called Panagea, which formed from smaller continents about 450 million years ago, began to break up again into large sections that have continuously moved away from one another and now comprise the contemporary continents.

Plate Tectonics

Plates move apart at divergent boundaries, usually represented by an undersea mountain range (called an oceanic ridge), with new seafloor material being created by the upwelling of hot magma from below. At a convergent boundary, plates moving in opposite directions meet, resulting in mountain building at the edges as one plate slides (subducts) under the other. At a transform boundary, two plates slip past one another laterally; this does not usually produce major landforms but may results in fault movements and earthquakes.

Volcanism

It is a general term that covers all processes in which the magma moves from The Earth's interior to or near the surface; volcanism can be extrusive volcanism, intrusive volcanism, and deep plutonic activity.

Diastrophism

It refers to the deformation of the Earth's crust by bending or breaking in response to great pressures exerted either from below or from within the crust. The major diastrophic movements are folding and faulting.

Rocks

The earth's crust is formed of mineral material called *rocks*. The rocks can be grouped into three broad categories:

1. *Igneous Rocks*: Formed by the solidification of molten magma from the interior of the earth. About 90% of the earth's crust is made of this type of rock. Examples—granite, basalt, volcanic rocks.
2. *Sedimentary Rocks*: Formed from the sediment deposits on the ocean beds. It comprises only about 5% of the earth's crust. These rocks are also known as *stratified rocks* because they are formed in horizontal layers or strata.

Examples of Sedimentary Rocks
- Gypsum, chalk and limestone, which are formed by the deposits created by chemical action or chemical sedimentation.
- Peat, lignite, bituminous coal and anthracite, which are formed by deposits of organic matter or marine remains.
- Gravel, pebbles and shingle, sandstone and shale, which are formed by the deposits of sediments in water.

3. *Metamorphic Rocks*: These rocks were originally either igneous or sedimentary. They metamorphose or change due to pressure, temperature or the action of water and chemicals. Examples–slate, quartzite, gneiss and marble.

GEOGRAPHICAL FEATURES

The Continents

The earth's surface is made-up of immense land masses, divided into seven continents covering about one-quarter of the total surface area.

Largest Continent	—	Asia (4,45,79,000 km^2)
Smallest Continent	—	Australia (76,92,024 km^2)
Island Continents	—	Antarctica and Australia
Ice-covered Continent	—	Antarctica

Name	Area (km^2)	Approx. percentage of the World's Land	Population estimated	Approx. percentage of the World's Population
Asia	4,45,79,000	29.5	4,29,87,23,000	58.6
Africa	3,02,21,532	20.0	1,11,06,35,000	12.5
North America	2,47,09,000	16.3	56,52,65,000	8.2
South America	1,78,40,000	11.8	40,67,40,000	5.6
Antarctica	1,40,00,000	9.6	—	—
Europe	1,01,80,000	6.2	74,24,52,000	9.1
Australia	76,92,024	5.2	3,83,04,000	3.2

Note: Australia with New Zealand, Tasmania, New Guinea and the Pacific Islands is also called *Australia/Oceania (811200 sq.km area)*

Mountains

Mountains are elevated land masses with peak areas (summit) smaller than the base and of a height above 300 m or 1000 ft. Similar elevations below 300 m or 1000 ft are called *hills*.

Table 6.2   Important Mountain Ranges

Name	Continent
Himalaya-Karakoram	Asia
Andes	South America
Alps	Europe
Rockies	North America

Table 6.3   Principal Mountain Peaks

Name	Continent	Country	Range	Height (m)	Date of First Ascent
Mt. Everest	Asia	Nepal–Tibet	Himalayas	8850	29 May 1953
K2 (Godwin Austen)	Asia	India	Karakoram	8611	31 July 1954
Kanchenjunga	Asia	Nepal–India	Himalayas	8586	25 May 1955
Lhotse	Asia	Nepal–China	Himalayas	8501	18 May 1956

(Continued)

Name	Continent	Country	Range	Height (m)	Date of First Ascent
Kanchenjunga Peak	Asia	India–Nepal	Himalayas	8470	–
Makalu	Asia	Tibet–Nepal	Himalayas	8162	15 May 1955
Dhaulagiri	Asia	Nepal	Himalayas	8167	13 May 1960
Nanga Parvat	Asia	India	Himalayas	8125	3 July 1953
Illampu	South America	Bolivia	Andes	7817	29 August 1960
Denali	North America	Alaska	Rockies	6194	–
Mt. Logan	North America		Rockies	6050	–
Mt. Ellas	North America		Rockies	5944	–
Ararat	Asia	Turkey	Caucasus	5156	–
Mont Blanc	Europe	France	Alps	4810	–
Monte Rosa	Europe		Alps	4565	–

Table 6.4 Important Volcanic Mountains

Name	Height (ft)	Country	Location	Last Notified Eruption
Ojos del Salado	7084	Argentina	Andes	1981
Guallatiri	6060	Chile	Andes	1960
Cotopaxi	5897	Ecuador	Andes	1975
Lascar	5641	Chile	Andes	2007
Tupungatito	5640	Chile	Andes	1964
Popocatépetl	5451	Mexico	Altiplano de Mexico	1996
Nevado del Ruiz	5400	Colombia	Andes	1991
Sangay	5230	Ecuador	Andes	2006
Chaiten	3681	Chile	Gulf of Corcovado	2008
Tonga Undersea Volcanic Eruption	Undersea	Kingdom of Tonga	Tongatapu	2009
Eyjafjallajökull	5417	Iceland	Skogar	2010
Mount Merapi	5600	Indonesia	Central Jam and Yogyakarta	2010
Puyehue-Cordón Caulle	7336	Chile	Andes	2011
Sangeang Api	6394	Indonesia	Lesser Sunda Island	2014

Table 6.5 Important Islands

Name	Location	Area in km^2
Kalaallit Nunaat (Greenland)	North Atlantic Ocean	21,75,597
New Guinea	Southwest Pacific Ocean	8,20,033
Borneo	West-Central Pacific Ocean	7,43,197
Malagasy (Madagascar)	Indian Ocean	5,87,042
Baffin	North Atlantic Ocean (Canadian)	4,76,068

(Continued)

Name	Location	Area in km^2
Sumatra	Northeast Indian Ocean (Indonesia)	4,73,605
New Zealand	South Pacific Ocean	2,70,000
Honshu	Western Pacific Ocean (Sea of Japan)	2,30,316
Great Britain	Atlantic Ocean	2,29,993

LARGEST ISLANDS

Greenland	21,75,600 km^2
New Guinea	7,92,500 km^2
Borneo	7,25,500 km^2
Madagascar	5,87,000 km^2
Baffin (Canada)	5,07,500 km^2
Sumatra (Indonesia)	4,27,300 km^2
Hanshu (Japan)	2,27,400 km^2
Great Britain (UK)	2,18,100 km^2
Victoria (Canada)	2,17,300 km^2
Ellesmere (Canada)	1,96,200 km^2
Celebes (Indonesia)	1,78,650 km^2
New Zealand South	1,51,000 km^2
Java (Indonesia)	1,26,700 km^2
New Zealand North	1,14,000 km^2
Newfoundland (Canada)	1,08,900 km^2

* Australia is more than 3 times the size of Greenland, the largest island. Australia is sometimes called *The Island Continent* and sometimes accorded the role of 'Earth's largest island but smallest continent'.

LARGEST DESERTS

1. Antarctic Desert (Polar)		
2. Arctic Desert (Polar)		
3. Sahara (Non polar)	9,400,000 sq.km	[Algeria, Chad, Egypt, Libya, Mali, Niga, Suydam & Tuninar]
4. Arabian (Non polar)	2,330,000 sq.km	[Jordan, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, Uae, Yeman]
5. Gobi (Non polar)	1,295,000 sq.km	[Mongolia, China]
6. Kalahari (Non polar)	930,000 sq.km	[Botswana, Namibia, South Africa]
7. Patagonia (Non polar)	670,000 sq.km	[Argentina, Chile]
8. Great victoria (Non polar)	348,750 sq.km	[Australian]
9. Syrian (Non polar)	200,000 sq.km	[Syria]
10. Great Basin (Non polar)	102,317 sq.km	[United States]

HYDROSPHERE

The hydrosphere is the mantle of water covering a greater part of the earth's surface. The oceans and seas comprise the hydrosphere. It is estimated that about 36,17,40,000 km^2 or 70.8% of the earth's surface is covered by water.

Largest Ocean

The Pacific ocean comprises the largest part of the hydrosphere and occupies an area of about 16,62,40,000 km^2 or 35.25% of the earth's surface.

Table 6.6 Oceans

Name	Area (km^2)	Sea Area (%)	Depth	
			Avg. (m)	Greatest (m)
Pacific	16,62,40,000	45.7	4280	11,033
Atlantic	8,23,60,000	22.8	3926	9219
Indian	7,35,50,000	20.3	3963	8047
Arctic	1,39,80,000	3.9	1205	5441

Table 6.7 Important Seas

Name	Area (km^2)	Average Depth (m)
South China Sea	29,74,600	5514
Malay	81,43,100	1200
Caribbean	25,15,900	7492
Mediterranean	25,10,000	4846
Bering	22,61,100	5121
Gulf of Mexico	15,07,600	4377
Sea of Okhotsk	13,92,100	3475
East China Sea	6,64,600	2999
Hudson Bay	7,30,100	259
Sea of Japan	10,12,900	3743
Andaman Sea	5,64,900	865
North Sea	5,75,300	661
Black Sea	5,07,900	2243
Red Sea	4,53,000	2246
Baltic	4,22,300	439
Gulf of St Lawrence	2,37,760	120
Gulf of California	1,62,000	810

Table 6.8 Important Natural Lakes (Sorted by surface area)

Name	Location	Area (km^2)	Length (km)
1. Caspian (Also called the *Caspian Sea*)	Turkmenistan, Kazakhstan, Azerbaijan and Iran	3,71,000	1119
2. Superior	USA–Canada	82,100	616
3. Victoria	Uganda, Tanzania and Kenya	69,485	322

(Continued)

Name	Location	Area (km²)	Length (km)
4. Huron	USA–Canada	59,596	397
5. Michigan			
6. Aral Sea	Kazakhstan and Uzbekistan	66,457	428
7. Tanganyika	Tanzania–Zaire (Congo)	32,893	676
8. Baykal	Russia	31,500	636
9. Great Bear	Canada	31,300	373
10. Lake Nyasa	Tanzania, Africa	29,600	580

Shipping Canals

1. *Kiel Canal*: Between London and Baltic ports.
2. *Suez Canal*: Connects the Mediterranean Sea and the Red Sea.
3. *Panama Canal*: Links the Atlantic and the Pacific Ocean.

Table 6.9   Important Shipping Canals

Name	Location	Length (km)
Beloye–More	Baltic Sea	227
Gotta	Sweden	185
Suez	Egypt	169
Volga–Moscow	Russia	129
Kiel	Germany	98
Volga–Don	Russia	97
Elbe–Trave	Germany	66
Panama	Central America	58
Manchester	England	57
Welland	Canada	44

Table 6.10   Principal Waterfalls

Name	Location	Height (m)
Angel*	Venezuela	979
Yosemite	California	739
Southern Mardals Fossen	Norway	655
Tugela	South Africa	614
Cuquenan	Venezuela	610
Sutherland	New Zealand	580
Ribbon	California	491
Kamarang Great	Guyana	488
Northern Mardalsfossen	Norway	468

*Angel Waterfall is the world's highest waterfall.

Major Rivers of the World

1. *Largest River*: The Amazon in South America flowing into the South Atlantic ocean. Though, the Amazon river is 222 km shorter in length than the Nile, it is still considered the largest river because of greater flow of water and the highest river basin in the world. Longest River, the Nile in Africa, flowing into the Mediterranean sea.

Table 6.11   Important Rivers of the World

River	Location/Country	Length (m)	Source	Outflow Into
Nile	Africa/Egypt	6670	Lake Victoria	Mediterranean
Missouri-Mississippi	N. America/USA	6300	Red Rock, Montana	Gulf of Mexico
Amazon	S. America/Brazil	6448	Andes in Peru	Atlantic Ocean
Yangtze-Kiang	Asia/China	5490	Tibetan Plateau	East China Sea
Hwang-Ho	Asia/China	4840	Tibet	Pacific Ocean
Yenisei	Asia/Siberia	5300	Mt. Tannu-Ola	Arctic Ocean
Lena	Europe/Russia	4800	Lake Baikal	Laptev Sea of Arctic Ocean
Niger	Africa/Nigeria	4800	Sierra Leone	Gulf of Guinea (Atlantic)
Congo	Africa/Zaire	4800	Confluence of Lualuba and Luapula	Atlantic
Ob	Asia/Siberia	4150	Altai Mountains	Gulf of Ob (Pacific)
Indus	Asia/India and Pakistan	3180	Mt. Kailas	Arabian Sea
Brahmaputra	Asia/India	2900	Tibet	Bay of Bengal
Danube	Europe/Austria, Hungary, Czech Rep., Slovakia and Yugoslavia	2820	Near Baden in Germany	Black Sea
Murray Darling	Australia	3720	Alps	Indian Ocean
Volga	Asia/Russia	3700	Valdai Plateau (Moscow)	Caspian Sea
Amur	Asia/Siberia	4510	Pamirs	Pacific Ocean at the sea of Okhotsk

THE WORLD WE LIVE IN

Countries

The world comprises 193 (as on May 2016, the new country added is South Sudan) sovereign countries and 13 non-sovereign, separately administered territories, making a total of 206 countries. However, as per the membership within the United Nations system, these 206 States are categorized as:

- 193 member states of the United Nations.
- 2 states which are not UN member states but which are either a UN observer state or a member state of a UN specialized agency [these are: (i) Vatican City, (ii) Kosovo (claimed by Serbia)].
- 9 other states [these are: (i) Abkhazia (claimed by Georgia); (ii) Nagorno-Karabakh (claimed by Azerbaijan); (iii) Northern Cyprus (claimed by Cyprus); (iv) Palestine (claimed by Israel); (v) Sahrawi Arab Democratic Republic (claimed by Morocco);

Till the end of 1989, there were only 170 sovereign countries; then Namibia joined as the 171st country when it achieved independence in March 1990. However, the unification of North and South Yemen in May 1990 and East and West Germany in October 1990, brought the total number of sovereign countries to 169 at the end of 1990.

With the disintegration of former USSR towards the end of 1991 (which comprised 15 union Republics) the number of the countries in the world stood at 183. Today, there are total 196 countries in would. Taiwan is not considered an official country which bring the count down to 195 countries.

(vi) Somaliland (claimed by Somalia); (vii) South Ossetia (claimed by Georgia); (viii) Taiwan (claimed by China); and (ix) Transnistria (claimed by Maldova)].

The Curious Case of Taiwan

Taiwan operates as an independent country; it is not considered as an official country by many, which would take the count up to 194 countries. Because the People's Republic of China considers Taiwan a breakaway province of China, countries who wish to maintain diplomatic relations with China have had to sever their formal relations with Taiwan. (More than 100 countries, however, have unofficial relations with Taiwan.)

Table 6.13   Changed Names of Some Cities, States and Countries

Old Name	New Name	Old Name	New Name
Abyssinia	Ethiopia	Gold Coast	Ghana
Angora	Ankara	Greenland	Kalaallit Nunaat
Batavia	Jakarta	Holland	The Netherlands
British Honduras	Belize	Kampuchea	Cambodia
Bechuanaland	Botswana	Leopoldville	Kinshasa
Basutoland	Lesotho	Madagascar	Malagasy
Bombay	Mumbai	Malaya	Malaysia
Burma	Myanmar	Manchukuo	Manchuria
Canton	Guangzhou	Mesopotamia	Iraq
Cape Canaveral	Cape Kennedy	New Hebrides	Vanuatu
Ceylon	Sri Lanka	Nippon	Japan
Christina	Oslo	Northern Rhodesia	Zambia
Congo	Zaire	Nyasaland	Malawi
Constantinople	Istanbul	Peking	Beijing
Dacca	Dhaka	Petrograd	Leningrad
Dahomey	Benin	Persia	Iran
Dutch East Indies	Indonesia	Portuguese Guinea	Guinea Bissau
Dutch Guiana	Surinam	Rangoon	Yangon
East Pakistan	Bangladesh	Rhodesia	Zimbabwe
East Timor	Loro Sae	Saigon	Ho Chi Minh City
Egypt	United Arab Republic	Salisbury	Harare
Ellice Island	Tuvalu	Sandwich Islands	Hawaiian Islands
Formosa	Taiwan	Siam	Thailand
French West Africa	Mali	South West Africa	Namibia

(*Continued*)

Old Name	New Name	Old Name	New Name
Spanish Guinea	Equatorial Guinea	Trucial Oman	United Arab Emirates
Stalingrad	Volgograd	Upper Volta	Bourikina Fasso or Burkina Faso
Tanganyika and Zanzibar	Tanzania	West French Africa	Mauritania

Note: Zaire's National Conference on Democracy has decided in 1993 to rename the country 'Congo', thus, reverting to the name chosen by the Belgian colonizers. To differentiate it from Congo-Brazzaville, Zaire's new name would be 'Congo-Kinshasa'.

Table 6.14   Distinctive Names of Countries/Towns: Geographical Epithets

Distinctive Name	Country/Town/Port/River
Britain of the South	New Zealand
The Battlefield of Europe	Belgium
City of the Golden Gate	San Francisco
City of Magnificent Distances	Washington D.C.
City of Popes	Rome
City of Seven Hills	Rome
City of Skyscrapers	New York
Cockpit of Europe	Belgium
Dark Continent	Africa
Dairy of Northern Europe	Denmark
Emerald Island	Ireland
Empire City	New York
Eternal City	Rome, Italy
Forbidden City	Lhasa (Tibet)
Garden of England	Kent
Gate of Tears	Babel-Mandab, Jerusalem
Granite City	Aberdeen (Scotland)
Great White Way	Broadway (New York)
Gift of Nile	Egypt
Gibraltar of the Indian Ocean	Aden
Herring Pond	Atlantic Ocean
Hermit Kingdom	Korea
Holy land	Palestine
Island of Cloves	Madagascar (Malagasy)
Island of Pearls	Bahrain
The Isle of Spring	Jamaica
Key to the Mediterranean	Gibraltar
Land of Cakes (Oat Cakes)	Scotland
Land of the Flying Fish	Barbados
Land of the Golden Fleece	Australia
Land of the Golden Pagoda	Myanmar (Burma)
Land of Kangaroos	Australia

(*Continued*)

Distinctive Name	Country/Town/Port/River
Land of Lilies	Canada
Land of the Midnight Sun	Norway
Land of Milk and Honey	Canaan
Land of Morning Calm	Korea
Land of the Rising Sun	Japan
Land of a Thousand Lakes	Finland
Land of Thunderbolt	Bhutan
Land of White Elephants	Thailand
Lady of Snow	Canada
Little Venice	Venezuela
Mother-in-Law of Europe	Denmark
Never, Never Land	Prairies (North Australia)
Pearl of Antilles	Cuba
Playground of Europe	Switzerland
Pillars of Hercules	Straits of Gibraltar
Pearl of the Pacific	Guyayquil Port (Equador)
Powder Keg of Europe	Balkans
The Promised Land	Canaan
Quaker City	Philadelphia
Queen of the Arabian Sea	Kochi (India)
Queen of the Adriatic	Venice
Rich Coast	Costa Rica
Rich Port	Puerto Rico
Roof of the World	Pamir (Tibet)
The Sea of Mountains	British Columbia
Sorrow of China	River Hwang Ho
The Saw Mill of Europe	Sweden
Sick Man of Europe	Turkey
Sugar Bowl of the World	Cuba
The Storehouse of the World	Mexico
The Down Under	Australia
Venice of the North	Stockholm
Venice of the East	Bangkok (Thailand), Allepey (India)
Yellow River	Hwang Ho (China)
White City	Belgrade
Windy City	Chicago
White Man's Grave	Guinea Coast (West Africa)
Workshop of Europe	Belgium
World's Loneliest Island	Tristan Da Cunha
World's Bread Basket	Prairies of North America
The Spice Island of the West	Grenada
The Mother Colony of the West Indies	St. Kitts
City of Arabian Nights	Baghdad

(*Continued*)

Distinctive Name	Country/Town/Port/River
Twin City	Budapest
The Imperial City	Rome
Golden City	Johannesburg
The Modern Babylon	London
Valley of Kings	Thebes

Table 6.15 Major Crops and Its Producer

Crop	Top 3 producing up countries (according to 2012-2014 survey)
1. Rice	China, India,Indonesia.
2. Corn	US, China, Brazil
3. Coffee	Brazil, Vietnam, Indonesia
4. Cotton	China, India, US
5. Wheat	European Union, China, India
6. Tea	China, India, Kenya.

Other Crops	Countries
Barley	Russia, US, China, Canada, UK, India
Cloves	Indonesia, Madagascar, Tanzania.
Cocoa	Africa, Asia, America
Groundnut	India, China
Jute	India, Bangladesh, China
Rubber	Malaysia, Indonesia, Thailand, Sri Lanka
Maize	US, China, Brazil, Argentina
Silk	China, India, Uzbekistan
Tobacco	China, USA, Russia

Table 6.16 Important Minerals and Major Producing Countries

Mineral	Countries
Aluminium	Jamaica, Surinam, France, Ghana, US, Russia, Canada, Germany, Norway, Hungary, India, Greenland
Asbestos	Canada, Zimbabwe, South Africa
Chromium	India, South Africa, Zimbabwe, Cuba
Coal	US, Russia, China, Germany, UK, France, Poland, Belgium, Australia, India
Copper	US, Russia, China, Germany, Zambia, Zaire, Canada, Spain, Mexico, Japan, Australia, India
Gold	South Africa, US, Australia, Canada
Graphite	Sri Lanka
Iron Ore	Russia, US, Australia, Canada, Sweden, France, Spain, India, China, Brazil
Lead	US, Russia, Spain, Germany, Belgium
Lignite	Germany, Russia
Magnesium	India, Russia, Mexico, Ivory Coast
Mercury	Italy, Spain, US

Mineral	Countries
Mica	India
Nickel	Canada
Petroleum	Saudi Arabia, Kuwait, Iran, Iraq, Qatar, UAE, Libya, Algeria, Nigeria, Niger, Egypt, US, Russia, Indonesia
Silver	Canada, Russia, Mexico, US, Australia
Tin	Malaysia, Bolivia
Uranium	Zaire, South Africa, US, Canada, Germany, Czech, Slovakia, Russia, India
Thorium	India, Brazil, US
Zinc	Canada, Russia, Belgium and Germany

Table 6.17 Major Exporters of Minerals and Crops

Item Exported	Major Exporting Countries
Aluminium	US
Coal	US
Coffee	Brazil
Copper	US
Gold	South Africa
Iron Ore	US
Jute	Bangladesh
Manganese	Russia
Mica	India
Rice	China
Rubber	Malaysia
Silver	Mexico
Sugar	Indonesia
Wheat	US
Wool	Australia

Table 6.18 Major Industries

Industry	Major Manufacturing Countries
Iron and Steel	US, Russia, Japan, Germany, UK, France and India
Textiles (cotton)	US, China, India, Japan, Russia, UK, Taiwan, Canada, Egypt, France, Italy
Textiles (woollens)	Russia, UK, Japan, Australia, India, France, Poland, Belgium, US, Czech, Slovakia, Germany, Bulgaria
Item Exported	**Major Exporting Countries**
Chemicals	US, Germany, UK, Russia, Japan, Canada, Australia, India
Paper	US, Canada, Japan, UK, Germany, Sweden, Norway, Finland, Russia, India
Rubber	US, UK, Germany, France, Netherlands, Australia, Canada, Brazil, Indonesia, Sri Lanka

Table 6.19 Countries and Their Parliaments

Country	Name of Parliament	Country	Name of Parliament
Afghanistan	Shora	Iran	Majlis
Bangladesh	Jatiya Sangsad	Israel	Knesset
Bhutan	Tsongdu	Japan	Diet
Bulgaria	Narodna Subranie	Malaysia	Dewan Rakyat and
Myanmar (Burma)	Pyithu Hluttaw		Dewan Negara
Denmark	Folketing	Maldives	Majlis
Ethiopia	Shergo	Mongolia	Great People's Khural
Finland	Eduskusta	Nepal	National Panchayat
Germany	Bundestag (Lower	The Netherlands	The Staten General
	House) Bundestrat	Norway	Storting
	(Upper House)	Poland	Sejm
Greenland	Landstraad	Spain	Cortes
Iceland	Althing	Surinam	Staten
India	Lok Sabha (Lower	Swaziland	Liblandla
	House) Rajya Sabha	Sweden	Riksdaq
	(Upper House)	Switzerland	Federal Assembly
Indonesia	Majlis		

Fact Bytes : Important Lines and Boundaries

➤ *Durand Line*—It is the line demarcating the boundaries of India and Afghanistan. It was drawn up in 1893 by Sir Mortimer Durand. India recognizes the Durand Line but Afghanistan does not. ➤ *Hindenburg Line*—It is the boundary dividing Germany and Poland. The Germans marched to this line in 1917 during World War I. ➤ *Maginot Line*—A 320 km line of fortification built by France along its border with Germany before World War II, to protect against German Attack. ➤ *Mannerheim Line*—It is the line of fortification on the Russia—Finland border. Drawn up by General Mannerheim. ➤ *McMahon Line*— Drawn up by Sir Henry McMahon. It demarcates the frontier of India and China. China did not recognize this line and violated it in 1962. ➤ *Oder-Neisse Line*—It is the border between Poland and Germany running along the Oder and Neisse rivers; adopted at the Poland Conference (August 1945) after the World War II. ➤ *Radcliffe Line*—Drawn up by Sir Cyril Radcliffe, this line demarcates the boundary between India and Pakistan. ➤ *Siegfried Line*—the line of fortification drawn up by Germany on its border with France. ➤ *17th Parallel*—The 17th parallel defined the boundary between North and South Vietnam before the two were united. ➤ *24th Parallel*—Is the line which Pakistan claims for demarcation between India and Pakistan. This, however, is not recognized by India. ➤ *38th Parallel*—Is the parallel of latitude which separates North and South Korea. ➤ *49th Parallel*—The boundary between the US and Canada.

Time

1. *Local Time*: Parallels of longitude determine the time at a place. Local time varies, from GMT (London) at the rate of four min/degree of longitude.

2. *Standard Time*: It is the uniform time fixed by each country. As the local time is found to vary constantly from one plain to another, there is an arrangement by which all places in a certain region agree to use the same time.

3. *Greenwich Mean Time (GMT)*: It is the UK Standard time. It is based on the local line of the meridian passing through Greenwich near London.

4. *International Date Line:* The 180° east meridian and 180° west meridian are one and the same line, running over the Pacific Ocean, deviating at Fiji, Samoa and Gilbert Islands. The International Date Line roughly corresponds to 180° east west meridian of longitude which falls on the opposite side of the Greenwich meridian. When one crosses the Date line from east to west the date is to be advanced by one day. Similarly, when one crosses the Date Line from west to east, the date is to be set back by one day.
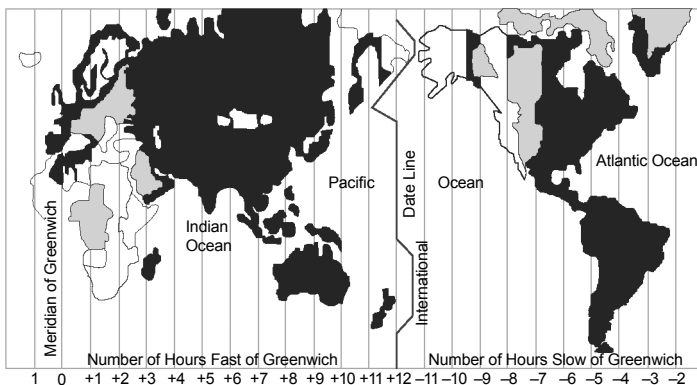
Wonders of the World

Seven Wonders of the Ancient World

A Greek author Antipater of Sidon (2nd century BC) was the first to list the greatest monuments and buildings as the Seven wonders of the World. Most of these structures are now in ruins except the 'Pyramids of Egypt', a portion of which has survived. Antipater listed the following Seven Wonders of the world:

1. *The Pyramids of Egypt*: These are royal tombs built more than 4000 years ago for the Egyptian Pharaohs and house their mummified bodies surrounded by their treasures and personal belongings. They are about 70 in number and represent 1200 years of ancient Egyptian history that flourished around the lower Nile (near Cairo). Of all the seven wonders, the pyramids alone survive.

2. *The Colossus of Rhodes*: It was a bronze statue of the Greek sungod, Helios (Apollo) in the port city of Rhodes along the eastern part of the Mediterranean Sea. It was sculpted around 325–292 BC by Charles of Lindus. It was destroyed during an earthquake in 224 BC.

3. *The Hanging Gardens of Babylon*: They were built in the 6th century BC by Nebuchadnezzar II near the Euphrates river (south of modern Baghdad, Iraq). The

gardens consisted of a series of terraces at about 23–91 m (75–300 feet) above the ground level and water was piped down from the reservoir at the top of the terraces.

4. *The Mausoleum at Halicarnassus*: Also known as the Tomb of Mausolus (the King of Caria in Asia Minor–325 BC) at Halicarnassus on the eastern side of Aegean Sea in Turkey.

5. *The Pharos of Alexandria*: It was world's first known lighthouse, built in 270 BC on the island of Pharos at the entrance of the port of Alexandria (chief port of Egypt on the Nile Delta). It was destroyed by an earthquake in the 14th century.

6. *The Statue of Zeus (Jupiter) at Olympia*: It was located in the valley of Olympia, in the southern peninsula of Greece and was made of wood, built some time in 5th century BC.

7. *The Temple of Artemis (Diana) at Ephesus (Rome)*: It was situated in Asia Minor at Ephesus, an ancient but now vanished city, built some time in 6th century BC. It was destroyed by invading hordes in AD 262. The fragments of this structure are preserved in the British Museum.

Other Wonders of the World

The Taj Mahal of Agra: Built in 1631–53 by the emperor Shahjahan in Agra as a mausoleum for his beloved wife Mumtaz Mahal. The tomb of Shahjahan also rests by its side.

The Great Wall of China: Built in the 3rd century BC to protect China against nomadic invaders from the north. It has a mainline length of 3460 km, running across northern China up to the border with Turkestan.

The Eiffel Tower: Built by Alexandre Gustave Eiffel for the 1889 Paris exhibition. It is about 300 m high.

The Leaning Tower of Pisa: Built by Bonanus of Pisa around AD 1154. It is a 54.5 m high tower made of marble.

The Sphinx: Near Gizeh in Egypt. It is a large winged, crouching lion hewn out of a solid rock—52.6 m long and 20.1 m high and built around 2500 BC.

7 Glimpses of World History

IMPORTANT BATTLES

Battle	Period/Year	Countries Involved
Battle of Megiddo	608 BC	Necho of Egypt and Josiah of Judah; Egyptians victorious
Battle of Marathon	490 BC	Athenians and Persians; King Darius of Persia defeated.
Battle of Thermopylae	480 BC	Spartans led by Leonidas and Persians by Xerxes; Spartans were defeated.
Battle of Salamis	480 BC	Athenian and Persian fleet in the Bay of Salamis; Persian fleet defeated
Battle of Platae	479 BC	Greek and Persian forces; Persian forces defeated
Battle of Mycale	479 BC	Greek and Persian forces; Persian fleet defeated
Spartan War I	459 BC	Sparta and Athens, also called 'Pelponesian War'; it lasted for 30 years
Spartan War II	431–21 BC	Sparta and Athens; Spartans victorious
Battle of Arabia	331 BC	Greek and Persian forces; Greeks victorious
Battle of Magnesia	190 BC	Syrian and Roman forces; Syrian forces defeated (north-west Lydia)
Hundred Year War	1337–1453	France and England
War of Roses	1455–85	Civil War in England between the two rival royal houses of Lancaster and York; White and red rose were their respective symbols
Anglo-Spanish War	1588	Spanish and English fleets fought in the English Channel; Defeat of the Spanish fleet
Thirty Year War	1618–48	Started as religious-cum-political war between (Conto) the Lutherans and Catholics in Germany and developed into an international war
Civil War of England	1642–49	Between Cavaliers (King Charles supporters) and forces of the Parliament led by Oliver Cromwell; King Charles I executed
Battle of Gibraltar Bay	1607	The Dutch defeated the Spaniards and the Portuguese
Seven Year War	1756–63	Britain and France against Austria and Prussia; British alliance won
Battle of Nile	1798	British and French fleets; Britain victorious
Battle of Trafalgar	1805	British fleet defeated fleets of France and Spain; British fleets commanded by Admiral Nelson, who was killed in the battle
Battle of Austerlitz	1805	Britain, Austria, Russia and Prussia on one side and France on the other; French forces victorious
Battle of Borodino	1812	France and Russia; the French forces were commanded by Napoleon who was defeated

Battle	Period/Year	Countries Involved
Battle of Leipzig	1813	Germany and combined forces of Austria, Prussia and Russia defeated Napolean (French forces)
Battle of Waterloo	1815	British forces led by Duke of Wellington defeated French forces led by Napolean Bonaparte; it was Napolean's last battle; Napolean was abdicated and was exiled to the island of St Helena in South Atlantic where he died in 1821
First China War	1840	China and Britain; Chinese forces yielded. It was a trade war and also known as the 'Opium War'
American Civil War	1861–65	Northern Vs Southern states of America for the abolition of slavery; Abraham Lincoln defeated the Southern states
Russo–Japanese War	1904–05	Russia and Japan in the Sea of Japan; Russia defeated; also called the 'Battle of Port Arthur' or 'Battle of Yalu'
Balkan War I	1912	Turkey and Balkan countries (Montenegro, Serbia, Bulgaria and Greece); Turkey defeated
Balkan War II	1913	Invasion of Serbia and Greece by Bulgaria; Bulgaria defeated by combined forces of Serbia, Greece, Romania, Montenegro, which stripped Turkey of most of its European territories
World War I	1914–18	Germany (with Austria, Hungary and Turkey) against Britain (with France, US, Russia, Japan, Canada, Austria and Belgium); Germany and its allies were defeated
Battle of Jutland	1916	During World War I–naval battle between Germany and England in which Germany was defeated
World War II	1939–45	Axis powers (Germany, Italy and Japan) against the Allies (Britain, USSR, US, France and several other countries); Axis powers were defeated
Desert War	1942	Italian Army from Libya invaded Egypt in order to attack British forces
Korean War	1954	South Korea invaded by North Korea; North Korea was forced back by UN forces
Israel–Arab War	1967	Six-day war, shortest war in history; Arab forces led by Egypt, Syria and Jordan were defeated
Battle of Wandiwash	1970	Confrontation between French and British.
Pakistan–Bangladesh War	1971	Mukti Bahini forces aided by India against the Pakistani forces stationed in Bangladesh (former East Pakistan); Pakistani forces surrendered and Bangladesh came into being
Gulf War	1991	US led multinational forces attacked Iraq to oust Iraqi troops from Kuwait
Kargil War	1999	India defeated Pakistani forces at Kargil
US–Afghanistan War	2001	US led coalition forces attack Afghanistan to bring down the Taliban regime in Afghanistan in retaliation to the 11 September terrorist attack in the USA

(*Continued*)

– To date, World war I is sixth deadliest conflict in world history
– World war I, four empires collapsed - German, Russian, Ottoman, Austro - Hungarian.

Battle	Period/Year	Countries Involved
Gulf War II	2003	US led coalition forces dethroned the Iraqi President Saddam Hussein
Israel–Lebnon	2006	Hezbullah kidnaps two Israeli soldiers and kills other three. Israel responds with massive airstrikes and artillery fire on targets in Lebanon.
Fatah–Hamas Conflict	2006	Palestinian Civil War between two main Palestinian Political factions.
South Yemen Insurgency	2009	Between Government and the Southern Yemen movement.
Syrian Civil War	2011	Nationwide protest started in 2011 against President Bashar-al-Azad's government and various groups such as Free Syrian Army and Islamic Front Hezbollah began operating in 2013 and Islamic State of Iraq and Levant (ISIL) in 2014. By mid-2014, ISIL controlled almost 40% of Syrian Territory establishing itself as a major opposition party. Islamic countries have decided to impose sanctions against Syria because it has failed to check violence on its land.
Islamist Uncast in Egypt	2013	An Egyptian Armed Forces removed President Mohammed Morsi in mid-2013, the conflict between Egyptian Government and the Muslim Brotherhood has intensified.
Conflicts in Africa	No less than 30 sub-saharan	African nations have been involved in numerous Civil Wars since 1989, and some of these are still ongoing. Some work mentioning conflicts involves: Angola, Algeria, Burundi, Congo, the Democratic Republic of Congo (DRC), Côte d'Ivoire (Ivory Coast), Eritrea/Ethiopia, Liberia, Nigeria, Rwanda, Sierra Leone, Sudan and South Sudan/Darfur, Uganda and Zimbabwe. Some of these nations are involved in war in the DRC and the DRC is involved in some of these Civil Wars.

Landmarks in European History

Magna Carta: The Magna Carta was a Charter of Rights granted to the Englishmen during 1215 AD by King John II. The Magna Carta laid down the important principle that England should be governed by a definite law and not by the whims or will of a despotic ruler. It is said to be the foundation stone of the rights and liberties of the English people which led to the setting up of a constitutional monarchy and a parliamentary form of government in England.

Crusades: Crusades were military expeditions undertaken by European Christians in the 11th, 12th and 13th centuries to reclaim the holy land of Jerusalem from the Muslims.

Renaissance: Renaissance means revival or rebirth. During the time of the Roman Empire, all the manuscripts containing the wisdom of the ancient Greeks were kept in Constantinople (now Istanbul). In 1453, Turkish Sultan Mahomet II attacked and occupied Constantinople. The scholars fled taking with them the manuscripts and settled in the cities of Italy to spread learning throughout western Europe. The movement slowly spread to England in the 15th and 16th centuries.

REVOLUTIONS AND WARS OF INDEPENDENCE

American War of Independence

Great Britain regulated trade in the American colonies to such a great extent that there was growing annoyance among the settlers at the controls and checks imposed upon them. There were acts of rebellion and this hostility flared into war in 1776. A declaration of independence was announced from Philadelphia under the leadership of George Washington. The struggle ended in victory in 1783.

French Revolution (1789–93)

The autocratic monarch, nobles, clergy and privileged classes brought the socio-economic order to a point of collapse. King Louis XVI was not only inexperienced but also weak and lacked administrative capabilities. The medieval feudal society's oppression of the serf-peasants led the country to financial bankruptcy. It was a period of French philosophers like Voltaire and Montesqueau. This class of intellectuals were inspired to change the face of social life of France. They gave a call for 'Liberty, Equality and Fraternity'. King Louis XVI and Queen Marie Antoinette were executed. The product of the French Revolution was Napolean Bonaparte who emerged as a great warrior bringing glory to France and breaking down feudalism in Europe.

Russian Revolution (1917–22)

The Czars of Russia were the most autocratic rulers of Europe. The masses were very poor. The first stage of the Russian Revolution began in February 1917 with the overthrow of the Czar Nicholas II. The second stage in October of the same year led to the establishment of the world's first communist state of the Bolsheviks under Lenin. This was perhaps the greatest revolution after the French Revolution and was not limited to Russia alone but affected almost all countries of the world. It established the ideology of Marxism and led to the independence of several countries.

World Wars

World War I *(4 August 1914 to 11 November 1918)*

Franco-German rivalry proved to be the main cause of World War I.

Main Contestants

1. Central Powers comprising Germany, Austria–Hungary, Turkey and Bulgaria on the one hand, and
2. Allied Powers comprising England, France, Belgium, Serbia which were joined by Russia and Italy in 1915 and 1917, respectively.

How the War Broke Out?

When Austria attacked Serbia, after one month of Prince Ferdinand's murder, it drew Russia towards Serbia. Germany entered the fray to support Austria because it had vested interests in Turkey and was committed to support Austria. One by one, France, England and the other countries entered the war.

– The shortest war on record took place in 1896 when Zanzibar surrendered to Britain after 38 minutes.
– The longest was so called 100 years was between Britain and French which lasted for 116 years ended in 1453.

Results/Consequences

Central powers were defeated. About 50 lakh Allied soliders were killed and 1 crore and 10 lakh wounded. Bulgaria, Turkey and Austria surrendered. Germany signed the Armistice Treaty on 11 November 1918 and World War I ended. In 1919 the Treaty of Versailles was signed which curbed powers of the German empire, further humiliating and weakening it.

World War II (3 September 1939 to 14 August 1945)

Causes: An unjust Treaty of Versailles, improper behaviour of France, rise of the Nazi party in Germany, dissatisfaction of Italy with the treaty, Japan's policy of expansion, and imperialism of England and France were some of the causes behind World War II.

Main/Contestants

1. Axis Powers—also called the central powers which included Germany, Italy and Japan
2. Allied Powers—Britain, France, Russia, US, Poland and Benelux countries.

Results/Consequences

Hitler, who was responsible for this war, was initially very successful but later met with strong resistance when he attacked Russia in 1941, and was forced to retreat to Berlin. On learning that Germany had collapsed, he committed suicide on 30 April 1945 in Berlin.

Germany was divided into two parts—East Germany under Russia and West Germany under the control of England, France and America (allies). Russia emerged as the single biggest power in the world. It was at this time that the struggle for freedom in colonies under European control in Asia (India, Myanmar (Burma), Sri Lanka (Ceylon), Malaysia (Malaya), Egypt, etc.) caught on. The British empire thus rapidly lost its leadership as more and more colonies won independence. The UN was then established in 1945.

When Japan did not agree to the demands of the allied powers to surrender, the first atom bomb was dropped on Hiroshima on 5 August 1945 and the second on Nagasaki on 9 August 1945. Japan then surrendered unconditionally on 14 August 1945 and World War II ended.

GLIMPSES OF WORLD HISTORY

BC

6000	● Neolithic settlements at Mehrgarh, Baluchistan and in the Indus Valley
	● Cultivation of wheat and barley
	● Discovery of copper
5000	● Rise of the Sumerian civilization between the rivers of Tigris and Euphrates, an area later named—Mesopotamia (now Iraq) (South-western Asia Turkey and Iraq)
	● Invention of the first written language
	● Invention of the wheel
	● Neolithic settlement in Egypt
	● From the annual rising of the waters of the Nile river, the first calendar of 365 days was evolved consisting of 12 months of 30 days each
3500	● Discovery of bronze in Egypt. Development of pottery in the Indus Valley, potter's wheel in use
	● Sumeria develops cuneiform writing

2700–2600	● Building of the pyramids in Egypt (one of the seven wonders of the ancient world)
2500	● Building of Mohenjodaro—site of the third oldest civilization after the Sumerian and Egyptian
	● Sumerians evolved a numerical system, lunar calendar developed
2500–2000	● Settlement of Andean civilization (South America)
2000	from North America
2300	● The Babylonians, Egyptians and Chinese built observatories upon the flat roofs of temples and this marked the beginning of Astrology
	● The Neolithic age in northern Europe
2400	● The Aryan migrators—the tribe from the banks of the Danube and South Russia spread southwards
	● Moved through central and southern Europe and into India
	● Evolution of the Aryan language from which most of the European languages have developed
2205–1122	● Rise of the Chinese civilization along the banks of the Hwang Ho—building of stone-age villages
	● Traditional beginning of the Hsia dynasty in China
2200	● Indonesian settlement in the Malay Peninsula
2000–1200	● Iron age—during Hittites time, a fierce nation of Aryans who had conquered the Anatolian Peninsula developed the art of refining iron
	● The rise of Babylon—city in ancient Mesopotamia. King Hammurabi raised the first army of the world
	● The bronze age reaches Europe when Britain and its neighbours are invaded
	● Civilization in Japan by the Jomons who invaded country from China and Korea
1500	● Compilation of the Rig Veda, the first book and the oldest sacred scriptures of Hinduism
	● Rise of the Ganges civilization—The Aryans advanced towards India reaching Ganges and Jamuna rivers
1480	● Moses leads Israelites out of Egypt
1027	● Chou dynasty begins in China
1013	● Rise of the Israelites in Palestine
	● David (1013–973) established Israelite hegemony
1000	● Egypt ceases to be a power
	● Epic civilisation in India—composition of the great epics: the Ramayana and the Mahabharata
	● Phoenicians developed alphabetical writing
850	● The works of poet Homer—Illiad and Odyssey
776	● The first Olympics in the city of Olympia in Greece
753	● Foundation of the City of Rome by Romulus
604	● New empire in Mesopotamia with Babylon as capital
	● Birth of Lao-Tse (China)—Founder of Taoism

660	●	Birth of Zarasthushtra or Zoroaster, the founder of Zoroastrianism in Medea (Iran)
600	●	Zoroaster spread his teaching that became Zoroastrianism
586	●	Babylonians capture Jerusalem
560	●	Birth of Lord Buddha
553	●	Work of Pythagoras: A Greek settled in Italy, regarded as the greatest early Greek philosopher who discovered music and determined that an octave has eight nodes.
550	●	Birth of Confucianism—the third, great religion which emerged from China and became its state religion
509	●	Foundation of the Roman Republic when great temples, baths, circuses and triumph arches were built
500	●	Building of the theatre at Delphi: The first 'man of theatre' was a Greek called Thespis who founded the modern theatre around 500 BC
490	●	The battle of Marathon, Athenians defeat Persians
399	●	Socrates, the Athenian philosopher condemned to death
387	●	Plato (a disciple of Socrates) founded the Academy in Athens and wrote 'The Republic'
347	●	Death of Plato: At this time he was working on his treatise The Laws
336	●	Accession of Alexander the Great at the age of 22 he proclaimed that he would become master of the world
335	●	Aristotle (a disciple of Plato) founded school of Philosophy
300–280	●	Creation of the Colossus of Rhodes (one of the seven wonders of the ancient world)—an immense Statue of Helios (Apollo), the Sun god
279	●	Pharos Lighthouse at Alexandria built (one of the seven wonders of the ancient world)
264	●	Ashoka becomes Emperor of India
215	●	The Great Wall of China built by Shih Hunga Ti (221–206)
73	●	Slaves' revolt in Rome
58	●	Caesar begins conquest of Gaul
55	●	Invasion of Britain by Julius Caesar
44	●	Julius Caesar murdered by Brutus
4	●	Birth of Jesus Christ, the founder of Christianity

AD

29	●	Crucifixion of Jesus Christ
64	●	Burning of Rome: The fire continued for six days and almost demolished Rome; the Roman emperor Nero (AD 37–68) is said to have been responsible for the great fire
120	●	Accession of Kanishka (Afghanistan)
570	●	Birth of Prophet Mohammed (Mecca) the founder of Islam
868	●	The first printed book Diamond Sutra—Buddhist scripture
1138	●	Civil War in England—death of Henry I, his daughter Matilda was to become successor

1139	●	Stephen ruled after Henry I died—Henry II son of Matilda reigned over England
1163	●	Oxford University founded
1215	●	Magna Carta signed
1337	●	Hundred Year War began between England and France, ended in 1453
1348	●	Plague in England
1388	●	Geoffrey Chaucer wrote Canterbury Tales
1400	●	Welsh War of Independence
1415	●	John Wycliffe, Morning scar of reformation is declared as heretic
1431	●	Burning of Joan of Arc at the stake
1455	●	War of Roses: Britain's civil war from 1455–85
1492	●	Christopher Columbus discovers the West Indies
1504	●	Mona Lisa painted by Leonardo da Vinci in Paris
1545	●	The Council of Trent starts for countering the protestant reformation
1556	●	Creation of Akbar's empire
1564	●	Birth of Shakespeare
1598	●	Edict encouraging the extermination of the Huguenots (Calvinists in France) is issued
1618	●	Thirty Year War commences in Germany
1642	●	Civil War in Britain; struggle between King Charles I and his Parliament which demanded democratic rights for Englishmen
1653	●	Charles I of England executed
1666	●	A great fire in London, lasted four days, more than 1300 houses destroyed
1688	●	Glorious Revolution in Britain
1689	●	Establishment of constitutional monarchy in England
1756	●	Seven Year War began between combined forces of Britain and Prussia against Austria, France and Russia
1762	●	The Social Contract is published by Jean-Jacques Rousseau
1770	●	James Cook discovers New South Wales
1776	●	American Declaration of Independence
1783	●	Recognition of independence of the United States of America by Britain
1787	●	Drafting of the American constitution
1789	●	Outbreak of the French Revolution
	●	Louis XVI calls the Estates General
	●	The fall of Bastille
1792	●	France becomes a Republic
1793	●	Louis XVI, King of France, executed on 21 January 1793
1798	●	Rebellion in Ireland
	●	Execution of Wolfe Tone (1763–98), an Irish revolutionary, inspired by the French Revolution
	●	Battle of the Nile
1801	●	England and Ireland unite following unsuccessful rebellion in Ireland in 1798

1804	●	18 May 1804, Napoleon Bonaparte takes over as Emperor of France
1805	●	Battle of Austerlitz: In July 1805, Britain, Austria, Russia and Prussia form a coalition against France. Though Russian and Austrian army outnumbered Napolean's army, the French army was victorious
1812	●	Battle of Borodino: Took place between French and Russians, Napolean invaded Russia, defeating the Russians in Borodino but his men suffered heavily after reaching Moscow
1815	●	Battle of Waterloo: Napolean was defeated and exiled
1821	●	Napolean dies in St Helena
	●	Greek Nationalist Revolt: Greeks launched war of independence against Turks
1830	●	Greeks gain independence
1830	●	Belgian independence
	●	Revolution in July in France—18 years reign of King Louis Philippe begins
1831	●	Giuseppe Mazzini starts "Young Italy" movement for unification of Italy
1833	●	Abolition of slavery in Britain
1836	●	Battle of Alamo: Texas became a republic but nine years later joined United States
1837	●	Accession of Queen Victoria (1819–1901)
1838	●	First Afghan War
1840	●	Opium war between Britain and China; opium was illegally traded by British and Chinese merchants
	●	Antarctica discovered
1843	●	First International Peace Congress held in London
1847	●	First Black Republic of Liberia founded
1848	●	Karl Marx writes Communist Manifesto
	●	February Revolution in France against Louis Philippe
		European Revolutions: Italy, Sicily France, Belgium, Holland, Germany, Prussia, Hungary and Czech Republic revolt
1854	●	Crimean War (Peninsula of Russia) between Russian troops and Turkish empire
	●	Florence Nightingale goes to Crimea
1859	●	Origin of Species published by Darwin which created a major controversy (Theory of Natural Selection)
1861	●	American Civil War on the question of African slaves Slavery abolished in America
1863	●	Slavery abolished in the US by a proclamation by President Abraham Lincoln
	●	International Football Association formed
1864	●	Dunant found Red Cross (see International Organizations)
1865	●	End of American Civil War, Abraham Lincoln, President of USA, assassinated

1869	● Suez Canal opened
1870	● Franco-Prussian War by Bismarck (Prussian PM) for Spanish Throne—Treaty of Frankfurt signed
1871	● Rugby Football Union founded in London
1878	● Cyprus ceded to Britain
1881	● First South African War—Dutch settlers in South Africa rose against the British to gain independence and the British were defeated
1882	● Australian cricket team wins against England in the 'Ashes'
1883	● Egypt occupied by Britain
1886	● Lawn Tennis Association formed in England
1889	● Eiffel Tower built in Paris
1896	● Olympic Games revived in Athens
1899	● Second South African War between British and Dutch settlers—Union of South Africa formed
1901	● Theodore Roosevelt becomes the youngest President in the history of USA
	● Death of Queen Victoria of England
1904	● Russo-Japanese war; Russia made peace with Japan in 1906
1905	● Unrest in Russia—preparation for the great revolution
1909	● Discovery of North Pole by Commander Robert Peary
	Russian navy defeated by Japan
1910	● Korea occupied by Japan
1911	● China declared Republic—Revolution took place under Sun Yatsen (1866–1925)
1912	● Establishment of the Chinese Republic
1914	● First World War
	● Panama Canal opens
1916	● First World War spreads—Italy joins allies (Bulgaria and Central Powers)
	● Battle of Verdun (France) between France and Germany (during World War I)
1917	● United States enters the World War
	● Outbreak of Russian Revolution
1918	● First World War ends—Armistice signed on 11 November
	● Czech Republic and Poland become independent
	● Czar Nicholas II (Russia) assassinated
1919	● Treaty of Versailles
1920	● League of Nations formed under Treaty of Versailles
	● International Court of Justice established at the Hague, Netherlands
1921	● Formation of Irish free state
1922	● Egypt gains independence from British rule
1923	● End of monarchy in Turkey—Mustafa Kamal becomes President
	● Hitler imprisoned due to political unrest in Germany and fear of communist revolution

1924	● Lenin dies—rise of Stalin
	● First Labour government established in Britain
1931	● Spanish Republic proclaimed
1933	● Hitler comes to power in Germany and becomes Chancellor
1934	● After death of Von Hindenburg, Hitler becomes President of Germany
1935	● Italy invades Abyssinia
1936	● Abyssinia annexed by Italy
	● Civil war in Spain
1938	● Germany annexes Austria
1939	● Germany annexes Czech Republic
	● Second World War commences
1940	● Germany invades Denmark, Norway and the low countries
	● Churchill becomes Prime Minister of Britain
	● Fall of France—after German invasion
	● Battle of Britain with Germany
1941	● Germany invades Russia but is defeated
	● Japan attacks Pearl Harbour
1942	● The Desert War
	● Battle of Stalingrad
	● Japanese capture south-east Asian countries up to Burma
1943	● Surrender of Italy
1944	● Allied forces invade France
	● Liberation of Paris—General Charles de Gaulle takes over provisional government
1945	● Surrender of Germany and Japan—First atom bomb dropped in Hiroshima, Japan (6 August 1945); Second atom bomb dropped on Nagasaki, Japan (9 August 1945)
	● San Francisco Conference on the formation of the United Nations Organization (25–26 April)—Formation of UN (24 October)
1946	● General Charles de Gaulle resigns
1947	● India attains independence—Partition of India
	● Term cold war is coined by U.S. state department advisor Bernard Baruch
1948	● Czech Republic forms Communist Government
	● State of Israel proclaimed in Palestine (Jewish state)
	First Indo-Pak war
1949	● NATO (North Atlantic Treaty Organization) formed; establishment of German Republic
	● Mao Tse-Tung proclaims Chinese People's Republic (Communist Government formed)
1950	● War in Korea; Tibet occupied by Chinese forces
1951	● Japanese Peace Treaty signed

1952	●	King Farouq of Egypt overthrown. Accession of Queen Elizabeth II of England
1953	●	Eisenhower becomes US President
	●	Mount Everest scaled by Edmund Hillary and Tenzing Norgay
	●	Death of Stalin
	●	Ceasefire in Korea
1954	●	First Hydrogen bomb tested by the United States
	●	Nikita Khruschev becomes First Secretary of the Communist Party of Soviet Union
1955	●	First Afro-Asian conference of heads of states held in Bandung, Indonesia
1956	●	Hungarian Revolution Joint invasion of Egypt by Britain, France and Israel
	●	Nationalization of Suez Canal
1957	●	Sputnik I launched by the former USSR—the first man made satellite
1958	●	Coup in Iraq and monarchy abolished
1960	●	Africa Year—16 African countries achieve independence France explodes atomic device in Sahara (Africa)
1961	●	John F. Kennedy becomes the US President
	●	First man in space—Yuri Alekseyevich Gagarin of Russia
	●	Building of Berlin wall around former west Berlin to cut-off communication with the former East Berlin
1962	●	Algeria attains independence
1963	●	Partial Test Ban Treaty signed in Moscow by UK, US and the former USSR
	●	John F. Kennedy, President of US assassinated
1964	●	American president signs the Civil Rights Bill granting equal rights to Blacks
	●	Escalation of the Vietnam war
	●	Martin Luther King (Black American clergyman) awarded Nobel Peace Prize
	●	China explodes its first atomic device
1965	●	Sir Winston Churchill dies
	●	First space walk—8 March 1965 by Russian cosmonaut Aleksei Arkhipovich Leonov
	●	Second Indo-Pak war
	●	Singapore becomes sovereign nation
1966	●	Cultural Revolution in China
	●	Tashkent Declaration between India and Pakistan signed
1967	●	The six-day Arab-Israel war—Arabs defeated
	●	Military coup in Greece
	●	First human heart transplant operation conducted by Dr Christian Barnard on Louis Washkansky—donor was Denise Darval

1968	• Martin Luther King assassinated
	• Invasion of Czech Republic by Warsaw Pact countries
	• South Pacific Island of Nauru and Mauritius become independent
	• UN approves Nuclear Non-Proliferation Treaty
1969	• US astronauts Neil Armstrong and Edwin E. Aldrin Jr land on the moon on 21 July and Michael Collins orbits the moon in the mother ship
	• Richard Nixon becomes 37th President of the US
1970	• West German-Soviet Non-Aggression Treaty signed
	• Charles de Gaulle, former President of France, dies
	• Soviet Lunokhod 1 lands on the moon
	• Fiji achieves Independence
1971	• Indo-Pak War (3–17 December)
	• Mujibur Rahman declares Bangladesh independent
	• China admitted to UN; Taiwan expelled
	• India recognizes Bangladesh
	• Apollo-15 launched; man's first drive on the moon
1972	• Bhutto releases Mujibur Rahman
	• Pakistan leaves Commonwealth
	• Ceylon becomes Sri Lanka Republic
1973	• Bahamas becomes independent
	• Afghanistan ends monarchy and becomes a Republic
	• War breaks out in West Asia between Israel, Egypt and Syria
1974	• South Vietnam Government (supported by US) surrenders to National Liberation Front Forces ending the civil war
	India's first nuclear blast at Pokharan in Rajasthan (Thar desert)
	• Malta becomes a Republic
1975	• Mujibur Rahman assumes full power as the President—one-party rule in Bangladesh
	• Margaret Thatcher elected first woman leader of the British Conservative Party
	• Mozambique becomes free after nearly 500 years of Portuguese rule
	• Angola free from Portuguese rule
	• India enters space age with the launch of satellite, 'Aryabhatta'
	• India lifts Hockey World Cup at Kuala Lumpur
	• Laos becomes a Republic
	• Army coup in Bangladesh and Sheikh Mujibur Rahman assassinated
1976	• Mao Tse-Tung of China dies
	• Jimmy Carter becomes President of the US
	• India elected to UN Security Council
1977	• Gen. Zia-ul-Haq takes over the Pakistan Government
	• Maj. Gen. Zia-ur-Rahman sworn in as new Bangladesh President
1978	• First test tube baby—Louise Brown born in Lancashire

1979	● Observed as International year of the Child
	● Iran proclaimed Islamic Republic and Ayatollah Khomeini returns to Iran after 14 years of exile
	● Margaret Thatcher becomes the first woman Prime Minister of Britain
	● China invades Vietnam
	● Soviet intervention in Afghanistan
	● Z. A. Bhutto, former PM of Pakistan, executed
1980	● Zimbabwe achieves independence
	● Iran–Iraq war commences
	● Ronald Reagan becomes President of the USA
	● Marshal Tito of Yugoslavia dies
1981	● Observed as International Year of the Disabled
	● US Space Shuttle Columbia makes a space trip
	● President Sadat of Egypt and Zia-ur-Rahman of Bangladesh assassinated
	● Belize becomes independent
	● Barbuda becomes independent
	● Ronald Reagan sworn in as the 40th President of the US
1982	● Egypt officially gets back Sinai peninsula after 15 years of Israeli occupation
1983	● Sheila Cameron becomes the first woman Vicar-General of the Church of England
	● Queen Elizabeth honours Mother Teresa with the Order of Merit (Highest British honour)
1984	● China and Britain sign agreement to return Hong Kong to Chinese control in 1997
	● 23rd Olympic Games held in Los Angeles
	Egypt resumes diplomatic relations with the USSR
	● Ronald Reagan re-elected President of the US
1985	● Mikhail Gorbachev takes over as the first elected Secretary-General of the Communist Party of Russia
	● Pakistan's first civilian government in eight years, headed by Prime Minister Mohammed Khan Junejo, sworn in. Marshal law lifted in Pakistan
	● More than 20,000 people dead as volcano erupts in Columbia
1986	● US solar system probe, Voyager-2, discovers six new moons of the planet Uranus
	● US Space Shuttle, Challenger, explodes after launching, all the seven on-board killed
	● Swedish Prime Minister, Olaf Palme, killed
	● Lt Gen. H. M. Ershad elected 10th President of Bangladesh
	● Benazir Bhutto returns triumphant to Pakistan from exile
1987	● West German Chancellor, Helmut Kohl, returned to power

- Margaret Thatcher wins a third consecutive term of office as PM of Britain
- Lebanese PM Rashid Karami killed in helicopter crash
- Australian PM Bob Hawke wins third term
- David Lange re-elected PM of New Zealand

1988
- Khan Abdul Ghafar Khan passed away in Peshawar
- French President Francois Mitterrand re-elected for another term of seven years
- Pakistan President Zia-ul-Haq killed in a plane crash
- George Bush elected the 41st US President
- PLO Chairman Yasser Arafat declares state of Palestine with capital at Jerusalem
- Benazir Bhutto sworn in PM of Pakistan
- Ghulam Ishaq Khan elected President of Pakistan
- R. Premadasa elected President of Sri Lanka

1989
- George Bush sworn in President of the US
- PLO leader, Yasser Arafat, elected President of Palestine
- Iranian leader, Ayatollah Khomeni, dies
- Rafsanjani elected as new Iranian President
- F. W. de Klerk sworn in as South African President
- Dismantling of Berlin wall begins

1990
- Nelson Mandela freed from prison after 27 years
- Iraq invades Kuwait—the Emir of Kuwait flees to Saudi Arabia
- Benazir Bhutto relinquishes power
- West and East Germany united
- Zimbabwean President, Robert Mugabe, re-elected
- Lithuania, Latvia, Belarus and Kazakhstan declare inde-pendence from the USSR
- Nawaz Sharif sworn in as Pakistan PM
- Lt Gen. H. M. Ershad quits as Bangladesh President

1991
- The USSR formally disintegrated into 15 republics
- Russian President Gorbachev ousted in a bloodless coup
- Begum Khaleda Zia appointed first woman Prime Minister of Bangladesh
- Iraq refuses to withdraw from Kuwait and Gulf war begins—US-led coalition forces from 28 countries attacked Iraq—ceasefire declared after 44 days and Kuwait liberated

1992
- Yugoslavia expelled from the UN
- Boutros Boutros Ghali assumes charge as Secretary General of the UN
- Bill Clinton of the Democrat Party elected as 42nd US President
- Bangladesh President Lt Gen. H. M. Ershad sentenced to three years' imprisonment for illegally amassing wealth
- India and UK sign treaty against terrorism

- The UN Security Council votes unanimously to establish a UN Protection Force (UNPROFOR) for civil war torn Yugoslavia
- The Earth Summit—UN Conference on Environment and Development (UNCED)—held in Rio De Janeiro, Brazil
- Prince Charles and Princess Diana of Britain announce their separation
- 25th Olympics in Barcelona, Spain (25 July–9 August)

1993
- Bill Clinton takes over as US President (20 January)
- Sri Lankan President, Ranatunga Premadassa assassinated in a powerful bomb blast
- G-15 Summit in New Delhi, 30 March
- New World Trade Treaty, 15 April

1994
- Chandrika Kumartunga elected Sri Lankan President
- Plague outbreak in India
- Devastating earthquake in Maharashtra
- First Communist Government in Nepal
- Refuelling Machine malfunctionaing at the Wyefa nuclear plant
- Explosion in lead/zinc mine in Guangxi, China—nearly 120 died

1995
- Britain–Ireland sign Peace Pact
- 100 years of world cinema
- Devastating earthquake in Japan and Russia
- Israeli Prime Minister, Yitzhak Rabin, assassinated

1996
- Russia becomes member of European Union on 26 January
- Blasts in London put an end to Irish ceasefire
- Leakage of radiation due to human error and technical failure at Dimitrovgrad nuclear research centre in Russia

1997
- After being under British sovereignty for 156 years, Hong Kong was returned to China on 1 July 1997. Henceforth, it will be called the 'Hong Kong Special Administrative Region' (HKSAR).
- Civil war in Cambodia

1998
- Nuclear tests conducted by India and Pakistan

1999
- Euro, the European single currency comes into effect on January 1999, with 11 countries participating
- Kosovo crisis deepens in April 1999 as Russia moved warships into Mediterranean
- Danger of 'Mir'—the Russian spacelab averted as Kazakhstan lets Russian cargo spacecraft 'Progress' to take off from Baikonur cosmodrome in July 1999 to make urgent food, water and oxygen deliveries to the cosmonauts in the flying lab in the orbit
- Army takes over in Pakistan in October 1999 in a bloodless coup headed by Army Chief Parvez Musharraf
- The people of East Timor rejected the autonomous plan within Indonesia and voted for independence from Indonesia

2000
- In July 2000, ousted Pakistani PM, Nawaz Sharif, jailed for 14 years

- In March, acting President of Russia, Vladimir Putin, won the presidential elections
- Bashir Assed, son of former President Hafez Assad, became President of Syria in July 2000

2001
- On 11 September 2001 in a horrific sequence of destruction, terrorists crashed two planes into the World Trade Center at New York, USA
- America's war against terrorism begins in Afghanistan against the ruling Taliban in October 2001
- Taliban surrender Kandhar, their last stronghold in Afghanistan, on 7 December 2001
- An earthquake hits Gujarat in India where more than 20,000 people died
- Likud party leader Ariel Sharon wins election as Prime Minister of Israel
- Former Yugoslavian President Slobadan Milosevic to be tried on war crimes; Japanese cities of Urawa, Omiya and Yono merge to form the city of Saitama
- World's first self-contained artificial heart implanted in Robert Tools
- Attack on WTC in New York City, The Pentagon in Arlington, Virginia and rural Pennsylvania
- 'Boom Accord' on Kabul (Afghanistan) signed on 5 December 2001 and Hamid Karzai made makeshift President of Afghanistan

2002
- In February, the govt of Sri Lanka signed 'Permanent Ceasefire Agreement' with the Liberation Tigers of Tamil Eelam (LTTE). The peace agreement was brokered by the Norwegian govt
- In June, Afghanistan's grand assembly—'Loya Jirga'—chose leader Hamid Karzai as President of Afghanistan
- SARS (Severe Acute Respiratory Syndrome) outbreaks in China and spreads all over world killing thousands, to be contained only during June 2003
- World Summit on sustainable development
- Introduction of Euro bank notes and coins in European Union
- Beginnings of operation Anaconda in Eastern Afghanistan
- Launch of ENVISAT (Enviornmental satellite), carrying heaviest payload of 8500 kg
- Quaoar is discovered which is a trans-Neptunian object, orbiting Sun in Kuiper belt

2003
- In February, the Space Shuttle Columbia perished in space and finally disintegrated over Texas, about 16 minutes before its scheduled landing at the Kennedy Space Centre, USA. All its 7 onboard astronauts which included Dr Kalpana Chawla, the first and only Indian-American in space, died
- 300th anniversary of Saint Petersburg, celebrated in Russia

2004
- G. W. Bush defeated John Kerry to start his second term as US president
- Tsunami hits Southeast Asian nations around Indian Ocean. More than 283,000 killed

- NASA's MER-A (Spirit) and MER-B lands on Mars (Opportunity)
- EU Expansion takes place by including 10 members, namely, Poland, Lithuania, Latvia, Estonia, Czech Republic, Slovakia, Slovenia, Hungry, Malta and Cyprus
- Yasser Arafat, leader of the Palestinian Authority dies in a Paris Hospital

2005
- Terrorists strike London transportation system, bombing three underground rail terminals and one bus killing more than 50 people in July a day after London was awarded to host 2012 Olympics
- An earthquake with a magnitude of 7.6 struck Pakistan-controlled Kashmir on 8 October. More than 81,000 people were killed and 2.5 million left homeless. India suffered about 1500 casualties
- George W. Bush begins his second term as 43rd President of United States
- Pope John Paul II dies and is succeeded by Pope Benedict XVI
- Hurricane Katrina Strikes eastern North America completely destroying the city of New Orleans, Lousiana

2006
- On 12 June a stampede by pilgrims in the annual Haj killed more than 350 people in Mecca, Saudi Arabia
- In March 2006, India and USA agreed on Nuclear deal that permitted the sale of US Nuclear to India despite the fact India has never signed the International Nuclear Non-proliferation Agreement
- On 27 May, a 6.3 magnitude earthquake killed more than 5700 people and destroyed 1,35,000 homes
- On 11 July, more than eight bomb blasts rocked Mumbai killing more than 200 people
- Ban Ki-moon is elected as the new Secretary-General of the United Nations
- Saddam Hussein, former Iraq President, was died om 30th December 2006

2007
- Political crisis begins in Pakistan after the suspension of Supreme Court Chief Justice Iftikhar Muhammad Chaudhry by Gen. Pervez Musharraf
- NASA's space shuttle Atlantis returned safely to earth on 22 June 2007 at the Edwards Air Force Base, California. Sunita Williams returns after a record 195 days stay in space
- Benazir Bhutto, former Prime Minister of Pakistan, was assassinated on 27 December 2007 after having returned from exile

2008
- Nepal bids adieu to Monarchy on 12 May 2008
- Earthquake rocks China injuring 10,000 people including school children and killing as many as 9000 people in the Beichuan Qiang country in Sichuan province.
- Pakistan's Gen. Pervez Mussharraf ends his 8 year old reign

2009
- Barack Hussein Obama sworn in as the 44th US President on 20 January 2009
- Sri Lankan cricket team attacked in Lahore, Pakistan. Six police officers died and six cricketers were injured as the attackers ambush the bus carrying the team

2010	● On 24 February 2010, Chile was hit by one of the world's most powerful earthquakes measuring 8.8 on the Richter scale and killing 800 people

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- Polish President Lech Kaezynki died in an air crash on 10 April 2010

2011
- Al-Qaeda leader, Osama Bin laden was killed in a special operation carried out by the US Navy SEALS and CIA paramilitary operatives on 1 May 2011.
- Libyan uprising threatened Gaddafi's 41 year-old autocratic rule. Several Middle East countries, in the year 2010–11, witnessed a massive change in the political scenario with a series of protests taking place in these major powers.
- On 11 March 2011, a devastating earthquake of magnitude 8.9/9.0 hit Japan—the largest in the history of Japan. The earthquake caused severe nuclear disaster in the region.
- India wins ICC Cricket World Cup 2011

2012
- Sachin Tendulkar become the first cricketer to score 100 international hundreds
- Kim Jong-II, the North Korean supreme leader passes away and his son Kim Jong-Un takes over as the next leader
- Barak Obama relected as President of United States.

2013
- Hassan Rowhani, a moderate cleric and Iran's former negotiator on nuclear issues won Iran's Presidential election in June.
- Mass protests were observed in Istanbul's Gezi Park in Taksim square against the authoritarian approach of the Prime Minister of Turkey, Recep Tayyip Erdogan.
- Civil war in Syria spilled over into Lebanon in may. US senator John Mc Cain travelled to Syria and met rebels in show of support, hinting a possible US role in Syria's civil war
- Despite stiffer sanctions from the United Nations, Kim Jong-un announced in April his plans to expand North Korean nuclear weapons and to strengthen its economy.
- Salam Fayyad, the Prime Minister of Palenstine resigned in April in wake of infighting among top echelon of the Palestinian Authority and popular discontent.
- In April, special presidential elections were held to pick Hingo Chavez's successor in Venzuela. Nichola's Maduro defected Henrique Capriles Radonski and assumed office in 19 April 2013. Hugo Chavez died on 5 May 2013.
- XI Jingping becomes President of China on 14 March 2013. Li Yuanchao is named vice president.
- Pope Banedict XVI resigned in February 2013. He was succeded by Pope Francis on 13 March 2013. Pope Francis is the 266th pope of the Catholic church.
- Violent protests were recorded in Egypt in January against the Muslim brotherhood and the President Mohammed Morsi's government.

- Nobel laureate Nelson Mandela passed away in Johannesburg on 5 December 2013.

2014
- Former Israeli Prime Minister Ariel Sharon dies on 22 January 2014.
- 2014 Winter Olympics held in Sochi, Russia (7–23 February 2014).
- On February 2104, the China–Taiwan officials hold first meeting in 65 years.
- Russia–Ukraine crisis intensifies as Russia dispatches troops to Crimea in March 2104. Crimea votes to secede from Ukraine in mid-March 2014.
- Mass kidnapping by Boko Haram in Nigeria sparks international outrage in April 2014.
- Indian parliamentary elections beings in April 2014. Bhartiya Janta Party (BJP), under the leadership of Narendra Modi, roars to power with landslide victory. Narendra Modi replaces Dr Manmohan Singh as India's Prime Minister in May 2014.
- Military coup in Thailand under Army Chief, Gen. Prayuth Chan-ocha on 20 May 2014.
- Billionaire Businessman, Petro Poroshenko, wins Presidential elections in Ukraine on 25 May 2014.
- In July, the New Development Bank was established by BRICS Countries (Brazil, Russia, India, China and South Africa) as an alternative to the existing World Bank and International Monetary Fund.

2015
- On January 1,Eurasian Economic Union was established. The member states include Belarus, Kazakhstan, Russia, Armenia and Kyrgyz
- On April 25 a major earthquake measuring 7.8 on the Richter scale hit Nepal leaving more than 10,000 people dead.
- In May 23 the Republic of Ireland became the first country to legalize same-sex marriage by referendum.
- On Jan 22, 2015, the US intelligence published a report alleging that Syrian President Bashar Al-Assad was secretly constructing a new underground nuclear compound near the Lebanese border, with the help of Iran and North Korea.
- On Jan 23, 2015, the King Abdullah of Saudi Arabia passed away. He was nearly 90. His half-brother, Prince Salman, who was the Crown Prince, has assumed the throne.
- On March 26, 2015 the Saudi Arabia has begun launching air strikes in Yemen as part of a coalition of Arab nations in an effort to dislodge Iranian-backed Houthi rebels sweeping through the country.
- On April 1, 2015 India luanched operation Rahat in Yemen and evacuated about 4000 of its nationals, trapped in the regions under active fighting. Indian government sent five ships and other modes in the operation

2016
- On May 6, 2016 the Scotland National party (SNP) secured another term in government with a third consecutive victory in the country's parliamentary elections, but fell short of an outright majority.

- On May 2, 2016 Leicester City won the English Premier League.
- On April 15, 2016 the CDC (Centers for Disease Control and Prevention) of USA established a link between pregnant women catching 'Zika' and their babies developing microcephaly as well as other neurological abnormalities. 'Zika' was a life threat in 2016 Brazil Olympics.
- On April 2016 an unprecedented leak of 11.5m Panama Papers files from the database of the world's fourth biggest offshore law firm, Mossack Fonseca, drove offshore business entities to launch probes for illegal purposes like fraud, kleptocracy, tax evasion etc. by the world's rich and powerful personalities like businessmen, bureaucrats and politicians.
- In April 2016 the ceasefire between Armenia and Azerbaijan refrained their activities for the Nagorno-Karabakh enclave on their border.
- March 22, 2016 the twin blasts at Zaventem Airport, Brussels (Belgium) staggered the entire world. It was seen as the continuation of the jihadist attacks in Paris (France) in November 2015.
- On January 14, 2016 a series of attacks hit Jakarta followed with threat by the Islamic State (Daesh) fighters to target Indonesia.

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8 International Organizations

UNITED NATIONS (UN) ORGANIZATION

The UN is an association of sovereign states bound by a Charter (Constitution) to maintain international peace and security. It is the world's largest international organization; a successor to the League of Nations.

How the Name United Nations Was Coined?

The US President, Franklin D. Roosevelt, used the name United Nations in the 'Declaration by United Nations' on 1 January 1942 during the World War II, when representatives of 26 nations pledged support to continue fighting together against the Axis Powers.

UN Charter

On 26 June 1945, the United Nations Charter (Constitution) was signed by the delegates of 49 countries at San Francisco (US). There were originally 50 nations invited to the San Francisco Conference. Poland did not attend because the composition of her new government was not announced until late for the conference. Therefore, the space was left for the signature of Poland, one of the original signatories of the UN Declaration. The generally recognized government in Poland was formed on 28 June 1945 and on 15 October 1945, Poland signed the Charter, thus becoming one of the original members.

Foundation Day of the UN

The UN formally came into existence on 24 October 1945, when Governments of China, France, the United Kingdom, the former USSR, the United States and a majority of other states ratified the UN Charter. 24 October is celebrated as the United Nations Day throughout the world.

First Regular Session of the UN

The first regular session of the UN was held in London in January 1946 and Trygve Lie (Norway) was elected the first Secretary General of the UN.

Headquarters of the UN

UN Headquarters are located on the First Avenue, UN Plaza, New York City, United States of America.

The UN Flag and the Emblem

The UN General Assembly adopted the UN flag on 20 October 1947. The white UN emblem is superimposed on a light blue background. The emblem consists of the global map projected from the North Pole and embraced in twin olive branches (symbol of peace). The UN flag is not to be subordinated to any other flag in the world. The UN Emblem was approved on 7 October 1946.

Agencies Related to the United Nations

Working in collaboration with the UN in various economic, social, scientific and technical fields are a group of inter-governmental organizations. These agencies are related to the UN through special agreements.

Table 8.1

S.No.	Name of Agency	Abbreviation	Year of Establishment	Headquarters	Purpose
1.	International Labour Organization	ILO	1919	Geneva	To promote social justice, improve conditions and living standards of workers and promote economic stability
2.	International Atomic Energy Agency	IAEA	1957	Vienna	To promote peaceful uses of atomic energy
3.	Food and Agriculture Organization	FAO	1945	Rome	To raise nutritional levels, living standards, production and distribution of food and agricultural products, improve living conditions of rural population
4.	United Nations Educational Scientific and Cultural Organization	UNESCO	1946	Paris	To promote collaboration among nations through education, science and culture in order to further justice, human rights and freedom
5.	World Health Organization	WHO	1948	Geneva	Attainment of highest possible level of health by all people
6.	International Bank for Reconstruction and Development	IBRD	1945	Washington	Development of economies of members by and Development facilitating investment of foreign capital and providing loans
7.	World Meteorological Organization	WMO	1950	Geneva	Promoting international exchange of weather reports and other weather related services
8.	Inter-governmental Maritime Consultative Organization	IMCO	1958	London	Promotes co-operation on technical matters, maritime safety, navigation and encourages anti-pollution measures
9.	United Nations International Children's Emergency Fund	UNICEF	1946	New York	Children's welfare all over the world
10.	General Agreement on Tariffs and Trade (from 1994 it is known as World Trade Organization)	GATT(WTO)	1948	Geneva	Treaty setting rules for world trade to reduce tariffs and eliminate other barriers to international trade

(Continued)

S.No.	Name of Agency	Abbreviation	Year of Establishment	Headquarters	Purpose
11.	United Nations Development Programme	UNDP	1965	New York	Help developing countries increase wealth producing capabilities of their natural and human resources
12	United Nations Environment Programme	UNEP	1972	Nairobi	Promotes international co-operation in matters relating to human environment
13.	United Nations Population Fund	UNFPA	1969	New York	Promotes population related programmes
14.	United Nations High Commissioner	UNHCR	1951	Geneva	Provides international protection for refugees
15.	United Nations Industrial Development Organization	UNIDO	1966	Vienna	Extends assistance to LDCs for development and modernisation of industries
16.	International Development Association	IDA	1960	Washington	An affiliate of the World Bank which aims to help underdeveloped countries raise living standards
17.	International Finance Corporation	IFC	1956	Washington	Promotes economic development by encouraging private enterprise in its member-countries
18.	International Monetary Fund	IMF	1945	Washington	Promotes international monetary co-operation and expansion of international trade
19.	International Civil Aviation Organization	ICAO	1947	Montreal	Promotes safety in international aviation and establishes international standards and regulations
20.	Universal Postal Union	UPU	1947	Berne	Improves various postal services and promotes international collaboration
21.	International Telecommunication	ITU	1947	Geneva	Sets international regulations for radio, telegraph, telephone and space radio communications
22.	International Fund for Agricultural Development	IFAD	1977	Rome	Finances agricultural projects to introduce, expand and improve food production and raise nutritional levels
23.	United Nations Conference on Trade and Development	UNCTAD	1964	Geneva	Promotes international trade with a view to accelerate economic growth of developing countries
24.	United Nations Institute for Training and Research	UNITAR	1965	New York	Provides high priority training and research projects to help facilitate the UN objectives of world peace and security and of economic and social progress
25.	United Nations Relief and Work Agency for Palestine Refugees	UNRWA	1949	New York	Provides food, health services, education and vocational training for those displaced in Arab–Israel wars

Aims and Objectives

The main objectives of the UN are

1. To maintain peace and security in the world.
2. To work together to remove poverty, disease and illiteracy and encourage respect for each other's rights of basic freedom.
3. To develop friendly relations among nations.
4. To be a centre to help nations achieve these common goals.

Membership of the UN

1. *Admission of Members*: New members are admitted to the General Assembly on the recommendations of the Security Council and two-thirds of the members should vote in favour. Members are expelled or suspended in the same manner.
2. *Permanent Members*: There are five permanent members of the Security Council: China, France, Russia, UK and US.
3. *Veto*: A negative vote by a permanent member bars action by the Security Council and is called a veto. Each permanent member enjoys the power to veto.
4. *Membership*: When the UN Charter was signed, there were only 50 members. As of 01 July 2014, the UN has 193 members.

Year	New Membership
1990	Namibia, Liechtenstein
1991	Estonia, Democratic People's Republic of Korea, Republic of Korea, Latvia, Lithuania, Marshall Islands, Micronesia (Federated States of)
1992	Armenia, Azerbaijan, Kazakhstan, Kyrgyzstan, Republic of Moldova, San Marino, Tajikistan, Turkmenistan, Uzbekistan, Bosnia and Herzegovina, Croatia, Slovenia, Georgia
1993	Czech Republic, Slovakia, The former Yugoslav Republic of Macedonia, Eritrea, Monaco andorra
1994	Palau
1999	Kiribati, Nauru, Tonga
2000	Tuvalu, Serbia
2002	Switzerland, Timor-Leste
2006	Montenegro
2011	South Sudan (193rd member of the UN)

5. *Non-members*: (1) Switzerland (2) Taiwan. In addition, several other small states like Nauru, Tonga, Vatican City are also not members of the UN.

Organization of the UN

The principal bodies of the UN are:

1. The General Assembly
2. The Security Council
3. The Economic and Social Council
4. International Court of Justice
5. Trusteeship Council
6. Secretariat

Quick Facts
- Membership: 193 member states
  - Permanent Members: China, France, Russian Fed, U.K, U.S
  - Non-Permanent Members: Angola, Chad, Chile, Jordan, New Zealand, Nigeria, Spain, Venezuela
- Established: 24 October 1945 (United Nations Day)
- Present Secretariat Staffing: 43,000 approx.
- Current UN Peace Keeping Operations: 16
- Official Languages: Arabic, Chinese, English, French, Russian, Spanish
- Nobel Prize 2001 was awarded equally between UN Secretary General Kofi Anan and the United Nations itself on 10 December 2001

General Assembly (GA)

Headquarters   New York

Membership   Consists of all member states of the UN. Each member can send five delegates but each nation has only one vote.

Function   All other UN bodies report to the General Assembly. It discusses and makes recommendations on any subject covered under the UN Charter except those with which the Security Council may be dealing.

Meeting   The General Assembly meets every year in regular sessions beginning on the third Tuesday in September.

Security Council (SC)

Headquarters   New York

Membership   The Security Council has 15 members—five permanent members enjoying veto power (China, France, Russia, UK and US) and 10 non-permanent elected members. The non-permanent members are elected by the General Assembly. They retire on rotation every two years.

Function   The Security Council is responsible for international peace and security. Any nation, irrespective of its membership of the UN, can put forth its problem before the Council. The Security Council can recommend peaceful solutions or, if necessary, may order use of force to restore peace.

The Economic and Social Council

Headquarters   New York

Membership   Consists of representatives of 54 member-countries elected by a two-thirds majority in the General Assembly. One-third of the members are elected every year to serve for a period of three years and one-third of the members retire annually.

Function   The Economic and Social Council carries on the functions of the UN with regard to international economic, social, cultural, educational, health and related matters.

International Court of Justice (ICJ)

Headquarters   The Hague (Netherlands)

Membership   Consists of 15 judges who are elected by the General Assembly and the Security Council for a term of nine years.

Function   It gives advisory opinion on legal matters to the bodies and special agencies of the UN and considers the legal disputes brought before them.

Justice R. S. Pathak, Chief Justice of India, was elected judge of the ICJ on 18 April 1989. He became the third Indian on whom this honour has been bestowed. The other two were Justice B. N. Rao and Justice Nagendra Singh.

Trusteeship Council

Headquarters   New York

Membership   There are five permanent members of the Security Council plus those nations who administer Trust Territories.

Function   To safeguard the interest of inhabitants of territories which are not yet fully self-governing and are governed by an administering country.

* The Trusteeship Council suspended operation on 1 November 1994, with the independence of Palau, the last remaining United Nations trust territory, on 1 October 1994.

Secretariat

Headed by   A Secretary-General who is appointed by the General Assembly on the recommendation of the Security Council.

Tenure   Five years and eligible for re-election after the term expires.

Function   It is the chief administrative office of the UN which coordinates and supervises the activities of the UN.

Secretary-Generals of the UN

1. Trygve Lie: (Norway) 1946–52
2. Dag Hammarskjoeld (killed in an air crash): (Sweden) 1953–61
3. U. Thant: (Myanmar) 1961–71
4. Dr Kurt Waldheim: (Australia) 1972–81
5. Javier Perez de Cuellar: (Peru) was appointed on 1 January 1982 for a term of five years and re-elected for another term in January 1986–91 and retired on 31 December 1991.
6. Dr Boutros Boutros Ghali, Egypt's Deputy Prime Minister, was the sixth UN Secretary-General from 1992–96.
7. Kofi Annan is seventh Secretary-General of the United Nations. The first Secretary-General to be elected from the ranks of United Nations staff, he began his first term on 1 January 1997. On 29 June 2001, acting on the recommendation by the Security Council, the General Assembly appointed him by Acclamation to a second term of office, beginning on 1 January 2002 and ending on 31 December 2006.
8. Ban Ki-Moon (South Korea) January 1–December 31 and January 2007–11, January 1 2011–December 31–2016.

Changing Role of United Nations

The work of the United Nations reached every corner of the globe. Although best known for peacekeeping, peacebuilding, conflict prevention and humanitarian assistance, there are many other ways the United Nations and its system (specialized agencies, funds and programmes) affect our lives and make the world a better place. The organization works on a broad range of fundamental issues, from sustainable development, environment and refugees protection, disaster relief, counter terrorism, disarmament and non-proliferation, to promoting democracy, human rights, governance, economic and social development and international health, clearing landmines, expanding food production and more, in order to achieve its goals and co-ordinate efforts for a safer world for now and future.

EUROPEAN UNION

European Union (EU) evolved from European Community (EC). EU was established on 7 February 1992 and came into effect on 1 November 1993. The historical roots of EU lie in the World War II. The idea of European Integration was concieved to prevent such killing and destruction ever happening again. It was first proposed by the French foreign minister Robert Suhuman in a speech on 9 May 1950. This date, the 'birthday' of what is now the EU is celebrated annually as 'Europe Day'.

IMPORTANT INFOrmation

1. In 2012, the EU was awarded the Nobel Peace Prize for having 'contributed to the advancement of peace and reconciliation, democracy and human rights in Europe'.
2. On July 2012, Croatia joined EU and became its 28th member.
3. The Euro was introduced in 2002, replacing most national currencies of the member countries in EU.

The EU family of democratic European countries are committed to work together for peace and prosperity and no single state will replace the existing states. Its member states have set up common institution to which they delegate some of their sovereignty, so that the decisions on specific matters of joint interest can be made democratically at European level. The pooling of sovereignty is also called 'European Integration'.

There are five EU institutions, each playing specific role:

1. European Parliament (elected by the people of the member states).
2. Council of the European Union (represents the governments of the member states).
3. European Commission (driving force and executive body).
4. Court of Justice (ensuring compliance with the law).
5. Court of Auditors (controlling sound and lawful, management of the EU budget).

Important Treaties (Establishment)

- *Treaty of Paris*   (23 July 1952)
- *Treaty of Rome: EEC and EU RATOM*   (1 January 1958)
- *Merger Treaty*   (1 July 1967)
- *Treaty of Maastricht*   (1 November 1993)
- *Lisbon Treaty*   (1 December 2009)
- *Treaty of Amsterdam*   (2 Oct 1997)
- *Single European Act*   (17 Feb 1986)
- *Treaty of Nice*   (26 Feb 2011)

Main Institutional Changes Introduced by the Lisbon Treaty

Differently from the existing Treaties, the Treaty of Lisbon offers the opportunity to keep one Commissioner from each Member State in the Commission.

The European Parliament has no more than 751 members. The delegate numbers for each country have been fixed to a maximum of 96 and a minimum of six for each Member State.

A new permanent post, the President of the European Council, is created. He or she is appointed by the European Council for a two and a half year period. This provides greater continuity and stability to the work of the European Council.

It creates a High Representative of the Union for Foreign Affairs and Security Policy. He or she also holds the post of Vice-President of the Commission and chairs the External

Relations Council. This strengthens coherence in external action and raises the EU's profile in the world, 'putting a face' on the Union.

Upon the entry into force of the *Maastricht Treaty* (1993), the EEC was renamed the European Community (EC) to reflect that it covered a wider range of policy. This was also when the three European Communities, including the EC, were collectively made to constitute the first of the three pillars of the European Union (EU), which the treaty also founded. The EC existed in this form until it was abolished by 2009 Treaty of Lisbon, which merged the EU's former pillars and provided that the EU would 'replace and succeed the European Community.'

A number of agencies and other bodies complete the system. The rule of law is fundamental to the EU decisions and the procedures are based on the treaties, which are agreed by all EU members.

Member States

Name	Capital	Accession
1. Belgium	Brussels	Founder
2. France	Paris	Founder
3. Italy	Rome	Founder
4. Luxembourg	Luxembourg	Founder
5. Netherlands	Amsterdam	Founder
6. Germany	Berlin	Founder
7. Denmark	Copenhagen	1 January 1973
8. Ireland	Dublin	1 January 1973
9. United Kingdom	London	1 January 1973
10. Greece	Athens	1 January 1981
11. Portugal	Lisbon	1 January 1986
12. Spain	Madrid	1 January 1986
13. Austria	Vienna	1 January 1995
14. Finland	Helsinki	1 January 1995
15. Sweden	Stockholm	1 January 1995
16. Cyprus	Nicosia	1 May 2004
17. Czech Republic	Prague	1 May 2004
18. Estonia	Tallinn	1 May 2004
19. Hungary	Budapest	1 May 2004
20. Latvia	Riga	1 May 2004
21. Lithuania	Vilnius	1 May 2004
22. Malta	Valletta	1 May 2004
23. Poland	Warsaw	1 May 2004
24. Slovakia	Bratislava	1 May 2004
25. Slovenia	Ljubljana	1 May 2004
26. Bulgaria	Sofia	1 January 2007
27. Romania	Bucharest	1 January 2007
28. Croatia	Zagreb	1 July 2013

THE COMMONWEALTH

The Commonwealth, originally called the British Commonwealth of Nations, is an association of sovereign and independent states which formally made up the British Empire. It came into being in 1947.

Constitution The Commonwealth has no written constitution. However, most of the member-countries have common constitutional features and they are bound together by common ideals and interest.

Purpose and Objectives Within the diversity, all members of Commonwealth hold certain common principles. It is by pursuing these ideals and principles that the commonwealth is able to influence international society for the benefit of mankind.

Membership There are 53 member-countries (South Africa joined as 51st member in May 1994) which include about a quarter of the world's people. Members of the commonwealth are represented in other commonwealth countries by diplomatic officers called *High Commissioners* (in the place of an *ambassador* representing Non Commonwealth countries).

Head of the Commonwealth The British monarch (Queen Elizabeth II) is the symbolic head. The other member-nations have their own heads of state but acknowledge the Queen as the head of the Commonwealth.

Secretary-General The Commonwealth Secretariat is the central body which has served the Commonwealth of Nations since its establishment in 1965 and responsible for represent-ing the Commonwealth publicly. It is headed by the Commonwealth Secretary-General who is appointed by the Commonwealth Heads of Government for a tenure of 4 years (renewable once). The position was created after the 14th Commonwealth Prime Ministers Conference in London in 1965. Since then the following persons have held the post:

1. Arnold Smith (Canada) from 1 July 1965 to 30 June 1975.
2. Sir Shridath Ramphal (Guyana) from 1 July 1975 to 30 June 1990.
3. Chief Emeka Anyaoku (Nigeria) from 1 July 1990 to 31 March 2000.
4. Sir Don McKinnon (New Zealand) from 1 April 2000 to 31 March 2008.
5. Kamalesh Sharma (India) 1 April 2008 (Incumbent).

THE NON-ALIGNED MOVEMENT (NAM)

Founder-Members of NAM 1. Marshal Tito—President of former Yugoslavia; 2. Dr Sukarno—President of Indonesia; 3. G. A. Nasser—President of Egypt; 4. Pt Jawaharlal Nehru—first Prime Minister of India. The credit of evolving the concept of NAM goes to Pt Nehru.

Established A conference of like-minded nations was held in April 1955 in Indonesia (Bandung) which became the forum for the birth of NAM.

Basic Principles of NAM

1. Mutual respect for each other's territorial integrity and sovereignity
2. Mutual non-aggression
3. Mutual non-interference in each other's affairs
4. Equality and mutual benefit
5. Peaceful coexistence

These principles are collectively known as Panchsheel and are the basic guidelines for the functioning of the NAM.

Membership As of 2012, the movement has 120 members and 17 observer countries (Argentina; Armenia; Bosnia and Herzegovina; Brazil; China; Costa Rica; Croatia; El Salvador; Kazakhstan; Kyrgyzstan; Mexico; Montenegro; Paraguay; Serbia; Tajikistan; Ukraine; Uruguay).

There are 4 former members of NAM: Argentina (1973–91); Cyprus (1961–2004); Malta (1973–2004) and Yugoslavia, incl. Federal Republic of Yugoslavia (1961–62).

SOUTH ASIAN ASSOCIATION FOR REGIONAL CO-OPERATION (SAARC)

Origin of SAARC   The idea of the SAARC was first mooted in 1979 by the former Bangladesh President Zia-ur-Rahman during his visit to Sri Lanka.

Date of Formation   8 December 1985 at Dhaka

Membership

Current members: (1) Afghanistan, (2) Bangladesh, (3) Bhutan, (4) India (5) Maldives (6) Nepal, (7) Pakistan and (8) Sri Lanka.

Observers: (1) Australia, (2) China, (3) European Union, (4) Japan, (5) Iran, (6) Mauritius, (7) Myanmar, (8) South Korea and (9) United States.

Important Points

South Africa has participated in meetings.

China has expressed interest in establishing special relations with SAARC and is supported by Pakistan, Bangladesh, Sri Lanka, Nepal and the Maldives.

Myanmar has expressed interest in upgrading its status from an observer to a full member of SAARC.

Russia and Turkey have applied for observer status membership of SAARC.

Purpose
1. To promote the welfare of the people of South Asia.
2. To improve the security environment in the region.
3. To accelerate economic growth and cultural development.
4. To combat terrorism.

Secretariat   Kathmandu (Nepal)

OTHER WORLD ORGANIZATIONS

Caribbean Community (CARICOM)

Established   1 August 1973 with its headquarters at Georgetown (Guyana). This organization was formed by the Caribbean Free Trade Association (CARIFTA).

Purpose   Coordinates economic policies and development of member-states, formulates common external trade, tariff and policy and has programmes to aid the less developed member-countries.

Members   CARICOM Members

15 Full Member

1. Antigua and Barbuda	(4 July 1974)
2. Bahamas	(4 July 1983)
3. Barbados	(1 August 1973)
4. Belize	(1 May 1974)
5. Dominica	(1 May 1974)
6. Grenada	(1 May 1974)

7.	Guyana	(1 August 1973)
8.	Haiti	(2 July 2002)
9.	Jamaica	(1 August 1973)
10.	Montserrat	(1 May 1974)
11.	Saint Kitts and Nevis	(26 July 1974)
12.	Saint Lucia	(1 May 1974)
13.	Saint Vincent and the Grenadines	(1 May 1974)
14.	Suriname	(4 July 1995)
15.	Trinidad and Tobago	(1 August 1973)

5 Associate Members

1.	Anguilla	(July 1999)
2.	Bermuda	(2 July 2003)
3.	British Virgin Islands	(July 1991)
4.	Cayman Islands	(16 May 2002)
5.	Turks and Caicos Islands	(July 1991)

8 Observer Countries

1. Aruba (Country of the Kingdom of the Netherlands)
2. Colombia
3. Curaçao (Country of the Kingdom of the Netherlands)
4. Dominican Republic
5. Mexico
6. Puerto Rico (Commonwealth of the USA)
7. Sint Maarten (Country of the Kingdom of the Netherlands)
8. Venezuela

Organization of Petroleum Exporting Countries (OPEC)

Established   OPEC is a permanent, intergovernmental organization created at the Baghdad Conference on 10–14 September 1960 by Iran, Iraq, Kuwait, Saudi Arabia and Venezuela with its headquarters at Geneva, Switzerland. The headquarters were moved to Vienna in 1965. The international oil companies' announcement that they were reducing prices of Middle East Crude oil led to the formation of the OPEC.

Purpose   To control production and pricing of crude oil.

Members   As of 2016, it has 13 members. Middle East (6 members), Africa (4 members) and South America (2 members), Southeast Asia (1 member).

S. No.	Members	Joined in Year
1.	Iran	1960
2.	Iraq	1960
3.	Kuwait	1960
4.	Saudi Arabia	1960
5.	Venezuela	1960
6.	Qatar	1961
7.	Libya	1962
8.	United Arab Emirates	1967
9.	Indonesia	1962–2009, 2016

10.	Algeria	1969
11.	Nigeria	1971
12	Angola	2007
13.	Ecuador	2007

Arab League (League of Arab States)

Established   22 March 1945 with its headquarters at Cairo, which were later shifted to Tunisia, Tunis in 1979 when Egypt's membership was suspended. After Iraq's invasion of Kuwait in August 1990, the headquarters were shifted from Tunisia to Cairo.

Purpose   To foster unity particularly among Muslim nations and maintenance of Arab solidarity.

Members   **22 Members**

1. Algeria	12. Morocco
2. Bahrain	13. Oman
3. Comoros	14. Palestine
4. Djibouti	15. Qatar
5. Egypt	16. Saudi Arabia
6. Iraq	17. Somalia
7. Jordan	18. Sudan
8. Kuwait	19. Syria (vacant)
9. Lebanon	20. Tunisia
10. Libya	21. United Arab Emirates
11. Mauritania	22. Yemen

Currently, the League has 22 members, although Syria's participation has been suspended since November 2011 as a consequence of government repression during the ongoing uprising and civil war.

Benelux Economic Union

Established   1958 with its headquarters in Brussels, Belgium. The union's name was formed by joining the first two or three letters of each member country's name – Belgium; Netherlands; Luxembourg – and was first used to name the customs agreement that initiated the union (signed in 1944). It is now used in a more general way to refer to the geographic, economic and cultural grouping of the three countries.

Purpose   The Treaty between the Benelux countries establishing the Benelux Economic Union was limited to a period of 50 years. The original establishing treaty, set to expire in 2010, was replaced by a new legal framework (called the Treaty revising the Treaty establishing the Benelux Economic Union), which was signed on 17 June 2008. The new treaty has no set time limit and the name of the Benelux Economic Union changed to Benelux Union to reflect the broad scope on the union. Five Benelux institutions remain:

1. The Benelux Committee of Ministers,
2. The Benelux Council,
3. The Benelux Parliament,
4. The Benelux Court of Justice,
5. The Benelux Secretariat General.

Beside these five institutions, the Benelux Organization for Intellectual Property is also present in this Treaty.

Members   Belgium, Netherlands and Luxembourg.

North Atlantic Treaty Organization (NATO)

Established   4 April 1949 with its headquarters in Brussels, Belgium.

Purpose   The member countries promised to maintain and develop their individual and collective capacity to resist armed attack and consult each other if any of the member nations was threatened politically. They agreed that an armed attack against any of them would be countered by combined action.

Members   **28 Member States**

1. Albania	15. Latvia
2. Belgium	16. Lithuania
3. Bulgaria	17. Luxembourg
4. Canada	18. Netherlands
5. Croatia	19. Norway
6. Czech Republic	20. Poland
7. Denmark	21. Portugal
8. Estonia	22. Romania
9. France	23. Slovakia
10. Germany	24. Slovenia
11. Greece	25. Spain
12. Hungary	26. Turkey
13. Iceland	27. United Kingdom
14. Italy	28. United States

Group of 77

Established   1964 under the auspices of the UN.

Purpose   To defend the economic and trade interests of the developing world.

Members   As of 2014, the group comprises all of UN members (along with the Palestinian Authority)—excluding the following:

1. All Council of Europe members (with the exception of Bosnia and Herzegovina)
2. All Organisation for Economic Co-operation and Development members (with the exception of Chile)
3. All Commonwealth of Independent States (full) members (with the exception of Tajikistan)
4. The new UN member South Sudan, along with two Pacific microstates: Palau and Tuvalu.

Former Members

1. Those that left G-77 after joining OCED: *Mexico; South Korea. New Zealand* had signed the 'Joint Declaration of the Developing Countries' in 1963, but pulled out of the group before the formation of the G-77 in 1964 (it joined the OECD in 1973).
2. Those that left G-77 after joining EU: *Cyprus, Malta* and *Romania*.

3. Those that left G-77 for other reasons: *South Vietnam* (was a founding member, but left the Group in 1975 when the North Vietnamese captured Saigon); *Yugoslavia* (Bosnia and Herzegovina is the only part of former Yugoslavia that is currently in G-77); *Palau* (joined G-77 in 2002 but left it in 2004 going with Alliance of Small Island States).

Colombo Plan

Established   1950 with headquarters in Colombo.

Purpose   To promote the development of newly independent Asian member-countries.

Members   Started as a group of seven Commonwealth countries, it now has 27 member countries.

27 Current Members

 1. Afghanistan
 2. Australia
 3. Bangladesh
 4. Bhutan
 5. Brunei
 6. Fiji
 7. India
 8. Indonesia
 9. Iran
10. Japan
11. Laos
12. Malaysia
13. Maldives
14. Mongolia
15. Myanmar
16. Nepal
17. New Zealand
18. Pakistan
19. Papua New Guinea
20. Philippines
21. Saudi Arabia
22. Singapore
23. South Korea
24. Sri Lanka
25. Thailand
26. United States
27. Vietnam

4 Former Members   Cambodia; Canada; South Vietnam and United Kingdom.

4 Permanent Programmes of the Colombo Plan

1. Programme for Public Administration and Environment (PPA and ENV).
2. Programme for Private Sector Development (PPSD).
3. Drug Advisory Programme (DAP).
4. Long-Term Scholarships Programme (LTSP).

Organization of American States (OAS)

Established on 30 April 1948 with its headquarters in Washington DC. The OAS was formed at the Ninth Conference of American States in Bogota (Colombia).

Purpose   To foster American solidarity and aid collaboration of member countries to protect their independence, sovereignty and boundaries. It has a membership now of nearly 35 nations of North and South America. 34 members participate actively as Cuba, a member state's participation has been suspended since 1962.

Organization for Economic Cooperation and Development (OECD)

Established   30 September 1961 with its headquarters in Paris. The Organization for European Economic Cooperation (OEEC) became OECD in 1961 with the addition of non-European countries.

Purpose   Seeks sustained economic growth, employment, higher standards of living and monetary stability in its member nations.

Members   **34 Members**

1. Australia	18. Japan
2. Austria	19. Luxembourg
3. Belgium	20. Mexico
4. Canada	21. Netherlands
5. Chile	22. New Zealand
6. Czech Republic	23. Norway
7. Denmark	24. Poland
8. Estonia	25. Portugal
9. Finland	26. Slovakia
10. France	27. Slovenia
11. Germany	28. South Korea
12. Greece	29. Spain
13. Hungary	30. Sweden
14. Iceland	31. Switzerland
15. Ireland	32. Turkey
16. Israel	33. United Kingdom
17. Italy	34. United States

The OECD's headquarters are at the Château de la Muette in Paris, France.

Association of South-East Asian Nations (ASEAN)

Established   8 August 1967 with headquarters in Jakarta, Indonesia.

Purpose   To accelerate economic progress and maintain economic stability in South-East Asia.

Members   The organization was established in Thailand along with Malaysia and the Philippines. Indonesia, Singapore and Brunei joined in 1984. The ASEAN is headed by a secretary-general, who is elected on rotation in alphabetical order for a term of three years. The other member countries are Cambodia, Lao PDR, Malaysia, Myanmar and Vietnam.

Members   **10 Member States**

1. Brunei	6. Myanmar
2. Cambodia	7. Philippines
3. Indonesia	8. Singapore
4. Laos	9. Thailand
5. Malaysia	10. Vietnam

2 Observers

1. Timor-Leste
2. Papua New Guinea

Amnesty International

Established   28 May 1961 with its headquarters in London by Peter Benenson, a British lawyer.

Purpose   A worldwide organization that investigates violations of human rights. It campaigns for the release of all prisoners of conscience provided they have not used or advocated violence; fair and prompt trials for all prisoners, abolition of torture and capital punishment. It has more than 3 million members in 150 countries. It won the Nobel Prize for Peace in 1977 for its 'campaign against torture' and the United Nations Prize in the Field of Human Rights in 1978.

In August 2012 Amnesty International's India head had sought a UN lead impartial investigation to render justice to those affected by war crimes in Sri Lanka.

Red Cross

Established   In 1863 by Jean Henri Dunant.

In 1859, J. H. Dunant, a Swiss businessman travelling through Italy, witnessed the battle of Solferino, in which about 30,000 soldiers were wounded or killed when France tried to free Italy from Austrian domination. He organized relief work for the wounded soldiers and subsequently called for the formation of a permanent relief society for those wounded in war. Dunant's appeal had immediate results. An international conference took place in Geneva (Switzerland) in 1864 where 26 governments were represented. The conference led to the Geneva Convention and the emblem motto of Red Cross was adopted.

Red Cross Day   World Red Cross and Red Crescent day is celebrated on 8 May the birthday of its founder, Henri Dunant.

Motto   Charity in War.

Symbol   Red Cross on a white background.

It is the reverse of the flag of Switzerland. The Red Cross completed 131 years on 8 May 1993 and in its 126th year, it adopted the slogan: 125 years at work—and still developing.

In the Middle-East, a Red Crescent replaces the Red Cross, while in Iran a lion or sun is used as the symbol. The organization was awarded the Noble Prize in 1917, 1944 and 1963. It has about 97 million members from 131 countries of the world.

The International Committee of the Red Cross (ICRC) constitutes with the league of Red Cross societies, the International Red Cross. The League of Red Cross Societies was founded in 1929.

Interpol

Established   1923, it is a 190-nation Police Commission which coordinates activities of member-nations with its headquarters in Paris. It shifted to Lyons after a terrorist bomb blast in 1986.

World Trade Organization (WTO)

Established   1 January 1995 replacing the General Agreement on Tariffs and Trade (GATT).

Purpose   It has come into effect with the backing of at least 85 founding members, including India. The WTO comes as the third economic pillar of worldwide dimensions with the World Bank and the International Monetary Fund (IMF). The WTO has powers to settle trade disputes between nations and to widen the principle of free trade to sectors such as the services and agriculture and covers more areas than GATT.

The organization is attempting to complete negotiations on the Doha Development Round, which was launched in 2001 with an explicit focus on addressing the needs of developing countries.

- As of June 2012, the future of the Doha Round remained uncertain: the work programme lists 21 subjects in which the original deadline of 1 January 2005 was missed and the round is still incomplete.
- The conflict between free trade on industrial goods and services but retention of protectionism on farm subsidies to domestic agricultural sector (requested by developed countries) and the substantiation of the international liberalization of fair trade on agricultural products (requested by developing countries) remain the major obstacles.
- These points of contention have hindered any progress to launch new WTO negotiations beyond the Doha Development Round. As a result of this impasse, there has been an increasing number of bilateral free trade agreements signed.
- As of July 2012, there were various negotiation groups in the WTO system for the current agricultural trade negotiation which is in the condition of *stalemate*.
- A trade facilitation agreement known as the Bali Package was reached by all members in December 2013, the first comprehensive agreement in the organization's history.

Asia-Pacific Economic Cooperation (APEC)

Established   1 January 1989 on call for more effective economic cooperation across the Pacific Rim region by the Australian PM, Bob Howke.

Purpose   APEC is a group of 21 Pacific Rim nations that seek to promote free trade and economic cooperation throughout Asia-Pacific region.

Group of Eight (G8)

Established   In 1975 as G6 (France, Germany, Italy, Japan, UK and the US) with addition of Canada it became G7. With Russia joining the group it came to be known as G7 + 1 or G8. Interestingly, it does not has members such as China (2nd largest economy), Brazil (6th largest economy) and India (9th largest economy).

Purpose   Since 2009 its major focus has been on global food supply.

Organization for the Prohibition of Chemical Weapons (OPCW)

Established   29 April 1997 as an intergovernmental organization located in the Hague, Netherlands.

Purpose   OPCW promotes and reifies the adherence to the chemical weapons convention that prohibits the use of chemical weapons and requires their destruction.

Organization for Security and Co-operation in Europe (OSCE)

The Organization for Security and Co-operation in Europe (OSCE) has its roots in the 1973 Conference on Security and Co-operation in Europe (CSCE). The collapse of the Soviet Union required a change of role for the CSCE. The Charter of Paris for a New Europe, signed it on 21 November 1990 and marked the beginning of this change. CSCE was renamed as OSCE on 1 January 1995, according to the results of the conference held in Budapest, Hungary, in 1994. Its mandate includes issues such as arms control and the promotion of human rights, freedom of the press and fair elections. It has its headquarters in Vienna, Austria with 57 members and 11 partners of cooperation.

The Commonwealth of Independent States (CIS)

With the disintegration of the Soviet Union, the now independent states of the Russian Federation, Ukraine, and Belarus came together to create the CIS, except Georgia and the Baltic States. The CIS was not a platform for effective and mutually beneficial cooperation, instead, it was a club whose members merely exchanged their views. The CIS is virtually moribund as a political organization. Its members have signed very few agreements till date since its inception in late 1991 have been implemented.

Members   Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Uzbekistan. [Georgia, Turkmenistan and, and Ukraine cease to be members]

Collective Security Treaty Organization (CSTO)

The CIS had been unproductive and has not materialized into the political-military pact, Moscow had envisioned as a competitor to NATO and the EU. In May 2002, the Collective Security Treaty of the CIS renamed itself the CSTO, focusing on preserving territorial integrity and seeking closer cooperation with other multilateral institutions, such as the UN, Organization for Security and Cooperation in Europe, Shanghai Cooperation Organization (SCO), and NATO.

CSTO members   Russia, Armenia, Belarus, Kazakhstan, Kyrgyzstan, and Tajikistan.

African Union

A union consisting of 54 African states was established on 2001 in Addis Ababa was launched on July 2002 in South Africa to replace the Organisation of African Unity (OAU). It has two political centres: Addis Ababa-Ethopia (Seat of the African Union Commission) and Johannesburg-South Africa (Seat of the Pan-African Parliament). Currently, there are eight RECs (Regional Economic Communities) recognized by the AU, each established under a separate regional treaty. These are:

- Arab Maghreb Union (UMA)
- Common Market for Eastern and Southern Africa (COMESA)
- Community of Sahel-Saharan States (CEN-SAD)

- East African Community (EAC)
- Economic Community of Central African States (ECCAS)
- Economic Community of West African States (ECOWAS)
- Intergovernmental Authority on Development (IGAD)
- Southern Africa Development Community (SADC).
- ECOSOCC (Economic, Social and Cultural Council of AU) is an advisory organ developed similar to the European Economic and Social Committee.

Asia-Pacific Economic Cooperation

Established in 1989 as an economic forum, it constitutes 21 Pacific Rim nations, and aims at promoting the free trade and other economic synergies across the Asia-Pacific region. It has its headquarters in Singapore. [India has been desperately asking for the membership of Asia-Pacific Economic Cooperation (APEC) but was only allowed as an observer in 2011.]

Shanghai Cooperation Organisation (SCO)

Also known as the Shanghai Pact, Shanghai Cooperation Organisation (SCO) was established in 2001 in Shanghai (China) when Uzbekistan was includeed into erstwhile 'Shanghai Five' (which was established in 1996 as a Eurasian organization with focus on the political, economic and military aspects of the member nations) and it was renamed as Shanghai Cooperation Organization.

Member States   China, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, and Uzbekistan. Observers: Afghanistan, India, Iran, Mongolia, and Pakistan. Dialogue partners: Belarus, Sri Lanka, and Turkey. Guest (ASEAN, CIS and Turkmenistan).

Brazil–Russia–India–China–South Africa (BRICS)

Originally known as BRIC (Brazil, Russia, India and China), it became BRICS when in 2010 South Africa joined this league of major emerging national economies. BRICS nations comprise approximately one-fifth of the world's total GWP (Gross World Product) and represents more than one-third of the world's population. After its 5th Summit in Durban, South Africa in 2013 it is now contemplating formulating a BRICS Development Bank, establishing a contingency reserve arrangement (CRA) with an initial size of US\$ 100 billion, and setting up of BRICS Business Council and BRICS Think Tank Council.

BRICS Summits   BRICS's first summit was held in 2009 at Yakaterinburg, Russia. Since then there have been six summits: 2nd (Brasilia, Brazil in 2010); 3rd (Sanya, China in 2011—South Africa attended as a full member); 4th (New Delhi, India in 2012); 5th (Durban, South Africa in 2013), 6th (Brasilia, Brazil in 2014), and 7th (Ufa, Russia in 2015). 8th (To be held) – 2016, Panaji, India.

Potential Members   Indonesia, Turkey, Mexico and Germany have been mentioned as candidates for full membership of the BRICS, while Egypt, Argentina, Iran, Japan, Nigeria, Korea, Syria and most recently Bangladesh have expressed interest in joining BRICS.

Next Eleven (N-11)

This is a group of high-potential countries, known as N-11 (as it includes 11 nations), that are considered to have the potential to be among the world's largest economies in 21st century. These eleven countries are: Bangladesh, Egypt, Indonesia, Iran, Mexico, Nigeria, Pakistan, Philippines, Turkey, South Korea and Vietnam. The term was introduced by Jim O'Neill (of Goldman Sachs Investment Bank) who used macroeconomic stability, political maturity, openness of trade, investment policies, and the quality of education as criteria for defining N-11.

E-7 (Emerging-7)

E-7 is a group of seven countries with emerging economies and are predicted to have larger economies than the G-7 countries by 2020. The E-7 club includes—China, India, Brazil, Mexico, Russia, Indonesia and Turkey. E-7 was used first in the Stern by PriceWaterhouseCoopers in 2006. However, in 2009 economist Peter Marber in his book Seeing the Elephant, used the term E-7 to mention the emerging economies but replaced Turkey with South Korea.

E-9 Nations

UNESCO's Education for All (EFA) initiatives clubbed 9 nations (Bangladesh, Brazil, China, Egypt, India, Indonesia, Mexico, Nigeria and Pakistan) and started the E-9 initiative during the 1993 UN-EFA Summit held in New Delhi. E-9 Initiative has developed an organized platform for the member states to discuss their practices related to education, exchange bestpractices, and analyse EFA-related progress.

G-4

The G-4 nations (Brazil, Germany, India and Japan) support each other's bids for permanent seats on the UN Security Council. G-4's primary aim is the permanent member seats on the SC. Each of these four countries has figured among the elected non-permanent members of the council since the UN's establishment. Their economic and political influence has grown significantly in the last few decades, reaching a scope comparable to the permanent members (P-5). However, the G-4's bids are often opposed by 'Uniting for Consensus movement', and particularly their economic competitors or political rivals.

Uniting for Consensus

It is a movement to promote regional representation and to increase the number of non-permanent members in the UN Security Council. The core members of the group are Argentina, Canada, Colombia, Costa Rica, Indonesia, Italy, Malta, Mexico, Pakistan, South Korea, San Marino, Spain and Turkey.

G-8 (Group of Eight)

It is a governmental forum of leading advanced economies in the world. It originated as G-6 with France, Germany, Italy, Japan, the UK and the USA as members in 1975 and

later in 1976 became G-7 with inclusion of Canada. G-7 came to be known as the club of seven wealthiest nations of the world. Russia joined it in 1998 and the group became 'Group of Eight' that represented top-ranked advanced economies with the largest GDP and with the highest national wealth. Russia, however, was suspended since 2014, and G8 in effect comprise seven nations and the EU as the eight members (however, the EU has been represented within G8 since 1980s.

G-6 (Group of Six)

G-6 now is referred to the six most populous nations in the EU (Germany, France, United Kingdom, Italy, Spain and Poland) and was established in 2003 as G-5 to deal with the issues such as immigration, law and order, and terrorism. G-5 became G-6 when Poland was included in 2006.

G-(8+5)

It is a selected group of nations that consists of the leaders of the heads of government from the G7 nations, i.e. G8 minus Russia, (Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States of America), plus the heads of government of the five leading emerging economies (Brazil, China, India, Mexico, and South Africa). The G8+5 group was formed in 2005 when Tony Blair, then Prime Minister of the UK, in his role as host of the 31st G8 summit at Gleneagles, Scotland, invited the leading emerging countries to join the discussions. The group accepted that the existence of man-made climate change was beyond doubt, and there should be a global system of emission caps and carbon emissions trading applying to both industrialized nations and developing countries.

G-15

The G-15 was established in 1989 at Belgrade's NAM summit. An informal forum set up to foster cooperation and provide input for other international groups,such as the WTO and the G-8. As of today, it comprises 17 members:

AFRICA (1. Algeria, 2. Egypt, 3. Kenya, 4. Nigeria, 5. Senegal, and 6. Zimbabwe);

ASIA (7. India, 8. Indonesia, 9. Iran, 10. Malaysia, 11. Sri Lanka);

LATIN AMERICA AND THE CARIBBEAN (12. Argentina, 13. Brazil, 14. Chile, 15. Jamaica, 16. Mexico, 17. Venezuela).

G-15 was established in order to further the process of south-south co-operation and consultation on matters of tangible and material interest to the economic performance of developing countries. 1st G-15 Summit was held in Malaysia in 1990, and 4th in India (1994). The 15th G-15 Summit was held in Sri Lanka in 2013.

G-20 (Group of 20)

A club of 20 developing nations (now 23 members) established in 2003, that emerged during the 5th Ministerial WTO Conference held in Cancun, Mexico. The group of nations represents about two-third of world's population and 70% of the world's farmers. It controls about one-fourth of the world's agricultural exports. G-20 is not an integral part of the UN.

Member States   Argentina, Bolivia, Brazil, Chile, China,Cuba, Ecuador, Egypt, Guatemala, India, Indonesia, Mexico, Nigeria, Pakistan, Paraguay, Peru, Philippines, South Africa, Tanzania, Thailand, Uruguay, Venezuela, Zimbabwe. The membership of the group has been fluctuating as Colombia, Costa Rica, Ecuador, El Salvador, Peru and Turkey has also been members in the history of G-20.

G-24 (Group of Twenty-Four)

The Group of 24 (G-24), a chapter of the G-77, was established in 1971 to coordinate the positions of the developing countries on international monetary and development finance issues and to ensure that their interests were adequately represented in negotiations on international monetary matters. Although membership in the G-24 is strictly limited to 24 countries, any member of the G-77 can join discussions. China has been a 'special invitee' since the Gabon meetings of 1981. The group, which is officially called the Inter-governmental Group of Twenty-Four on International Monetary Affairs and Development, is not an organ of the IMF, but the IMF provides secretariat services for the Group.

Member Countries

Region—I (Africa): Algeria, Côted'Ivoire, Egypt, Ethiopia, Gabon, Ghana, Nigeria, South Africa and the Democratic Republic of Congo)

Region—II (Latin America and the Caribbean): Argentina, Brazil, Colombia, Guatemala, Mexico, Peru, Trinidad and Tobago and Venezuela;

Region—III (Asia): India, Iran, Lebanon, Pakistan, Philippines, Sri Lanka and Syria.

World Bank

With 189 members, the WB operates like a cooperative, where member countries are represented by a Board of Governors, who are the key decision-makers and policymakers of this organization. Usually, finance ministers of member countries are appointed as the governors of the WB who meet annually at the Annual Meetings of the Boards of Governors of the WB Group and the IMF. The WB is a vital source of financial and technical assistance to developing countries around the world. Established in 1944, the WB Group is headquartered in Washington, D.C. It has more than 10,000 employees in more than 120 offices worldwide.

World Bank Group Organizations

– International Bank for Reconstruction and Development (IBRD) – 189 countries

– International Development Association (IDA) – 173 countries

– International Finance Corporation (IFC)

– Multilateral Investment Guarantee Agency (MIGA)

– International Centre for the Settlement of Investment Disputes (ICSID)

Regional Units of the WB

Africa; East Asia and Pacific; Europe and Central Asia; Latin America and North America; Middle East and North Africa; South Asia.

International Monetary Fund (IMF)

The International Monetary Fund (IMF) promotes international monetary cooperation and exchange rate stability, facilitates the balanced growth of international trade, and provides resources to help members in balanceing the payments difficulties or to assist with poverty reduction.

Membership   The IMF has 189 members. It is an independent international organization, which has its own charter, governing structure, and finances. Its members are represented through a quota system broadly based on their relative size in the global economy. The IMF is a specialized agency within the meaning of the UN Charter, and its relationship with the UN is defined by a special agreement between the two organizations. On joining, each member country of the IMF is assigned a quota, based broadly on its relative size in the world economy. The IMF's membership agreed in November 2010 on a major overhaul of its quota system to reflect the changing global economic realities, especially the increased weight of major emerging markets in the global economy. IMF grants loans only to its member countries.

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9 General Science

EVERYDAY SCIENCE

BASIC INFORMATION

Systems of Measurements

- Scientists in different parts of the world have been using various systems of measurement, the most common among them are:
  1. C.G.S. System (Centimeter, Gram, Second)
  2. F.P.S. System (Foot, Pound, Second)
  3. M.K.S. (Metre, Kilogram, Second)
- However to avoid confusion in these systems and to have a uniform system of measurement, the French Academy of Sciences, devised the Metric System in 1791 which was later propagated in other European countries by Napolean.
- The Metric System is a decimal system in which different units for a physical quantity are related by powers of ten.
- The Metric System was adopted in India in 1957.

International System (SI)

- In 1960, the General Conference on Weights and Measures gave official status to a single practical system, the System International, that is, International System of Units, abbreviated as SI in all languages.
- The SI system is a modernized version of the metric system and has seven basic units. These units are defined as:

meter (m) [distance]	The metre is the length of the path travelled by light in vacuum during a time interval of 1/299 792 458 of a second.
kilogram (kg) [mass]	The kilogram is equal to the mass of the international prototype of the kilogram.
second (s) [time]	The second is the duration of 9 192 631 770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the caesium 133 atom.
ampere (A) [electric current]	The ampere is that constant current which, if maintained in two straight parallel conductors of infinite length, of negligible circular cross-section and placed 1 metre apart in vacuum, would produce between these conductors a force equal to 2×10^{-7} newton per metre of length.

kelvin (K) [temperature]	The kelvin is the fraction 1/273.16 of the thermodynamic temperature of the triple point of water.
mole (mol) [amount of substance]	The mole is the amount of substance of a system which contains as many elementary entities as there are atoms in 0.012 kilogram of carbon 12. When the mole is used, the elementary entities must be specified and may be atoms, molecules, ions, electrons, other particles or specified groups of such particles.
candela (cd) [intensity of light]	The candela is the luminous intensity, in a given direction, of a source that emits monochromatic radiation of frequency 540 × 1012 hertz and that has a radiant intensity in that direction of 1/683 watt per steradian.

Table 9.1   Seven Basic SI Units

Basic Unit	Quantity (Unit of)	Symbol	Adopted in
Metre	length	m	1960
Kilogram	mass	kg	1960
Second	time	s	1948
Kelvin	thermodynamic temperature	K	1967
Candela	luminous intensity	cd	1967
Mole	substance	mol	1971

Table 9.2   Common Derived Units

Quantity	Definition of Quantity	SI Units
Area	Square metre	m^2
Volume	Cubic metre	m^3
Density	Kilogram per cubic metre	kg/m^3
Speed	Distance per unit time (second)	m/s
Acceleration	Speed changed per unit of time	m/s^2
Force	Mass times acceleration of object kg	m/s^2
Pressure	Force per unit area	kg/ms^2
Energy	Force times distance travelled	kgm^2/s^2

Non-SI Units Used Along with International System

- There are certain units which are accepted for use with the SI. It includes units which are in continuous everyday use, in particular the traditional units of time and of angle, together with a few other units which have assumed increasing technical importance.

- There are also units which are currently accepted for use with the SI to satisfy the needs of commercial, legal and specialist scientific interests or are important for the interpretation of older texts.

Derived Units of the International System (SI)

- The term *derived unit* covers any algebraic combination of the base units but it is only the 22 combinations listed above that have approved special names.

Table 9.3   Important Derived Units and Their SI units

Derived Unit	Measures	SI Units
Hertz (Hz)	frequency	/s
Newton (N)	force	kg·(m/s²)
Pascal (Pa)	pressure	N/m²
Joule (J)	energy or work	N·m
Watt (W)	power	J/s
Coulomb (C)	electric charge	A·s
Volt (V)	electric potential	W/A
Farad (F)	electric capacitance	C/V
Ohm (Ù)	electric resistance	V/A
Siemens (S)	electric conductance	A/V
weber (Wb)	magnetic flux	V·s
tesla (T)	magnetic flux density	Wb/m²
henry (H)	inductance	Wb/A
deg Celsius (°C)	temperature	K – 273.15
radian (rad)	plane angle	
steradian (sr)	solid angle	
lumen (lm)	luminous flux	cd·sr
lux (lx)	illuminance	lm/m²
becquerel (Bq)	activity	/s
gray (Gy)	absorbed dose	J/kg
sievert (Sv)	dose equivalent	Gy·(multiplier)
katal (kat)	catalytic activity	mol/s

Number System

- There are two numeral systems in vogue, namely,
    1. The Arabic system
    2. The Roman system

Arabic Numerals

- The numerals which are now universally used in all our calculations are known as Hindu Arabic numerals.

Invention of Zero and The Hindu Arabic Numbers

- The Arabic numerals are said to have been invented by ancient Hindu mathematicians from whom the system was adopted by the Arabs. The Arabic system of numerals was used as early as fifth or sixth century before the birth of Christ BC. However, at the time zero was not used with these numbers.
- From the Arabs the system reached Europe to replace the Roman system around the 10th century where they were named Arabic numerals.
- The zero was also invented by the Hindus sometime around AD 876 Zero was indicated by a small circle which was called 'Shunya', the Sanskrit word for 'vacant'.
- The Arabic system of numerals was popularized by an Italian, Leonardo Fibonacci (about 1170–1240) who advocated its use in his book Book of the Abacus published in 1202.
- The word Digit used in reference to numbers is derived.
- from the Latin word digitus which means finger because most of the counting was done on fingers at that time.

Invention of the Decimal System

- The decimal system is also of Indian origin and can be traced in the scriptures (Yajurveda 1000 BC). It was however, popularized by a Flemish mathematician named Simon Stevin (1548–1620) in his book 'De Thiende' (The Tenth) published in 1585. Before this invention numbers less than one were represented as fractions.

Roman Numerals

- The Roman numerals were used by ancient Romans almost 2000 years ago. In this system letters of the English alphabet are converted into numbers and consists of seven basic symbols. They are,

  1. I   2. V   3. X   4. L   5. C   6. D   and   7. M

- The numbers represented are 1, 5 and multiples of 5 and 10. There is no zero in this system. The system works on the following rules:
  — Repeating a letter repeats its value: XX = 20 (that is, 10 + 10)
  — A letter placed after one of the greater value adds thereto: VI = 5 + 1 = 6
  — A letter placed before another of greater value subtracts therefrom: 4 = IV (1 subtracted from V)
  — A dash over a number multiplies its value by thousand: $\bar{X} = 10 \times 1000 = 10000$

The system works as follows:
$$1 = 1$$
$$2 = II$$
$$3 = III$$

4	= IV	(One subtracted from X)
5	= V	
6	= VI	(V + 1)
7	= VII	(V + 1 + 1)
8	= VIII	(CV + 1 + 1 + 1)
9	= IX	(One subtracted from X)
10	= X	
19	= XIX	
27	= XXVII	
152	= CLII	

Mathematical Symbols

- *Equal to* (=): Robert Recorde invented the equal sign (=) in 1557. He suggested that two equal parallel lines were as equal as anything available.
- *Plus* (+) *and Minus* (–): The plus sign (+) was adopted from the Latin word *et* meaning *and*. The signs were used in the 15th century to indicate over weight or under weight of boxes of merchandise. For over weight they used the plus sign (+) and for under weight the minus sign (–).

The Prefixes of the SI

yotta	[Y]	1 000	000	000	000	000	000	000	000	= 10^24
zetta	[Z]	1 000	000	000	000	000	000	000		= 10^21
exa	[X]	1 000	000	000	000	000	000			= 10^18
peta	[P]	1 000	000	000	000	000	–10^15			
tera	[T]	1 000	000	000	000	= 10^12				
giga	[G]	1 000	000	000	*(a thousand millions = a billion)*					
mega	[M]	1 000	000		*(a million)*					
kilo	[K]	1 000			*(a thousand)*					
hecto	[H]	1 00			*(a hundred)*					
deca	[da]	1 0			*(tenth)*					
deci	[d]	0.1			*(a tenth)*					
centi	[c]	0.01			*(a hundred)*					
milli	[m]	0.001					*(a thousand)*			
micro	[μ]	0.000	001				*(a millionth)*			
nano	[n]	0.000	000	001			*(a thousand millionth)*			
pico	[P]	0.000	000	000	001		= 10^−12			
femto	[f]	0.000	000	000	000	001	= 10^−15			
atto	[a]	0.000	000	000	000	000	001	= 10^−18		
zepto	[z]	0 000	000	000	000	000	000	001		= 10^−21
yocto	[y]	0.000	000	000	000	000	000	000	001	= 10^−24

IMPORTANT LISTS

Table 9.4   Various Sciences

Acoustics	The study of sound and sound waves
Aerodynamics	The study of forces acting upon bodies in motion in the air (for example, aircraft, missiles, etc.)
Aeronautics	Concerned with all activities of aerial locomotion (art of flying)
Agronomy	The science of soil management and the production of field crops
Agrostology	The study of grasses
Anatomy	The science of the structure of the animal/human body learnt by dissection.
Anesthesiology	A branch of medicine concerned with administration of anesthetics and the condition of the patient while under anesthesia
Anthropology	The study of the origin and physical and cultural development of mankind
Archaeology	A scientific study of the material remains of the past as evidence of man's life, culture and history
Astronautics	A science dealing with space travel and space vehicles
Astrophysics	A branch of astronomy dealing with the physical nature of heavenly bodies
Astronomy	The science of heavenly bodies (planets)
Astrogeology	The study of structures and formation of rocks and minerals on other planets
Bacteriology	A branch of microbiology dealing with bacteria
Biology	The science of living organisms; subdivided into Botany and Zoology
Biophysics	The physics of the vital processes of living organisms
Botany	The science of the plant kingdom
Bryology	The study of mosses
Cardiology	A branch of medicine dealing with heart
Carpology	The study of fruits and seeds
Ceramics	The art of making objects from clay
Cetology	The study of acquatic mammals, especially whales
Chemistry	The study of elements, their behaviour and laws of their combination, etc.
Chorology	The study of geographical areas; plants and animal distribution
Cosmetology	The study of cosmetics and their use
Cosmology	The study of the universe—its origin, nature, structure and evolution
Craniology	The study of skulls (not to be confused with phrenology which is not a science)
Cryogenics	Concerned with the production, control and application of extremely low temperatures
Cytology	A branch of biology dealing with structure and function of cells
Cytopathology	The study of diseased cells
Dactylology	The study of fingerprints
Dermatology	A branch of medicine dealing with skin
Dietetics	The science of diet and nutrition
Ecology	The study of relationship between organisms and their environment
Entomology	Deals with study of insects
Endocrinology	The study of the body's hormone secreting glands (endocrine glands)
Etymology	A study of the origin and history of words
Genetics	A branch of biology dealing with heredity and the laws that govern it

Geology	A study of the chemical composition of the earth's crust
Gerontology	A branch of medicine studying the ageing process, problems and diseases
Gynecology	A branch of medicine dealing with female diseases of the reproductive system
Hematology	A branch of medicine studying blood and its disorders
Hematology	A branch of medicine dealing with the liver
Histology	The study of tissues
Horticulture	A branch of agricultural science dealing with flowers, fruits, vegetables, etc.
Hydrology	The science of water with reference to its occurrence and properties in the hydrosphere and atmosphere
Hygiene	A branch of medicine dealing with health and its preservation
Immunology	A branch of medicine dealing with the immune system of the body
Lithology	The study of the characteristics of rocks
Morphology	A biological study of external form and structure of living organisms and their parts
Mycology	Concerned with fungi and fungal diseases
Nephrology	A branch of medicine dealing with kidneys
Neuropathology	A branch of medicine dealing with changes produced by diseases in the nervous system
Obstetrics	A branch of medicine dealing with pregnancy, labour and child birth
Oncology	A branch of medicine dealing with tumours
Ophthalmology	A branch of medicine dealing with eyes and related diseases
Orology	The study of mountains
Ornithology	The science of birds
Orthopedics	A branch of medicine dealing with diagnosis and treatment of diseases of the skeletal system (bones)
Osteology	A study of bones
Pediatrics	A branch of medicine dealing with child diseases (infants)
Paleontology	The study of fossils and ancient life-forms
Parasitology	The science of parasites, especially those causing diseases
Pathology	A branch of medicine that deals with etiologies, mechanisms and manifestation of diseases
Pharmacology	A branch of medicine dealing with drugs, their chemistry, effects on body, etc.
Physiology	A study of the life processes of various organs of living organisms
Psychiatry	The study and treatment of mental and emotional disorders
Radiology	A branch of medical science dealing with the use of x-rays for diagnosis and treatment
Semiology	The science dealing with signs, sign language or system of signalling
Seismology	The study of earthquakes and related phenomena
Theology	The study of religions
Toxicology	A branch of pharmacology dealing with poisons and other toxic substances
Urology	The study of the physiology and pathology of the urogenital tract
Virology	The science that deals with viruses
Zoology	A branch of biology that deals with animal life
Zymology	A study that deals with the process of fermentation

Table 9.5   Scientific Instruments

Name of Instrument	Use
Altimeter	Measures altitude (used in aircraft)
Ammeter	Measures strength of electric current in a circuit
Anemometer	Measures force and velocity of wind and determines its direction
Audiometer	Measures intensity of sound
Barometer	Measures atmospheric pressure
Bolometer	Measures heat radiation
Calipers	Measure inner and outer diameters of solids
Calorimeter	Measures quantities of heat
Cardiogram (ECG)	Traces movements of the heart; recorded on a cardiograph
Chronometer	Determines longitude at sea; used for measuring time
Cytometer	Measures very low temperatures, usually below 0°C
Dynamo	Converts mechanical energy into electrical energy
Dynamometer	Measures electrical power
Electroencephalograph (EEC)	Records and interprets the electrical waves of the brain recorded on electroencephalograms
Electrometer	Measures very small, potential difference in electric current
Electroscope	Detects presence of an electric current
Endoscope	Examines internal organs of the body
Fathometer	Measures depth of the ocean
Flux meter	Measures magnetic flux
Galvanometer	Measures and detect small currents
Hydrometer	Measures the relative density of liquids
Hygrometer	Measures level of humidity
Hydrophone	Measures sound under water
Kymograph	Graphically records physiological movements (for example, blood pressure/heartbeat)
Lactometer	Measures the relative density of milk to determine purity (fat content)
Manometer	Measures the pressure of gases
Microphone	Converts sound waves into electrical signals
Microscope	To obtain a magnified view of small objects
Ohmmeter	Measures electrical resistance in ohms
Odometer	Measures the frequency of electromagnetic waves
Periscope	To view objects above sea level (used in submarines)
Polygraph	Instrument that simultaneously records changes in physiological processes such as heartbeat, blood pressure and respiration—used as a lie detector
Pyrometer	Measures very high temperature
Quadrant	Measures altitudes and angles in navigation and astronomy
Radar	Detects the direction and range of an approaching aeroplane by means of radiowaves (Radio, Angle, Detection and Range)
Refract meter	Measures refractive indices
Resistance Thermometer	An accurate type of thermometer in which temperature is measured by determining the electrical resistance of a coil of thin wire

(*Continued*)

Name of Instrument	Use
Salinometer	Determines salinity of solutions
Sextant	Used by navigators to find the latitude of a place by measuring the elevation above the horizon of the sun or another star—also measures the height of distant objects
Sphygmomanometer	Measures blood pressure
Stereoscope	Used to view two-dimensional pictures
Stethoscope	Used by doctors to hear and analyze heart and lung sounds
Stroboscope	Used to view rapidly moving objects
Tacheometer	Determines speed, especially the rotational speed of a shaft (used in motor vehicles, aeroplanes and motor-boats)
Tacheometer	Used to measure distances, elevations and bearings during survey
Telescope	Used to view distant objects in space
Theodolite	Measures horizontal and vertical angles
Tonometer	Measures the pitch of sound
Transponder	Used to receive a signal and transmit a reply immediately
Udometer	Rain gauge
Viscometer	Measures the viscosity of liquids
Voltmeter	Used to measure potential difference between two points
Wattmeter	Measures the power of an electric circuit
Wave meter	Measures the wavelength of a radiowave

Table 9.6   Scientific Inventions and Discoveries

Invention	Inventor(s)	Country	Year
Adding Machine	Pascal	France	1642
Airplane	Wright brothers	US	1903
Ballpoint Pen	C. Biro	Hungary	1888
Barometer	E. Torricelli	Italy	1643
Bicycle	K. Macmillan	Scotland	1839
Centigrade Scale	A. Celsius	France	1742
Cinematograph	Thomas Alva Edison	US	1891
Computer	Charles Babbage	Britain	1834
Cine Camera	Friese-Greene	Britain	1889
Cinema	A. L. and J. L. Lumiere	France	1895
Clock (mechanical)	Hsing and Ling-Tsan	China	1725
Clock (pendulum)	C. Hugyens	The Netherlands	1657
Diesel Engine	Rudolf Diesel	Germany	1892
Dynamite	Alfred Nobel	Sweden	1867
Dynamo	Michael Faraday	England	1831
Electric Iron	H. W. Seeley	US	1882
Electric Lamp	Thomas Alva Edison	US	1879

(Continued)

Invention	Inventor(s)	Country	Year
Electromagnet	W. Sturgeon	England	1823
Film (with sound)	Dr Lee de Forest	US	1923
Fountain Pen	LE Waterman	US	1884
Gas Lighting	William Murdoch	Scotland	1792
Gramophone	Thomas Alva Edison	US	1878
Jet Engine	Sir Frank Whittle	England	1937
Lift	E. G. Otis	US	1852
Locomotive	Richard Trevithick	England	1804
Machine Gun	Richard Gatling	US	1861
Match (safety)	J. E. Lundstrom	Sweden	1855
Microphone	Charles Wheatstone	England	1827
Microscope (compound)	Z. Janssen	The Netherlands	1590
Motor Car (petrol)	Karl Benz	Germany	1885
Motorcycle (tricycle)	Edward Butler	England	1884
Neon-Lamp	G. Claude	France	1910
Nylon	Dr W. H. Carothers	US	1937
Parachute	Louis Lenormand	France	1783
Photography (paper)	W. H. Fox Talbot	England	1841
Pneumatic Bicycle Tyre	J. B. Dunlop	Scotland	1888
Printing Press	J. Gutenberg	Germany	1450
Radar	Dr A. H. Taylor and L. C. Young	US	1922
Radium	Marie and Pierre Curie	France	1898
Rayon	Viscose Co.	US	1910
Razor (safety)	K. C. Gillette	US	1901
Razor (electric)	Col. J. Schick	US	1931
Refrigerator	J. Harrison and A. Catlin	Australia, US	1851
Revolver	Samuel Colt	US	1835
Rubber (vulcanized)	Charles Goodyear	US	1839
Rubber (waterproof)	Charles Macintosh	Scotland	1823
Safety Lamp	Sir Humphry Davy	England	1816
Safety Pin	W. Hunt	US	1849
Sewing Machine	B. Thimmonnier	France	1830
Scooter	G. Bradshaw	England	1919
Ship(steam)	J. C. Perier	France	1775
Ship (turbine)	Sir Charles Parsons	England	1894
Shorthand (modern)	Sir Isaac Pitman	England	1837
Spinning Frame	Sir Richard Arkwright	England	1769
Steam Engine (piston)	Thomas Newcomen	England	1705
Steam Engine	James Watt	Scotland	1782
Stainless Steel	Harry Brearley	England	1913
Submarine	D. Bushnell	US	1776

(Continued)

Invention	Inventor(s)	Country	Year
Tank	Sir Ernest Swington	England	1914
Telegraph Code	Samuel F. B. Morse	US	1837
Telephone	Alexander Graham Bell	US	1876
Telescope	Hans Lippershey	The Netherlands	1608
Television (successful demonstration)	John Logie Baird	Scotland	1926
Terylene	J. Whinfield and J. Dickson	England	1941
Thermometer	Galileo Galilei	Italy	1593
Tractor	Benjamin Holt	US	1900
Transistor	Bardeen, Shockley and Brattain	US	1947
Typewriter	C. Sholes	US	1867
Radio Valve	Sir J. A. Fleming	Britain	1904
Watch	A. L. Breguet	France	1791
X-ray	Wilhelm Roentgen	Germany	1895
Zip Fastener	W. L. Judson	US	1891

Table 9.7   Medical Discoveries

Discovery	Made by	Country	Year
Antibiotic(Penicillin)	Alexander Fleming	Scotland	1928
Antiseptic	Joseph Lister	Scotland	1867
Aspirin	Dr Felix Hoffmann	Germany	1899
Blood Circulation	William Harvey	Britain	1628
Blood Group	K. Landsteiner	Austria	1900–1902
Blood Transfusion	Jean-Baptiste Denys	France	1625
Cholera and TB Germs	Robert Koch	Germany	1883
Diphtheria Germs	Klebs and Loffler	Germany	1883–84
Electro cardiogram (ECG)	William Einthoven	Dutch	1903
Heart-Lung machine	John Heynsham Gibbon	US	1953
Hypodermic Syringe	Alexander Wood	Britain	1853
Heart Transplant	Christian Barnard	South Africa	1967
Kidney Machine	W. J. Kolf	The Netherlands	1944
Malaria Germs	A. Laveran	France	1880
Organ Transplant	John P. Merril	USA	1953
Scan (CAT)	Godfrey Hounsfield	England	1973
Sphygomomanometer	Scipione Riva-Rocci	Italy	1896
Stethoscope	Rene Laennec	France	1819
Thermometer (Clinical)	Sir Thomas Allbutt	England	1867
Ultrasound	Ian Donald	Ireland	1950
X-ray	W. Roentgen	Germany	1895

Table 9.8 Important Vaccines

Vaccine	Developed by	Country	Year
Small Pox	Edward Jenner	England	1796
Cholera	Louis Pasteur	France	1880
Diphtheria and Tetanus	Emil Adolf Von Behring and Shibasaburo Kitasato	Germany/Japan	1891
TB Vaccine	Albert Calmette and Camille Guerin	France	1922
Polio Vaccine	Jonas E. Salk	US	1952
Oral Polio Vaccine	Albert Bruce Sabin	US	1955
Measles Vaccine	John F. Enders, Thomas peeble	US	1953
Rabies Vaccine	Louis Pasteur	France	1885
Typhus Vaccine	Charles Nicolle	France	1909

PHYSICS

FUNDAMENTALS OF PHYSICS

Mechanics

Matter

- Anything that occupies space and possesses mass (weight) is called matter. Matter or material substances consist of atoms and molecules. Atoms combine to form molecules of a substance.
- Matter can be perceived by one or more senses and possesses mass. Matter can neither be created nor destroyed; it can only be changed from one form to another.
- Matter exists in three states, solid, liquid and gas, each of which can change into one of the other according to changes in temperature and pressure.
- There is also a fourth state of matter, the ionized state called plasma. Though this state is not common on the earth, the sun and stars are in this state.
- Matter can be classified as shown in the figure.
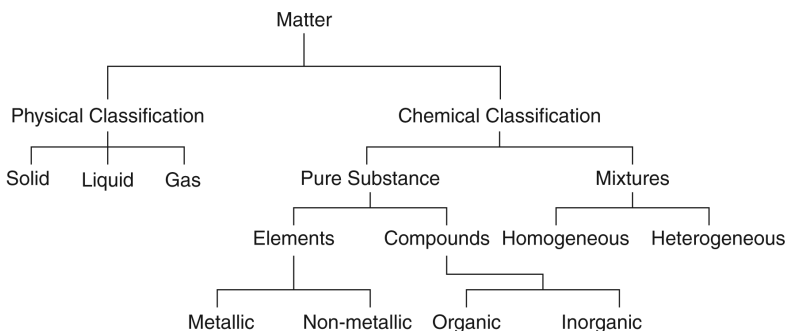
Mass

- The SI unit of mass is kilogram. It is the measure of inertia possessed by a piece of matter, that is, quantity of matter in a body.
- Mass is not the same as weight, it is the force with which the earth attracts a body. Mass remains constant while the weight varies from place to place and is zero at the centre of the earth.

Weight

- Weight is the product of acceleration due to gravity and mass of the body. On the moon, a body will weigh much less than on the earth because the moon's surface gravity is only 1/6th of that of the earth.
- A pair of scales measure mass while a spring balance measures weight. Mass is measured in grams whereas weight is measured in dynes.

Density

- Density is mass per unit volume of a substance and is expressed in the S.I. unit as kg/m^3. Density of water is 1000 kg/m^3. Densities are expressed as Relative density, that is, density relative to water and sometimes called specific gravity.
- Ice floats on water because its weight is less than the weight of an equal volume of water.
- The Lactometer used to test purity (density) of milk is based on the principle that the greater density of a liquid, the lesser will be the immersion of an object.

Force

- That which makes a body change its state of rest or uniform motion in a straight line it causes objects to remain stationary to continue moving steadily or to move faster.
- *Centrifugal Force*: The force which appears to act on an object moving in a circular path. It is directed away from the centre around which the body is moving.
- *It acts outward on a moving object*: The force acting on a body constrained to move in a curved path. It acts inwards on an object moving in a circular path. It is directed towards the centre around which the body is moving.
    - *Illustration*: When a piece of stone tied to a thread is whirled you have to pull the thread inwards. This pull on the stone is called centripetal force and an equal and opposite force is exerted by the stone on the hand which is called centrifugal force.
    - *Application*:
        —Curved rail tracks or curved roads are banked or raised on one side so that a fast moving train or vehicle leans inwards, thus providing required centripetal force to enable it to move round the curve.
        —A cyclist while turning round a curved road leans inwards so as to provide himself with the required centripetal force which enables him to take the turn.

Friction

- Friction is a force that resists the movement of one surface over another.
- Friction is very necessary because without it brakes would not work when applied; belts would not drive the wheels of a machinery, etc.

- Friction of moving parts causes wastage of energy and in such cases wheels, ball-bearings and lubricants, etc., are used to reduce friction.

Energy

- The capacity of doing work is called energy. It can exist in a number of forms. For example, mechanical, electrical, potential, chemical, kinetic, nuclear, etc.
- The energy possessed by a body owing to its position is called potential energy. For example, a wound up spring, a stretched rubber band, a bent bow or a reservoir of water.
- The energy possessed by a body due to its motion is called kinetic energy. For example, a bullet shot from a gun or water flowing in downstream.
- Energy is never lost or gained but only changes from one form to another.
- Energy can neither be created not be destroyed. This is known as Law of Conservation of Energy.

Surface Tension

- Surface tension is known to be due to intermolecular attraction in the liquid surface and these forces produce a skin effect on the surface. It is surface tension which causes water to climb up a narrow capillary. This phenomenon is known as capillary action or Capillarity.
- Rain drops are spherical due to surface tension. A needle may be made to float on water. This phenomenon is applicable to the capillary action of a blotting paper absorbing ink.
- The surface tension of a liquid decreases with increase in temperature and vanishes at the critical temperature.

Motion and Work

- *Motion*: Almost every event that takes place in the universe involves movement or motion of one kind or the other. Motion is the change of position of a body with respect to its surroundings.
- *Speed*: The rate of change of motion.
- *Velocity*: Commonly known as speed is the rate of change of motion in a particular direction and expressed in metres per second.
- *Acceleration*: The rate of change in velocity of a moving body expressed in metres per second square. Negative acceleration is called retardation.

Work

- When a force creates motion in a body it implies work has been done, that is, work is done by a moving force.
- It is equal to the product of the force and the distance it moves along its line of action.
- Power is the rate of doing work and Horsepower (hp) and watts are the units of power.

Elasticity

- A body that returns to its original shape and size on the removal of the deforming force after having deformed within elastic limit is called elastic.
- Contrary to the conception of elasticity in daily life, in physics it stands for opposition to change. Hence, the more rigid a body, the more elastic it is said to be. that is, why steel is more elastic than rubber.

Heat

- *Heat*: It is a form of energy which (i) raises temperature of matter; (ii) increases volume of matter and (iii) changes state and physical properties of matter and brings about chemical change
- *Latent Heat*: The heat required to change the state of a substance from solid to liquid or from liquid to gas without change in temperature.
- *Temperature*: The degree of heat of a body/substance which can be measured by various scales like Centigrade, Fahrenheit or Reaumur.

Evaporation

- Is the change of state from liquid to vapour and thereby results in cooling. Rate of evaporation is affected by wind, heat and surface area.
- *Illustration*: When alcohol is applied on the forehead of a person having high temperature, the temperature reduces because alcohol while evaporating draws the heat out of the body.

Transfer of Heat

- *Conductivity*: A property enjoyed by metals. The process of heat transfers without visible motion of the atoms or molecules from a region of higher temperature to that of lower temperature. It is the transmission of heat from molecule to molecule. Among metals, silver is the best conductor followed by copper.
- *Why are Metals Good Conductors?* In metals there are a large number of free electrons which transport major amount of heat and move from hotter part of the solid to the colder part transporting heat energy.
- *Illustration*: In winter a steel chair appears colder than a wooden chair because steel being a good conductor of heat when touched absorbs heat from the hand rapidly giving the feeling of coldness.
- Metals are good conductors while gas and air are poor conductors. Hence,
  - —Two thin blankets are warmer as they enclose air in between a new quilt is warmer than an old one because it encloses more air.
  - —Eskimos make double-walled ice houses and the air in between two ice walls does not allow heat to pass.
  - —A thermos flask is made of double-walled glass bottles.

Radiation

- Transmission of heat from one point to another without heating the medium, that is, transmission of heat by means of waves without the help of a medium.
- Polished surfaces are the best radiators of heat. Therefore
  - —The double-walled glass bottles used in a thermos flask have a silver coating— outside the inner wall and inside the outer wall.
  - —White clothes are preferred in summer. On the other hand, radiation is greater from black surfaces which are very good absorbers of heat.
  - —It is warmer on a cloudy night because the heat radiated by earth is obstructed and sent back to the atmosphere.

Convection

- It transmits the heat of heated matter, that is, by actual motion of the heated particles of a liquid or gas.
- Ventilators in a room are on the top portion of the walls because air after being heated rises upwards and passes through the ventilators and cold-air enters the room through doors and windows which are at lower levels.

Laws of Thermodynamics

- These laws show how heat energy can be passed from one body to another.
  1. *Zeroth Law*: No heat will flow between two bodies that are of the same temperature. In other words, a body's temperature does not depend on the material involved.
  2. *First Law*: Internal energy can be added to a body either by heating or doing work on it and conversely, if work is extracted from the body, its internal energy and hence its temperature will fall unless an equivalent amount of heat is supplied from outside.
  3. *Second Law*: Heat will not pass spontaneously from a cold body to a hotter body.
  4. *Third Law*: It is impossible to cool a body right down to absolute zero, that is, below $-273.15°C$.

Light

- Light is an electromagnetic radiation that has a wavelength in about the range of 380–780 nm and that may be perceived by the normal unaided human eye.
- It is a form of energy which travels in straight lines and causes the sensation of vision.
- If we interpose a small obstacle between the object and our eyes we are unable to see it. Formation of shadows is another proof of the fact that light travels in straight line.

Composition

- In 1666, Isaac Newton passed a beam of light through a prism and found that it has seven colours. They are
  1. Violet
  2. Indigo
  3. Blue
  4. Green
  5. Yellow
  6. Orange
  7. Red
- The band of colours so formed is called a spectrum in which violet and red bands form the extremes.
- *Colour Visualization*: Different objects have different colours—they absorb or reflect different parts of the spectrum. Thus, a blue object absorbs the red, yellow and green parts of white light and reflects only the colour blue.
- The colour of an object depends upon the nature of light falling on it and also on the constituent colour of the incident light reflected by it.

- If all the colours are absorbed the object appears black. If all the colour constituents of light are reflected, it appears white.
    —A stick immersed in water appears bent.
    —A pond looks shallower than it really is as the rays start from rarer to denser medium, the rays bend towards the normal.
    —A diamond sparkles because when light enters a piece of diamond and the cut of its faces the light is totally refracted to various faces of the diamond, as diamond has a high refractive index.
    —A person looks shorter when he is standing in water and if we look at him from a side.
    —A stone lying at the bottom of pond appears to be at a higher point than it actually is.
- Thus, we see objects because of the light they reflect. Most of the objects around us reflect only part of the light that is, incident upon them and it is the reflected part which gives the object its colour.
- When a rose is viewed in white light, it appears red and the leaves appear green, because the petals reflect the red part and the leaves green part. The remaining colours are absorbed.
- When the same rose is viewed in green light, the petals will appear black and the leaves green.
- In blue or yellow light both the petals and leaves will appear black.
- A white paper appears white because it reflects all the colours of light, whereas a print on it appears black because it absorbs all the colours.
- In red light green grass will appear black because it absorbs all colours except green and it would absorb the red rays of light falling on it.

Phenomenon of Light

- *Reflection*: It is the 'bouncing back' of light rays. The simple law of reflection is that the angle between the incoming ray and the perpendicular to the surface is equal to the angle between the reflected ray and the same perpendicular.
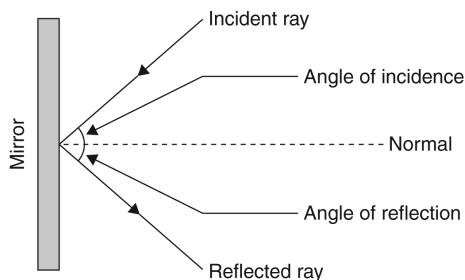
- *Refraction*: It is the sudden change of direction of light when passing from one transparent substance into another. For example, a ray of light passing from air into water bends towards the perpendicular.
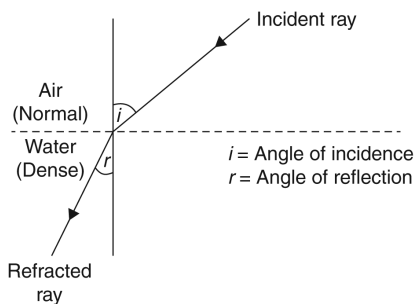
- The reason why stone at the bottom of the pond looks to be little raised up is because of refraction of ray of light as shown below.
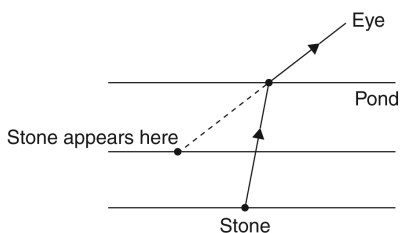
- *Diffraction*: Diffraction is the spreading out of waves of light as it passes through a narrow aperture because light is a wave of motion. Hence, light rays emerging from a cinema machine spread wide on the screen.
- *Dispersion*: When white light is passed through glass prism, it splits into the colours of the spectrum. This is because each colour has its own wavelength which determines the angle at which light is refracted. Red and yellow waves are the longest and hence are the least refracted. Blue and violet rays are shortest and are the most refracted (See illustration).
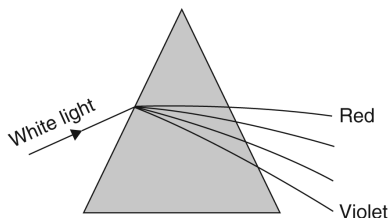
- *Rainbow*: The most spectacular illustration of dispersion is the rainbow. When the sun shines after a shower, a rainbow is seen in the sky opposite the sun. The colours of the rainbow are due to the dispersion of sunlight by water droplets suspended in the air. Another name for the phenomena is Total Internal Reflection.
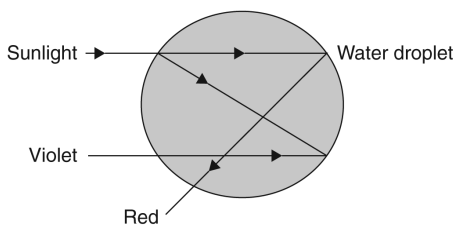
Total Internal Reflection in a Water droplet.

- *Scattering*: A rough surface scatters light because each part of the surface reflects the light at different angles which is known as scattering of light.
- *Why Is the Sky Blue*? Violet and blue light have short wavelength and are scattered by the atmosphere ten times more than red light waves. While the red light with long wave length goes almost straight through the atmosphere, blue and violet are scattered by particles in the atmosphere. Thus we see a blue sky.
- *Absorption*: Some surfaces absorb more of the light falling on them than others. If light of all colours is absorbed, the eyes see black. A black surface absorbs more light than a white surface.

Mirrors

- *Plane Mirror*: Mirrors work on the principle of reflection of light. When a man stands in front of mirror, light from all parts of the body, light which is reflected from the body in the presence of a source of light is reflected from the mirror back to the eyes and a virtual image appears to be formed behind the mirror.
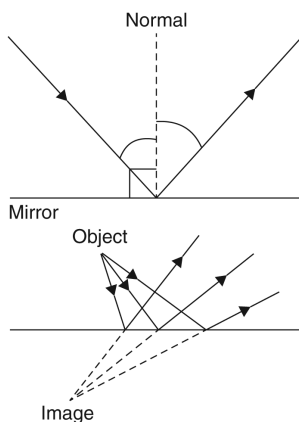
- *Some Important Definitions*
    —*Real Image*: It is one through which the rays of light actually pass and which can be formed on a screen.

—*Virtual Image*: It is one through which the rays do not actually pass although they appear to come from it.

- A consequence of the laws of reflection is that, for a real object, the image produced by a plane mirror is virtual and its distance behind the mirror is the same as the object's distance in front of it.

  —*Uses of Plane Mirrors*: Optical level, sextant, kaleidoscope, periscope, telescope flat, dental mirror.

  —*Curved Mirrors*: There are two types of curved mirrors used for specific purposes, namely, concave and convex.

  — *Concave Mirrors*: In concave mirrors the light rays are reflected so as to converge to a point called the focus of the mirror. A concave mirror can therefore, concentrate sun's radiation falling on it at one point. Hence, a concave mirror can be used as a burning glass and is used in solar cookers.
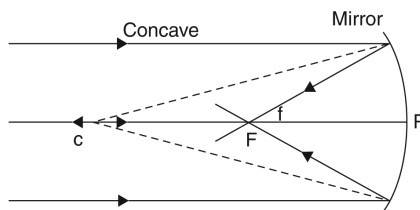
  — *Convex Mirrors*: The virtual images produced by convex mirror are erect and smaller than the object. The convex mirror is therefore used as a rear-view mirror in vehicles as it has the advantage of a wide field of view.
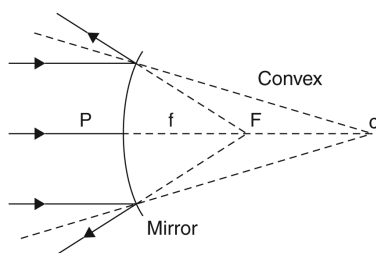
  — *Principal Axis*: It is a line through the centre of the mirror which passes through the centre of curvature.
  — *Pole of a Mirror (P)*: It is where the principal axis meets the mirror.
  — *Principal Focus (F)*: It is the point where parallel light close to the axis converges to a focus.

— *Focal Length (f)*: It is the distance from the principal focus to the pole of the mirror.
— *Centre of Curvature (c)*: Centre of curvature is centre of sphere of which mirror is apart and is calculated as twice the focal length.
— *Radius of Curvature*: It is the distance of the centre of curvature from the pole of the mirror.
— *Paraxial Ray*: It is one that lies close to the principal axis and may make a small angle with it.
— *Uses of Concave Mirrors*: Reflecting telescope, dental mirror, headlamp reflectors, shaving and make-up mirrors.
— *Uses of Convex Mirrors*: Safety viewers at dangerous corners, anti-shop-lifting devices, car wing mirrors.

Lenses

- Lenses are used in all optical instruments like microscopes, telescopes, cameras, projectors, etc. Lenses are of the two types:
  1. *Convex or Converging Lens*: If a parallel beam of light is incident on a convex lens, all rays, after passing the lens, converge on a point called the principal focus. Convex lens surfaces have a real and therefore positive radius of curvature. It has a real and positive focal length.
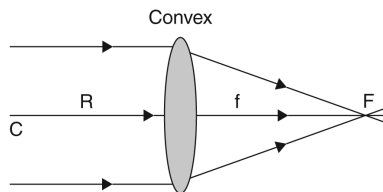
     — *Uses of Convex Lenses*: Magnifying glasses, eye (variable focal length), glasses to correct for long sight, microscope, telescope objective, camera (single lens system), Projectors.
  2. *Concave or Diverging Lens*: In case of a concave lens, the rays of light spread out after passing through the lens. Concave lens su faces have a virtual and therefore, negative radius of curvature. It has a real and positive focal length.
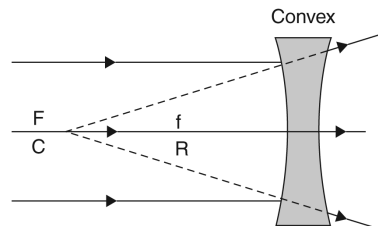
     — *Uses of Concave Lenses*: Wide-angle spyhole in doors, glasses to correct for short sight, wide-angle lens on coach rear window, eye lens in Galilean telescope.

— *Power of the Lens*: The strength of a lens is described in terms of either its focal length or its power. The power of a lens is defined as:

$$\text{Power of the lens} = \frac{1}{\text{focal lenght in metres}}$$

- Convex lenses have positive power while concave lenses have negative powers. The power of a meniscus lens depends on which face of the lens is the more sharply curved.

Sound

- Source of sound is always the vibrations of an object. It is transmitted in the form of waves with alternating increase and decrease in pressure.
- *Characteristics*: (i) Pitch or frequency; (ii) Loudness or intensity and (iii) Quality. On the basis of these characteristics sound can be recognized as we recognize a person from his voice.
- *Pitch*: Refers to the rate of vibration of sound and is measured in Hertz (Hz).
- *Loudness*: It is measured in decibels (db), a unit based on the weakest sound that can be detected by the human ear.

Phenomena Related to Sound

- *Diffraction*: Like light, sound waves spread as they move past an obstacle or through a narrow aperture. If the aperture is small, the sound waves spread out in all directions. Hence, sound can be heard round the corners of a corridor.
- *Reflection*: Deflection of sound waves into new directions by a surface is known as 'reflection of sound'.
- *Refraction*: is the change of direction of a sound wave on passing from one medium to another.
- *Echo*: Repetition of sound by reflection is known as echo.
- *Oscillation*: The term used to describe anything that vibrates.

Sound Waves and Music

- Sound is generated by a vibrating system setting up waves in the surrounding air.
- Musical sounds are produced by a vibration with a definite pitch often produced by a vibrating string (for example, sitar) or a vibrating column of air in a tube (for example, sehnai) which does not progress from one point to another but causes the string or column of air to vibrate as a whole with its characteristic frequency.

Ultrasonic and Supersonic Sounds

- Sounds of frequency higher than 20,000 Hz are known as *ultrasonic* and are inaudible.
- The human ear is normally sensitive to sounds whose frequencies are between 20 Hz and 20,000 Hz.
- The speed greater than the speed of sound is known as *supersonic*.
- The sound waves of frequency lower than 16 Hz are called *infrasonic*.

How Do Bats Fly at Night?

- Bats can fly in the dark because ultrasonic waves produced by them during flying are reflected back to them from the obstacles in their way and hence they can fly without difficulty.

Speed of Sound in Different Media

—Glass		5,000–6,000 m/sec
—Steel		5,000 m/sec
—Wood		3,847 m/sec
—Bricks		3,542 m/sec
—Ice-cold water		1,505 m/sec
—Air		331 m/sec

Speed of Sound

- The speed of sound depends upon the nature of the carrier media.
- In general the speed of sound refers to the speed at which sound travels in air at sea level.
- In dry air at 0°C the speed of sound is about 331 m/sec or 750 miles/h.
- The presence of water vapours in the air increases the speed of sound slightly.

Electricity

- It is a form of energy which is made from the charges that make up the atom— negatively-charged electrons and positively charged protons.

Electric Current

- Electric current is the rate of flow of an electrical charge. It flows from positive to negative.
- Batteries supply direct current (DC) and the mains supply alternating current (AC).
- The radio and TV require DC and this is obtained from AC mains by means of a rectifier which converts AC into DC.

Heating Effect of Electricity

- When electricity is passed through thin metallic wires of high resistance, they become hot and glow. Metals like platinum or tungsten offer resistance to the passage of electric current. They become white, hot and glow and light is produced by the electric current. The filament of electric bulbs and heater elements is made of such metals which have high resistance.

Fuse Wire

- Fuse wire is made of material having low melting point. If it is inserted in an electric circuit, it will not allow excess electricity to flow through it. When current exceeds its limit, the fuse wire gets heated, melts and breaks the circuit.

Magnetic Effect of Electricity

- It is a phenomenon by which magnetic field is produced by an electric current. A linear current carrying conductor produces a circular magnetic field and a circular current (in a coil) produces a straight magnetic field at the centre of the circular coil.

Types of Electricity

- *Static Current*: It is the electricity produced by friction or rubbing between two dissimilar objects.
- Depending on the nature of the objects, one acquire a positive charge and the other negative charge because of transfer of electrons. For example, when a glass rod is rubbed with a silk cloth, some electrons from the rod are transferred to the silk cloth. Thus, by losing electrons the glass rod becomes positively charged and by gaining the number of electrons the silk acquires an equal negative charge.
- Similarly by rubbing an ebonite comb on hair a magnetic property is produced which can attract small pieces of paper.
- *Current Electricity*: It is the electricity which brings light and power to our homes. It is of two types:
   1. Alternating Current (A.C.) which regularly reverses its direction around the circuit.
   2. Direct Current (D.C.) travels without reversing its direction.

Household Wiring System

- In household wiring systems, the various electrical devices are connected in parallel across the power line, which consists of a pair of conductors, one 'hot' and the other 'neutral'. An additional 'ground' wire is included for safety.
- The maximum permissible current in a circuit is determined by the size of the wires and the maximum temperature they can tolerate. Protection against excessive current and the resulting fire hazard is provided by fuses or circuit breaker.

Magnetism

Magnets

- It is a substance which has the property of attracting pieces of iron, cobalt and nickel and when freely suspended it points towards north and south.
- The attracting power of a magnet appears to be concentrated at definite regions called poles.
- When a magnet is broken into pieces, each piece becomes an independent magnet. Two poles of the magnet have equal strength. Like poles repel and unlike poles attract each other.

Types of Magnets

   1. *Artificial Magnets*: These magnets are created by artificial means.
   2. *Lodestones*: Iron ore (minor) which we know as magnetite (iron oxide) has magnetic properties of attracting iron, cobalt and nickel. These are called Lodestones.

Types of Magnetic Substances

1. *Ferro-Magnets*: These are special substances which are strongly magnetized by relatively weak magnetic fields. Iron, nickel and cobalt are the familiar examples of this class.

2. *Paramagnetic Substances*: These substances when placed in a strong magnetic field get magnetized in the same sense as the external field. Aluminium, chromium, copper sulphate and liquid oxygen are familiar examples.

3. *Diamagnetic Substances*: These substances when placed in a magnetic field get weakly magnetized in a sense opposite to the applied field. Examples are bismuth, atimony, gold, water, alcohol and hydrogen.

Magnetic Induction

- When a piece of soft iron or steel is brought close to strong bar magnet it is magnetized.
- When an electric current is passed through an insulated copper wire coil the steel or soft iron placed in the coil becomes a magnet.
- This is due to the magnetic field which is produced in the coil. The electric bell works on the above mentioned principle.

Magnetic Field of Earth

- Earth has its own magnetic field also known as geomagnetic field is similar to the field produced by a huge magnet at its centre. It is a fact of some historical importance because of the role of magnetic compass in explorations of the planet.
- The shape of the Earth's magnetic field resembles that of a bar magnet of length one-fifth of the Earth's diameter buried at its center.
- The South Pole of the Earth's magnet is in the geographical North because it attracts the North Pole of the suspended magnet and vice versa. Thus, there is a magnetic S-pole near the geographical North and a magnetic N-pole near the geographical South.
- The positions of the Earth's magnetic poles are not well defined on the globe; they are spread over an area.
- The axis of Earth's magnet and the geographical axis do no coincide. The axis of the Earth's magnetic field is inclined at an angle of about 15º with the geographical axis.
- Due to this a freely suspended magnet makes an angle of about 15º with the geographical axis and points only approximately in the North-South directions at a place. In other words, a freely suspended magnet does not show exact geographical South and North because the magnetic axis and geographical axis of the Earth do not coincide.
- *Cause of Earth's Magnetism*: It is now believed that the Earth's magnetism is due to the magnetic effect of current which is flowing in the liquid core at the centre of the Earth. Thus, the Earth is a huge electromagnet.
- *Elements of Earth's Magnetic Field*: To understand the Earth's magnetic field at any place, we should know the following two quantities or elements: (i) Declination and (ii) Angle of dip (or Inclination).
- It is well known that the axis of the magnetic field is tipped with respect to the rotation axis of the Earth.
- Thus, true north (defined by the direction to the north rotational pole) does not coincide with magnetic north (defined by the direction to the north magnetic pole) and compass directions must be corrected by fixed amounts at given points on the surface of the Earth to yield true directions.

- *Angle of Dip at the Poles*: The magnetic lines of force at the poles of Earth are vertical due to which the magnetic needle becomes vertical. The angle of dip at the magnetic poles of Earth is 90º.
- *Angle of Dip at the Equator*: The lines of force around the magnetic equator of the Earth are perfectly horizontal. So the magnetic needle will become horizontal there. Thus, the angle of dip at the magnetic equator of the Earth will be 0º. The angle of dip varies from place to place.

IMPORTANT LAWS OF PHYSICS

Archimedes' Principle

- States that when a body is partially or totally immersed in a fluid, it experiences an upward thrust equal to the weight of the fluid displaced by it, that is, its apparent loss of weight is equal to the weight of liquid displaced.
- The principle was discovered in 3rd century B.C. by the Greek mathematician, Archimedes.

Avagadro's Law

- Equal volumes of all gases under the same conditions of temperature and pressure contain equal number of molecules.
- It was an inspired guess in 1811 by the Italian Scientist Amedeos Avagadro that turned out to be correct.

Newton's Laws (1642–1727)

- *Law of Gravitation*: Objects attract each other with a force directly proportional to the product of the masses of the objects and inversely proportional to the square of the distance between them. Hence, for objects on or near the earth, the mass of the earth is very much greater than the object and so the gravitational force between them makes objects fall towards the earth. that is, why lead and feather fall at the same rate in a vacuum.
- *Newton's First Law of Motion*: A body continues in its state of rest or of uniform motion in a straight line except in so far as it be compelled by external impressed forces to change that state. It is also called Law of Inerta.
- *Newton's Second Law of Motion*: The rate of change of momentum is proportional to the impressed force and takes place in the direction of the straight line in which the force acts. In other words 'Force is equal to mass multiplied by acceleration'. It can also be represented as:

$$F = ma$$

Where, F = Force, m = Mass, a = Acceleration.
- *Newton's Third Law of Motion*: To every action there is an equal and opposite reaction. This is the principle behind the recoil felt on pulling the trigger of a gun.
- *Newton's Law of Cooling*: The rate at which a body cools or loses its heat to its surroundings is proportional to the excess of mean temperature of the body over that of the surroundings, provided this temperature excess is not too large.

Coulomb's Law (1738–1806)

- The force between the two electric charges reduces to a quarter of its former value when the distance between them is doubled.
- The SI unit of the electrical charge, coulomb is named after Charles Augustin de Coulomb who established the law.

Stefan's Law (1835–1883)

- The total energy radiated from a black body is equal to the fourth power of its absolute temperature.

Pascal's Law (1623–1662)

- When pressure is applied to a fluid, the pressure change is transmitted to every part of the fluid without loss.
- Hydraulic machines like the hydraulic press work on this principle.
- Atmospheric pressure decreases with increase in height.
- The SI unit of pressure, pascal is named after Pascal who established this law.

Hooke's Law (1635–1703)

- States that the extension of a spring is proportional to the tension stretching it. Doubling of the tension results in the doubling of the amount of stretch.

Lenz's Law (1805–1865)

- States that when an electric current is induced by a change in magnetic field, the induced current is always in such a direction that its magnetic field opposes the change of field which causes the induction.

Dalton's Law (1766–1844)

- States that the total pressure of a mixture of gases (or vapours) is equal to the sum of the partial pressures of its components, that is, the sum of the pressures that each component would exert if it were present alone and occupied the same volume as the mixture.
- In 1803, Dalton formulated his atomic theory stating that matter is made up of particles or atoms which are not subdivided during chemical change.
- It said that atoms of the same chemical element are similar and equal in weight, that atoms of different elements have different properties and different weights and that chemical compounds are formed when atoms of different elements combine in simple proportions.

Faraday's Laws (1791–1867)

- *Law of Electrolysis*: The amount of chemical change during electrolysis is proportional to the charge passed. The masses of substances liberated or deposited by the same quantity of electric charge are proportional to their chemical equivalents.
- *Law of Electromagnetic Induction*: An electromagnetic flux is induced in a conductor when the magnetic field surrounding it changes. The magnitude of the electromagnetic flux is proportional to the rate of the change of the field. The direction of the induced electromagnetic flux depends on the orientation of the field.

Ohm's Law (1787–1854)

- States that the amount of current flows in an electric circuit is governed by the voltage of the battery or dynamo which powers it.
- In other words, the current through a conductor is directly proportional to the potential difference across the conductor and inversely proportional to its resistance.
- The SI unit of electrical resistance, the ohm is named after George Simon Ohm, who established this law.

FREQUENTLY ASKED QUESTIONS

Q. Why does a balloon filled with hydrogen rise in the air?
  § Weight of hydrogen is less than the weight of air displaced by it. In balloons hydrogen is normally filled because it is lighter than air.

Q. Why do we lean forward while climbing a hill?
  § In order to keep the vertical line passing through our centre of gravity always between our feet, which is essential to attain equilibrium or stability.

Q. Eskimos live in double-walled ice houses. Why?
  § Because the air in between two ice walls does not allow heat to pass.

Q. Curved rail tracks or curved roads are banked or raised on one side. Why?
  § Because a fast moving train or vehicle leans inwards while taking turn and the banked or raised track provides required centripetal force to enable it to move round the curve.

Q. How do bats fly in dark?
  § When bats fly they produce ultrasonic sound waves which are reflected back to them from the obstacles in their way and hence they can fly without difficulty.

Q. Water pipes often burst at hill stations on cold frosty nights. Why?
  § The temperature may fall below 0°C during cold frosty nights which converts the water inside the pipes into ice, resulting in an increase in volume. This exerts great force on the pipes and as a result, they burst.

Q. Why does smoke curl up in the air?
  § Smoke contains hot gases which being lighter in weight, follows a curved path because of the eddy currents that are set up in the air.

Q. Why does an electric bulb explode when it is broken?
  § The bulb encompasses partial vacuum and as it breaks, air rushes in causing a small explosion.

Q. Why does a man fall forward when he jumps out of a running train or bus?
  § He is in motion while in the train or bus. When he jumps out, his feet comes to rest while touching the ground but his upper portion which is still in motion propels him forward.

Q. Why is one's breath visible in winter but not in summer?
  § In winter, water vapour contained in the breath condenses into small droplets which become visible but in summer they are quickly evaporated and not seen.

Q.   Why doesn't the electric filament in an electric bulb burn up?
  §   Firstly, because it is made of tungsten which has a very high melting point (3410°C) whereas the temperature of the filament required to glow is only 2700°C. Secondly, oxygen is absent since the bulb is filled with an inert gas which does not help in burning.

Q.   Why does blotting paper absorb ink?
  §   Blotting paper has fine pores which act like capillaries. When a portion of blotting paper is brought in contact with ink, ink enters the pores due to surface tension (capillary action of liquids) and is absorbed.

Q.   Why does a small ball of iron sink in water but a large ship float?
  §   The weight of water displaced by an iron ball is less than its own weight, whereas water displaced by the immersed portion of a ship is equal to its weight (Archimedes' Principle).

Q.   Why does ice float on water?
  §   The weight of the ice block is equal to the weight of the liquid displaced by the immersed portion of the ice.

Q.   A man with a load jumps from a high building. What will be the load experienced by him?
  §   Zero, because while falling, both the man and the load are falling at the same acceleration that is, acceleration due to gravity.

Q.   A piece of chalk when immersed in water, emits bubbles. Why?
  §   Chalk consists of pores forming capillaries. When it is immersed in water, the water begins to rise in the capillaries and air present there is expelled in the form of bubbles.

Q.   Why does a liquid remain hot or cold for a long time inside a thermos flask?
  §   The presence of air, a poor conductor of heat, between the double glass wall of a thermos flask, keeps the liquid hot or cold inside a flask for a long time.

Q.   Why does a ball bounce upon falling?
  §   When a ball falls, it is temporarily deformed. Because of elasticity, the ball tends to regain its original shape for which it presses the ground and bounces up (Newton's Third Law of Motion).

Q. Why is standing in boats or double decker buses not allowed, particularly in the upper deck of buses?
  §   On tilting the centre of gravity of the boat or bus is lowered and it is likely to overturn.

Q.   Why is it recommended to add salt to water while boiling dal?
  §   By addition of salt, the boiling point of water gets raised which helps in cooking the dal sooner.

Q.   Why is the boiling point of sea water more than that of pure water?
  §   Sea water contains salt and other impurities which cause an elevation in its boiling point.

Q. Why is it easier to spray water to which soap is added?
  § Addition of soap decreases the surface tension of water. The energy for spraying is directly proportional to surface tension.

Q. Which is more elastic, rubber or steel?
  § Steel is more elastic for the same stress produced compared with rubber.

Q. Why is the sky blue?
  § Violet and blue light have short waves which are scattered more than red light waves. While red light goes almost straight through the atmosphere, blue and violet light are scattered by particles in the atmosphere. Thus, we see a blue sky.

Q. Why does ink leak out of partially filled pen when taken to a higher altitude?
  § As we go up, the pressure and density of air goes on decreasing. A partially filled pen leaks when taken to a higher altitude because the pressure of air acting on the ink inside the tube of the pen is greater than the pressure of the air outside.

Q. On the moon, will the weight of a man be less or more than his weight on the earth?
  § The gravity of the moon is one-sixth that of the earth; hence the weight of a person on the surface of the moon will be one-sixth of his actual weight on earth.

Q. Why do some liquids burn while others do not?
  § A liquid burns if its molecules can combine with oxygen in the air with the production of heat. Hence, oil burns but water does not.

Q. Why can we see ourselves in a mirror?
  § We see objects when light rays from them reach our eyes. As mirrors have a shiny surface, the light rays are reflected back to us and enter our eyes.

Q. Why does a solid chunk of iron sink in water but float in mercury?
  § Because the density of iron is more than that of water but less than that of mercury.

Q. Why is a new quilt warmer than an old one?
  § In a new quilt the cotton is not compressed and as such it encloses more air which is bad conductor of heat. Therefore, it does not allow heat to pass.

Q. Why are white clothes more comfortable in summer than dark or black ones?
  § White clothes are good reflectors and bad absorbers of heat, whereas dark or black clothes are good absorbers of heat. Therefore, white clothes are more comfortable because they do not absorb heat from the sun rays.

Q. Why does a rose appear red and grass green in daylight?
  § Rose absorbs all the constituent colours of white light except red which is reflected to us. Similarly, grass absorbs all colours except green which is reflected to us.

Q. Why does a ship rise as it enters the sea from a river?
  § The density of sea water is high due to impurities and salts compared to river water. As a result, the upthrust produced by the sea water on the ship is more than that of river water.

Q. Why is cooking quicker in a pressure cooker?
  § As the pressure inside the cooker increases, the boiling point of water is raised, hence, the cooking process is quicker.

Q. When wood burns, it crackles. Explain?

§ Wood contains a complex mixture of gases and tar forming vapours trapped under its surface. These gases and tar vapours escape, making a crackling sound.

Q. Why do stars twinkle?

§ The light from a star reaches us after refraction as it passes through various layers of air. When the light passes through the earth's atmosphere, it is made to flicker by the hot and cold ripples of air and it appears as if the stars are twinkling.

Q. Why is it easier to roll a barrel than to pull it?

§ Because the rolling force of friction is less than the dynamic force of sliding friction.

Q. If a feather, a wooden ball and a steel ball fall simultaneously in a vacuum which one of these would fall faster?

§ All will fall at the same speed in vacuum because there will be no air resistance and the earth's gravity will exert a similar gravitational pull on all.

Q. When a man fires a gun, he is pushed back slightly. Why?

§ As the bullet leaves the nozzle of the gun's barrel with momentum in a forward direction as per Newton's Third Law of Motion, the ejection imparts to the gun an equal momentum in a backward direction.

Q. Ice wrapped in a blanket or saw dust does not melt quickly. Why?

§ Both wood and wool are bad conductors of heat. They do not permit heat rays to reach the ice easily.

Q. Why do we perspire on a hot day?

§ When the body temperature rises, the sweat glands are stimulated to secrete perspiration. It is nature's way to keep the body cool. During the process of evaporation of sweat, body heat is taken away, thus, giving a sense of coolness.

Q. Why does ice float on water but sink in alcohol?

§ Because ice is lighter than water it floats on it. However, ice is heavier than alcohol and therefore it sinks in alcohol.

Q. Why do we perspire before rains?

§ Before the rain falls, the atmosphere gets saturated with water vapour, as a result, the process of evaporation of sweat is delayed.

Q. Why does a thermometer kept in boiling water show no change in reading after 100°C?

§ The boiling point of water is 100°C. Once water starts boiling at this temperature, thermometer records no change in temperature. The quantity of heat supplied is being utilized as latent heat of evaporation to convert the water at boiling point into vapour.

Q. Why do we bring our hands close to the mouth while shouting across to someone far away?

§ By keeping hands close to mouth the sound is not allowed to spread (phenomenon of diffraction of sound) in all directions but is directed to a particular direction and becomes louder.

Q. Why does a corked bottle filled with water burst if left out on a frosty night?
  § Because of low temperature the water inside the bottle freezes. On freezing it expands, thereby its volume increases and pressure is exerted on the walls.

Q. Why is a small gap left at the joint between two rails?
  § To permit expansion of rails due to heat generated by friction of a moving train.

Q. Why cannot a copper wire be used to make elements in electric heater?
  § Copper melts at l08.3°C and forms a black powder on reacting with atmospheric oxygen. For heater elements a metal should have more resistance to produce heat.

Q. Why are water or mercury droplets always round when dropped on a clean glass?
  § The surface of a liquid is the seat of a special force as a result of which molecules on the surface are bound together to form something like a stretched membrane. They tend to compress the molecules below to the smallest possible volume which causes the drop to take a round shape as for a given mass the sphere has minimum volume.

Q. Why does an ordinary glass tumbler crack when very hot tea or milk is poured in it?
  § When a hot liquid is poured into a tumbler, the inner layer of the tumbler gets heated, it expands before the outer layer and an unequal expansion of both layers causes the tumbler to crack.

Q. Why is a compass used as an indicator of direction?
  § The magnetic needles of a compass under the influence of the earth's magnetic field lie in a north-south direction. Hence, we can identify direction.

Q. Why is water from a hand pump warm in winter and cold in summer?
  § In winter the outside temperature is lower than that of water flowing out of the pump and therefore, the water is warm. Whereas, in summer, the outside temperature is higher than the water of the pump and therefore, it feels cold.

Q. Why is a rainbow seen after rain?
  § After rain the clouds containing water droplets act like a prism through which the white light is dispersed producing a spectrum.

Q. Why does a swimming pool appear less deep than it actually is?
  § The rays of light coming from the bottom of the pool pass from a denser medium (water) to a rarer medium (air) and are refracted (bend away from the normal). When the rays return to the surface they form an image of the bottom of the pool at a point which is little above the real position.

Q. Why does moisture gather outside a tumbler containing cold water?
  § The water vapour in the air condenses on cooling and appears as droplets of water.

Q. Why does kerosene float on water?
  § Because the density of kerosene is less than that of water. For the same reason cream rises in milk and floats at the top.

Q. Why is the water in an open pond cool even on a hot summer day?
  § As the water evaporates from the open surface of a pond, heat is taken away in the process, leaving the surface cool.

Q. Why is it less difficult to cook rice or potatoes at higher altitudes?
- § Atmospheric pressure at higher altitudes is low and boils water below 100°C. The boiling point of water is directly proportional to the pressure on its surface.

Q. Why is it difficult to breathe at higher altitudes?
- § Because of low air pressure at higher altitudes the quantity of air is less and so also that of oxygen.

Q. Why are winter nights and summer nights warmer during cloudy weather than when the sky is clear?
- § Clouds being bad conductors of heat do not permit radiation of heat from land to escape into the sky. As this heat remains in the atmosphere, the cloudy nights are warmer.

Q. Why is a metal tyre heated before it is fixed on wooden wheels?
- § On heating, the metal tyre expands by which its circumference also increases. This makes fixing the wheel easier and thereafter cooling down shrinks it; thus fixing the tyre tightly.
  more than that of river water.

Q. Why are fuses provided in electric installations?
- § A safety fuse is made of a wire of metal having a very low melting point. When excess current flows in, the wire gets heated, melts and breaks the circuit. By breaking the circuit it saves electric equipment or installations from damage by excessive flow of current.

Q. Why is it easier to lift a heavy object under water than in air?
- § Because when a body is immersed in water, it experiences an upward thrust (Archimedes' Principle) and loses weight equal to the weight of the water displaced by its immersed portion and hence, is easier to lift objects.

Q. If a highly pumped up bicycle tyre is left in the hot sunlight, it bursts. Why?
- § The air inside the tube increases in volume when heated up. As sufficient space for the expansion of the air is not available because the tube is already highly pumped, it may result in bursting of the tyre.

Q. What will be the colour of green grass in blue light?
- § Grass will appear dark in colour because it absorbs all other colours of the light except its own green colour. The blue light falling on grass will be absorbed by it and hence, it will appear dark in colour.

Q. Why do two eyes give better vision than one?
- § Because two eyes do not form exactly similar images and the fusion of these two dissimilar images in the brain gives three dimensions of the stereoscopic vision.

Q. Why is it easier to swim in the sea than in a river?
- § The density of sea water is higher; hence the upthrust is more than that of river water.

Q.   Who will possibly learn swimming faster—a fat person or a thin person?
§   The fat person displaces more water which will help him float much more freely compared to a thin person.

Q.   Why is a flash of lightening seen before thunder?
§   Because light travels faster than sound, it reaches the earth before the sound of thunder.

Q.   Why cannot a petrol fire be extinguished by water?
§   Water, which is heavier than petrol, slips down permitting the petrol to rise to the surface and continue to burn. Besides, the existing temperature is so high that the water poured on the fire evaporates even before it can extinguish the fire. The latter is true if a small quantity of water is poured.

Q.   Why does water remain cold in an earthen pot?
§   There are pores in an earthen pot which allow water to percolate to the outer surface. Here evaporation of water takes place thereby producing a cooling effect.

Q.   Why do we place a wet cloth on the forehead of a patient suffering from high temperature?
§   Because of body's temperature, water evaporating from the wet cloth produces a cooling effect and brings the temperature down.

Q. When a needle is placed on a small piece of blotting paper which is placed on the surface of clean water, the blotting paper sinks after a few minutes but the needle floats. However, in a soap solution the needle sinks. Why?
§   The surface tension of clean water being higher than that of a soap solution, it can support the weight of a needle due to its surface tension. By addition of soap, the surface tension of water reduces, thereby resulting in the sinking of the needle.

Q. To prevent multiplication of mosquitoes, it is recommended to sprinkle oil in the ponds with stagnant water. Why?
§   Mosquitoes breed in stagnant water. The larvae of mosquitoes keep floating on the surface of water due to surface tension. However, when oil is sprinkled, the surface tension is lowered resulting in drowning and death of the larvae.

Q.   Why does oil rise on a cloth tape of an oil lamp?
§   The pores in the cloth tape suck oil due to the capillary action of oil.

Q.   Why are ventilators in a room always made near the roof?
§   The hot air being lighter in weight tends to rise above and escape from the ventilators at the top. This allows the cool air to come in the room to take its place.

Q.   How does ink get filled in a fountain pen?
§   When the rubber tube of a fountain pen immersed in ink is pressed, the air inside the tube comes out and when the pressure is released the ink rushes in to fill the air space in the tube.

Q.   Why are air coolers less effective during the rainy season?
§   During the rainy reason the atmospheric air is saturated with moisture. Therefore, the process of evaporation of water from the moist pads of the cooler slows down thereby not cooling the air blown out from the cooler.

Q. Why does grass gather more dew in nights than metallic objects such as stones?
§ Grass being a good radiator enables water vapour in the air to condense on it. Moreover, grass gives out water constantly (transpiration) which appears in the form of dew because the air near grass is saturated with water vapour and slows evaporation. Dew is formed on objects which are good radiators and bad conductors.

Q. If a lighted paper is introduced in a jar of carbon dioxide, its flame extinguishes. Why?
§ Because carbon dioxide does not help in burning. For burning, oxygen is required.

Q. Why does the mass of an iron rod increase on rusting?
§ Because rust is hydrated ferric oxide which adds to the mass of the iron rod. The process of rusting involves addition of hydrogen and oxygen elements to iron.

Q. Why does milk curdle?
§ Lactose (milk sugar) content of milk undergoes fermentation and changes into lactic acid which on reacting with milk protein (caesin), forms curd.

Q. Why does hard water not lather soap profusely?
§ Hard water contains sulphates and chlorides of magnesium and calcium which forms an insoluble compound with soap. Therefore, soap does not lather with hard water.

Q. Why is it dangerous to have charcoal fire burning in a closed room?
§ When charcoal burns it produces carbon monoxide which is suffocating and can cause death.

Q. Why is it dangerous to sleep under trees at night?
§ Plants respire at night and give out carbon dioxide which reduces the oxygen content of air required for breathing.

Q. Why does ENO's salt effervesce on addition of water?
§ It contains tartaric acid and sodium bicarbonate. On adding water, carbon dioxide is produced which when released into water causes effervescence.

Q. Why does milk turn sour?
§ The microbes react with milk and grow. They turn lactose into lactic acid which is sour in taste.

CHEMISTRY

FUNDAMENTALS OF CHEMISTRY

Elements

- Everything in the universe, living or non-living, is made of a combination of a few basic substances called elements.
- An element is the simplest form of matter composed of atoms having identical number of protons in each nucleus.

- An atom is the smallest fragment of an element that can take part in a chemical action.
- The theory that all matter is made up of small particles (atoms) was put forward by John Dalton. He defined the atom as the smallest neutral particle of matter which may have independent existence. It consists of a central nucleus (made up of protons which are positively charged and neutrons which are neutral particles) surrounded by orbiting electrons.
- Atoms of different elements differ from one another in the number of protons and neutrons in the nucleus and the number of electrons surrounding the nucleus.
- The number of electrons is however, always equal to the number of protons which is known as the elements' atomic number.
- *Periodic Table*: The chemical elements can be arranged in order of increasing atomic number in such a way that elements with similar properties appear together. Such an arrangement is called a periodic table.
  - Lightest (simplest) element (naturally occurring)—Hydrogen (Element 1)
  - Most complex element (naturally occurring)—Uranium (Element 92)
  - Commonest element (lithosphere)—Oxygen
  - Commonest element (atmosphere)—Nitrogen
  - Commonest element (universe)—Hydrogen
  - Rarest element—Astatine
  - Lightest element (metal)—Lithium
  - Heaviest element (gas)—Radon
  - Lightest element (gas)—Hydrogen
- Hydrogen has atomic number 1, with 1 proton and 1 electron. Uranium, the heaviest naturally occurring element has atomic number 92, having 92 protons, 92 electrons and 146 neutrons.
- All elements heavier than uranium are man-made and are produced in nuclear reactors or accelerators or isolated from debris of atomic explosions (transuranic).

The new elements are:

- The Russian scientist Dimitri Mendeleev devised the periodic table in 1869. At that time there were only 59 elements in it but had 33 empty spaces that implied that there were elements still to be discovered.
- Dimitri gave these still-hypothetical elements names like 'ekasilicon,' 'ekaaluminum' and 'ekaboron,' based on their expected similarities to known substances; the spaces were filled by germanium, gallium and scandium, respectively. ('Eka-' is a Sanskrit prefix meaning 'one,' so you can think of the names as silicon 1, aluminum 1 and so on.)
- By year 1939, all of Mendeleev's boxes had been filled in; the last one was 'ekacesium,' now called francium.
- There are around 118 known elements, out of which 92 are naturally occurring and 26 are man-made elements, created by nuclear bombardment.
- The man-made elements are known as transuranic. Neptunium (Element 93) was the first such element discovered in 1940.
- Since Lawrencium (Lr) in 1961, the following new elements have been discovered:
  1. Rutherfordium (Rf) Atomic No. 104
  2. Dubnium (Db) Atomic No. 105

3. Seaborgium (Sg) Atomic No. 106
4. Bohrium (Bh) Atomic No. 107
5. Hassium (Hs) Atomic No. 108
6. Meitnerium (Mt) Atomic No. 109
7. Darmstadtium (Ds) Atomic No. 110
8. Roentgenium (Rg) Atomic No. 111
9. Copernicium (Cr) Atomic No. 112
10. Flerovium (Fl) Atomic No. 114
11. Livermorium (Lv) Atomic No. 116.

- *Four elements*: Ununtrium (Element 113), Ununpentium (Element 115); Ununseptium (Element 117) and Ununoctium (Element 118) are still unconfirmed discoveries.
- Russian scientists had claimed the discovery of element 115 back in 2003 but the International Union of Pure and Applied Chemistry. Chemistry's equivalent of the International Astronomical Union which famously demoted Pluto from planet status in 2006 wouldn't acknowledge it without a confirming experiment from another team. The Helmholtz Center's work must still be reviewed by both the I.U.P.A.C. and the International Union of Pure and Applied Physics but ununpentium is now a step closer to inclusion on the periodic table. If that happens, the International Union will assign it a permanent, official name.
- I.U.P.A.C. has already signed off on element 116 (livermorium), element 117 (ununseptium) and element 118 (ununoctium), although the latter two haven't been assigned permanent names yet. Ununoctium's half life is just 0.89 milliseconds.

METALS AND NON-METALS

- Elements are classified in two main classes are (i) Metals (for example, lead, gold, mercury, etc.) and (ii) Non-metals (for example, chlorine, bromine, carbon, etc.)
- Some elements behave chemically both as metals and non-metals are called metaloids, for example, boron, silicon, germanium and antimony.
- *Nobel Gases*: There are also some elements which are neither metals nor non-metals. These elements are called noble gases and are present in the atmosphere as helium, argon, neon, krypton, radon and xenon.

Metals

- Elements which are hard, ductile, brittle and malleable; possess lustre and conduct heat and electricity are termed metals. All metals are solids except mercury and gallium which are liquids at room temperature. Metals usually have high melting and boiling points. About 80% of known elements are metals.

Chemical Nature of Metals

- Usually metals have the tendency to lose electrons and while reacting with acids, usually replace hydrogen in dilute non-oxidizing acids like hydrochloric acid (HCl) and sulphuric acid (H_2SO_4).
- Exceptions are copper, silver and gold. Chlorides of metals are true salts and oxides of metals are usually basic. Hydrides of metals are ionic, unstable and reactive.

- Although all the metals are reactive, that is, they are acted upon by common reagents like oxygen (air), hydrogen, halogens, sulphur, water, acids, etc., the extent of reaction is different in the case of each metal.
- Only gold, platinum and silver are not affected by air and water under ordinary conditions and are known as free metals.
- Various compounds of metal called minerals are found in nature and can be mined.
- The mineral from which metal can be extracted economically is called ore and the process of extraction of metals from their ores is called metallurgy which involves:
    —*Calcination*: The process of heating the concentrated ore in the absence of air.
    —*Roasting*: The process of heating the ore in excess air.
    —*Smelting*: The process by which roasted ore is mixed with coke and heated in a furnace to obtain free metal.

Steel and Iron

- Steel is a form of iron. To make steel from iron, the carbon content is bought down from 5% to 0.5–1.5%.
- *Heat Treatment of Steel*
    —*Quenching*: If steel is heated to bright redness and then suddenly cooled in water or oil it becomes extraordinarily hard and brittle.
    —*Tempering*: By controlled heating (250–325°C) of quenched steel its brittleness can be removed without affecting its hardness.
    —*Annealing*: Steel is heated to a temperature well below red hot and then cooled turns it soft and the process is called annealing.

Rusting of Iron

- Majority of metals occur in nature in the combined form and are extracted from their ores.
- When these metals are exposed to atmospheric conditions they have a tendency to form oxides or salts of their original metal. This change is called corrosion of metals and in the case of iron it is known as rusting.
- Rusting consists of the formation of hydrated ferric oxide. For rusting water and oxygen are essential in the absence of water or electrolyte rusting does not occur.
- The process involves addition of hydrogen and oxygen elements and it is found that mass of an iron rod increases by rusting. Rusting is prevented by coating the surface of iron with metals or non-metals or by alloying. The coating of another metal is known as electroplating or hot dipping.
- In electroplating chromium or nickel is used. When a coat of zinc is applied on an iron surface by the hot-dipping process it is known as galvanizing.

Non-metals

- Non-metals are electro-negative elements which have a tendency to gain one or more electrons to form negative ions called anions. All non-metals generally exist as powders or gases, except bromine which is liquid under normal conditions.

- Non-metals are non-lustrous and are bad conductors of heat and electricity. They cannot be hammered into sheets or drawn into wires like metals. The melting point of non-metals is lower than that of metals.

ALLOYS

Alloys are homogeneous mixtures of two or more metals and non-metals and have more commercial utility than some of the constituent elements. The following table lists some of the commercially important alloys.

Alloys of Some Important Elements

Aluminum Alloys
1. AA-8000: used for building wire
2. Al-Li (aluminum, lithium, sometimes mercury)
3. Alnico (aluminum, nickel, copper)
4. Duralumin (copper, aluminum)
5. Magnalium (aluminum, 5% magnesium)
6. Magnox (magnesium oxide, aluminum)
7. Nambe (aluminum plus seven other unspecified metals
8. Silumin (aluminum, silicon)
9. Zamak (zinc, aluminum, magnesium, copper)
10. Aluminum forms other complex alloys with magnesium, manganese and platinum

Bismuth Alloys
1. Cerrosafe
2. Wood's metal (bismuth, lead, tin, cadmium) Cerrobend is another name for wood's metal
3. Rose metal (bismuth, lead, tin)
4. Field's metal

Cobalt Alloys
1. Stellite (cobalt, chromium, tungsten or molybdenum, carbon)
2. Talonite (cobalt, chromium)
3. Ultimet (cobalt, chromium, nickel, molybdenum, iron, tungsten)

Copper Alloys
1. Beryllium copper (copper, beryllium)
2. Billon (copper, silver)
3. Brass (copper, zinc) [Calamine brass (copper, zinc); Chinese silver (copper, zinc); Dutch metal (copper, zinc); Gilding metal (copper, zinc); Muntz metal (copper, zinc); Pinchbeck (copper, zinc); Prince's metal (copper, zinc); Tombac (copper, zinc)]
4. Bronze (copper, tin, aluminum or any other element) [Aluminum bronze (copper, aluminum); Arsenical bronze (copper, arsenic); Bell metal (copper, tin); Florentine bronze (copper, aluminum or tin); Glucydur (beryllium, copper, iron); Guanin (likely a manganese bronze of copper, manganese, with iron sulfides and other sulfides); Gunmetal (copper, tin, zinc); Phosphor bronze (copper, tin and phosphorus); Ormolu (Gilt Bronze) (copper, zinc); Speculum metal (copper, tin)]
5. Constantan (copper, nickel)
6. Copper-tungsten (copper, tungsten)
7. Corinthian bronze (copper, gold, silver)
8. Cunife (copper, nickel, iron)
9. Cupronickel (copper, nickel)
10. Cymbal alloys (Bell metal) (copper, tin)
11. Devarda's alloy (copper, aluminum, zinc)
12. Electrum (copper, gold, silver)
13. Hepatizon (copper, gold, silver)
14. Heusler alloy (copper, manganese, tin)

15. Manganin (copper, manganese, nickel)
16. Nickel silver (copper, nickel)
17. Nordic gold (copper, aluminum, zinc, tin)
18. Shakudo (copper, gold)
19. Tumbaga (copper, gold)

Gallium Alloys
1. Galinstan (gallium, indium, tin)
2. Galfenol (iron)
3. Al Ga (aluminium)

Gold Alloys
1. Electrum (gold, silver, copper)
2. Tumbaga (gold, copper)
3. Rose gold (gold, copper)
4. White gold (gold, nickel, palladium or platinum)

Indium Alloys
Field's metal (indium, bismuth, tin)

Iron or Ferrous Alloys
1. Steel (carbon) [Stainless steel (chromium, nickel); {AL-6XN; Alloy 20; Celestrium; Marine grade stainless; Martensitic stainless steel; Surgical stainless steel (chromium, molybdenum, nickel)}; Silicon steel (silicon); Tool steel (tungsten or manganese); Bulat steel; Chromoly (chromium, molybdenum); Crucible steel; Damascus steel; High speed steel; Maraging steel; Wootz steel]
2. Iron [Anthracite iron (carbon); Cast iron (carbon); Pig iron (carbon); Wrought iron (carbon)]
3. Fernico (nickel, cobalt)
4. Elinvar (nickel, chromium)
5. Invar (nickel)
6. Kovar (cobalt)
7. Spiegeleisen (manganese, carbon, silicon)
8. Ferroalloys [Ferroboronl; Ferrochrome (chromium); Ferromagnesium; Ferromanganese; Ferromolybdenum; Ferronickel; Ferrophosphorus; Ferrotitanium; Ferrovanadium; Ferrosilicon]

Lead Alloys
1. Antimonial lead (lead, antimony)
2. Molybdochalkos (lead, copper)
3. Solder (lead, tin)
4. Terne (lead, tin)
5. Type metal (lead, tin, antimony)

Magnesium Alloys
1. Magnox (magnesium, aluminum)
2. T-Mg-Al-Zn (Bergman phase)
3. Elektron

Mercury Alloys
Amalgam (mercury with just about any metal except platinum)

Nickel Alloys
1. Alumel (nickel, manganese, aluminum, silicon)
2. Chromel (nickel, chromium)
3. Cupronickel (nickel, bronze, copper)
4. German silver (nickel, copper, zinc)
5. Hastelloy (nickel, molybdenum, chromium, sometimes tungsten)
6. Inconel (nickel, chromium, iron)
7. Monel metal (copper, nickel, iron, manganese)
8. Mu-metal (nickel, iron)
9. Ni-C (nickel, carbon)
10. Nichrome (chromium, iron, nickel)
11. Nicrosil (nickel, chromium, silicon, magnesium)
12. Nisil (nickel, silicon)
13. Nitinol (nickel, titanium, shape memory alloy)

Potassium Alloys
1. KLi (potassium, lithium)
2. NaK (sodium, potassium)

Rare Earth Alloys
1. Mischmetal (various rare earths)
2. Terfenol-D (terbium, dysprosium & iron)

Silver Alloys
1. Argentium sterling silver (silver, copper, germanium)

2. Billon (copper or copper bronze, sometimes with silver)
3. Britannia silver (silver, copper)
4. Electrum (silver, gold)
5. Goloid (silver, copper, gold)
6. Platinum sterling (silver, platinum)
7. Shibuichi (silver, copper)
8. Sterling silver (silver, copper)

Tin Alloys
1. Britannium (tin, copper, antimony)
2. Pewter (tin, lead, copper)
3. Solder (tin, lead, antimony)

Titanium Alloys
1. Beta C (titanium, vanadium, chromium, other metals)
2. 6al-4v (titanium, aluminum, vanadium)

3. Titanium hydride (hydrogen)
4. Titanium nitride (nitrogen)

Uranium Alloys
1. Staballoy (depleted uranium with titanium or molybdenum)
2. Uranium may also be alloyed with plutonium

Zinc Alloys
1. Brass (zinc, copper)
2. Zamak (zinc, aluminum, magnesium, copper)

Zirconium Alloys
1. Zircaloy (zirconium and tin, sometimes with niobium, chromium, iron, nickel)
2. Zirconium hydride (hydrogen, zinc.)

Table 9.9 Important Alloys and Their Uses

Alloy	Composition	Commercial Utility
Babbitt Metal	Tin = 91%, Antimony = 7% Copper = 3%	Used in bearings because of its low measure of friction with steel
Bell Metal	Copper 77%, Tin = 23%	Casting of bells
Monel	Nickel = 60%, Copper = 33%, Iron = 7%	Corrosion-resistant containers
Magnalium	Aluminium = 85–99%; Magnesium = 1–15%	Used in making balance beams and light instruments
Duralumin	Aluminium = 95%, Copper = 4%, Magnesium <1%, Manganese = 0.5%	Used in the production of airships, pressure cookers, railroad cars and machinery because of its high strength and resistance to corrosion.
Bronze	Copper = 75–90%, Tin (Sn) = 10–25%	Utensils, coins, medals and statues, heavy gears, tools electrical hardware
Phosphor Bronze	Bronze with a small amount of Phosphorous	Springs (normal and electrical) and Boat propellers.
Aluminium Bronze	Copper = 88–90% Aluminium = 10–12%	In the manufacture of utensils, decorative articles like photo frames, coins and jewellery
Brass	Copper = 60–80% Zinc = 20–40%	Utensils, inexpensive jewellery, hose nozzles and couplings, standing dies, condenser sheets and cartridges
Gun metal	Copper = 85-90%, Tin = 8–12% Zinc = 1–3%	Guns, gears, castings

Alloy	Composition	Commercial Utility
Coinage Alloy	Copper = 75%, Nickel = 25%	In the making of coins also known as 'Coin Metal'
Solder	Lead = 50%, Tin = 50%	For soldering joining two metals to each other
Stainless steel	Iron = 73%, Carbon = 1% Chromium= 18%, Nickel= 8%	In the manufacture of utensils, automobile parts, cycle parts, cutlery
Invar	Iron (Fe) = 63%, Carbon = 1% Nickel (Ni) = 36%	In the manufacture of meter scales measuring tapes, pendulum rods
Duriron	Iron = 84.7%, Carbon = 0.8% Silicon = 14.5%	Laboratory plumbing
Tungsten steel	Iron= 75–81%, Tungsten = 14–20%, Chromium = 4%, Carbon = 1%	For making high speed cutting tools
Sterling silver	Silver = 92.5%, Copper 7.5%	Jewellery, art objects etc.
Type Metal	Lead = 75-90%, Antimony = 2–18% Tin in trace quantities.	Used to make type characters for printing; also used for making decorative objects like statuettes and candlesticks.

MINERALS

- Minerals are naturally occurring chemical compounds of fixed composition and characteristic, physical form and properties. A few minerals consist of only one element. For example, graphite and diamond (both forms of carbon), sulphur and gold.
- Most minerals, however are a combination of two or more elements as in halite or rock salt (NaCl). The most common group of minerals are Silicates, oxides, sulphides, halides, carbonate.
- Minerals are of two types, namely, metallic or ore and non-metallic, for example, carbon, sulphur, etc. (See table). Metallic minerals can be further divided into ferrous and non-ferrous minerals.

Table 9.10 Common Minerals

Name of the Mineral	Composition	Commercial Utility
Albite	Sodium aluminium silicate	Glass, ceramics
Anhydrite	Calcium sulphate	Cement, fertilizers, chemicals
Anorthite	Calcium aluminium silicate	Glass, ceramics
Apatite	Calcium phosphate flour-phosphate or chlorophosphate	Phosphate, Fertilizers, gemstones

(Continued)

Name of the Mineral	Composition	Commercial Utility
Aragonite	Calcium carbonate	Essential for replication of reef conditions in aquariums
Azurite	Copper carbonate	Source of copper
Bauxite	Hydrated aluminium oxide	Source of aluminium
Calcite	Calcium carbonate	Cement, plaster, paint glass, fertilizers
Calamine	Zinc carbonate	Source of zinc
Cassiterite	Tin oxide or Tinstone	Source of tin
Cerussite	Lead carbonate	Source of lead
Chalcocite	Copper sulphite	Source of copper
Cinnabar	Mercuric sulphite	Source of mercury
Dolomite	Calcium magnesium carbonate	Cement and building stone (marble)
Fluorite	Calcium fluoride	Glass, enamel
Galena	Lead sulphide	Source of lead (main ore)
Gypsum	Hydrated calcium sulphate	Plaster of Paris, glass, fertilizer
Halite	Sodium chloride	Source of common salt
Haematite	Ferric oxide	Important source of iron
Kaolinite	Hydrated aluminium silicate	Porcelain tiles, filters, earthenware
Malachite	Copper carbonate	Source of copper
Mircocline	Potassium aluminium silicate	Glass, ceramics
Pyrite	Iron sulphite	Source of sulphur
Quartz	Silica	Abrasives, cement, glass, electronic equipment
Rutile	Titanium oxide	Source of titanium
Talc	Magnesium silicate	Talcum powder, asbestos
Topaz	Hydrous aluminium flourosilicate	Gemstones

CHEMICAL COMPOUNDS

- The atoms of an element, the smallest component seldom exist singly. They usually join up with atoms of other elements to form a molecule of a compound. For example, two atoms of oxygen combine to form a molecule of oxygen written as O_2, O being the symbol of oxygen and 2 the number of atoms combined.
- In the formulation of a compound, 2 atoms of iron (Fe), for example, may combine with 3 atoms of oxygen to form a molecule of ferric oxide (Fe_2O_3).

- It has been estimated that there are 40,40,000 described compounds of which 63,000 are in common use.

Chemical Reaction and Chemical Change

- Chemical change happens everywhere all the time, for example, when coal burns, when iron rusts, when beer ferments, when concrete and cement set or when food is digested to give energy, etc.
- When coal burns, carbon and hydrogen compounds within it combine with the oxygen of the air to form carbon dioxide (CO_2) and water vapours.
- Thus original constituent chemicals called reactants are converted into different substances called products which have different properties.

Characteristics of Chemical Change

1. As seen above, in a chemical change the resultant product has different properties as against that of the reactants.
2. *Conservation of Mass*: For matter can neither be created nor destroyed during a chemical reaction. In the above example the mass of coal and oxygen which combine during combustion is exactly equal to the mass of carbon dioxide, water vapour and ash produced.
3. When substances are formed in different ways, that is, by different chemical reactions, it always has the same composition. In carbon dioxide (CO_2), for example, no matter how it is formed, carbon (C) and oxygen (O) are always in the ratio of 3:8 by mass.
4. In a chemical reaction, energy is given out or absorbed. For example, When coal burns in air, energy in the form of heat and light is given out. On the other hand, when carbon and sulphur are made to combine, heat is absorbed in this process.

Chemical Equation

- Chemical change can be represented by an equation, for example, the combustion of carbon (C) in oxygen (O) to form carbon dioxide (CO_2) can be shown as:

$$C + O_2 \rightarrow CO_2$$
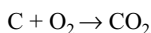
- The subscripts show that there are two atoms in an oxygen molecule.
- When hydrogen (H) and chlorine (Cl) react to form hydrogen chloride, the equation will be

$$H_2 + Cl_2 \rightarrow 2\ HCl$$
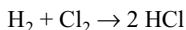
- Note that two must be added before HCl on the right to balance the equation. The equation shows that one molecule containing two hydrogen atoms plus one molecule containing two chloride atoms react to form two molecules of hydrogen chloride.

Acid-base Reactions: A chemical reaction in which a strong acid and a strong base react with each other to form water and salt. Also called Neutralization reaction as the acid and the base neutralize each other.

Another most common name is double de-composition reactions as an acid is losing a proton (H^+ ion). For example, Magnesium sulphate ($MgSO_4$) reacts with the solution of caustic soda (NaOH) to form sodium sulphate ($Na_2\ SO_4$) and antacid magnesium hydroxide ($Mg(OH)_2$)

$$MgSO_4 + 2NaOH \rightarrow Na_2SO_4 + Mg(OH)_2$$
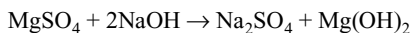
Oxidation and Reduction: Another common chemical reaction is oxidation. Originally it meant combination of a substance with oxygen. However, now the term covers all analogous reactions in which substances combine with other elements and lose electrons in the process.

- Oxidation is always accompanied simultaneously with reduction in which electrons are gained.

  E .g. Action of hydrogen (H_2) with copper oxide (CuO)

$$CuO + H_2 \rightarrow Cu + H_2O$$
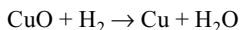
- The oxide (CuO) is reduced to copper (Cu), the copper gains electrons in the reduction.
- Chemical reactions may take place either slowly—for example, rusting—or quickly as in an explosion.
- Rate of chemical reaction can he greatly increased by the presence of a *catalyst*—a substance which influences the reaction but does not change with it.

Air

- Is a colourless and tasteless gaseous mixture of nitrogen (78%), oxygen (21%) with lesser amounts (say traces) of argon. carbon dioxide, neon, helium, ozone and other gases.
- Air also contains water vapour and pollutants enveloping the earth. Being a mixture (not compound) its composition varies from one place to another.
- Its constituents can be separated and it can be prepared by mixing oxygen and nitrogen. Air is a bad conductor of heat.
- Of its constituents, oxygen helps in burning of substances and respiration and nitrogen dilutes the action of oxygen.
- Carbon dioxide is added to the atmosphere through burning and also through respiration and water vapour is formed during evaporation from the sea, rivers, ponds, etc.

Water Vapour in the Air: Air contains about 0.4% of water vapour.
- If we place a glass containing ice cubes in the open air, the outer surface of the glass gets covered with water droplets. This is due to the condensation of water vapour, from the atmospheric air on the cooler surface of the glass.

Carbon Dioxide: Air contains about 0.03% carbon dioxide.
- If we place lime water in the open air, it turns milky due to absorption of carbon dioxide from the air.

Water

- Water was shown by Cavendish, in the eighteenth century, to be a chemical compound.
- It consists of hydrogen and oxygen in the ratio of 2:1 by volume and 1:8 by mass. Hence, when an electric current is passed through acidified or alkaline water for every one volume of oxygen two volumes of hydrogen evolve.
- Water can be prepared by combining oxygen and hydrogen with the help of an electric current where for every one part of hydrogen, 8 parts of oxygen are required. Boiling point of water is 100°C and freezing point is 0°C.

Hard and Soft Water

Hard Water: Does not produce lather with soap.

Soft Water: Produces lather with soap very easily.

Hardness of water is of two types:

1. *Temporary hardness* is due to the bicarbonates of calcium and magnesium. It can be removed by (a) boiling or (b) addition of lime.
2. *Permanent hardness* is due to the sulphates and chlorides of calcium and magnesium. It can be removed by (a) addition of washing soda or (b) distillation.

Rain Water: It is the purest form of water since it is condensed water vapour of the air. It is soft water because it does not contain salts like bicarbonates, sulphates and chlorides of calcium and magnesium.

River Water: By flowing over the earth's surface carries with it soluble minerals of earth and becomes hard water and also contains several pollutants.

Important Gases

Oxygen: Is a colourless, odourless and tasteless gas, sparingly soluble in water and slightly heavier than air. It does not burn itself but helps in burning of other substances. It is found in abundance in the earth both in the free state and combined state with other elements.

- Oxygen can be prepared in a laboratory by heating potassium chlorate and manganese dioxide together. It can also be obtained in small quantities by heating oxides or salts rich in oxygen. Oxygen can be separated from the air by passing an electric current through water.
- It is essential for plant and animal respiration and for nearly all kinds of combustion.

Atomic No. 8	Relative atomic mass: 15.999
Melting point: –218.4°C	Boiling point: –183.0°C
Density at 0°C = 1.329 kg/m³	Valency: 2

Hydrogen: Is a colourless, highly flammable gaseous element, the lightest of all substances known and in most abundant supply in the universe. In the free state it occurs in volcanic gases.

- Hydrogen burns with a pale blue flame but does not help combustion and is slightly soluble in water. It is used in the manufacture of vanaspati ghee, alcohol and ammonia.
- Hydrogen can he obtained from water, acids and alkalies. In a laboratory it is prepared by the action of dilute sulphuric acid on commercial zinc.

Atomic No. 1	Relative atomic mass: 1.008
Melting point: –259.14°C	Boiling point: –252.5°C
Density: 0.08988 kg/m³	Valency: 1

Nitrogen: A colourless, tasteless and odourless gas constituting nearly four-fifths of the air by volume. It is an almost inert diatomic gas, neither combustible nor helping combustion. Slightly soluble in water.

- In a laboratory it can be prepared by heating ammonium nitrite. On a large scale it can be obtained from air. Air is liquefied first and then evaporated, nitrogen evaporates first, leaving oxygen. Nitrogen is used to manufacture nitric acid, ammonia and fertilizers.

Atomic No. 7

Relative atomic mass: 14.007

Melting point: –209.86°C

Boiling point: –195°C

Valencies: 3 and 5

Carbon Dioxide: A colourless, odourless, incombustible gas formed during respiration, combustion and organic decomposition and is heavier than air.

- Carbon dioxide is acidic and turns lime water milky. It is used in food refrigeration, carbonated beverages, fire extinguishers, etc.
- Carbon dioxide is prepared by the action of dilute acids on carbonates or by fermentation of sugar. In a laboratory it can be prepared by treating marble pieces with dilute hydrochloric acid.

Table 9.11   Other Useful Gases

Name	Use
Acetylene, ethylene	To produce a hot flame for welding/cutting
Ammonia	Fertilizer, synthetic fibres, refrigeration
Butane	Cigarette, lighters/domestic fuel
CS gas	Tear gas used in riots
Cyanogen	Welding, chemical weapons, rocket propellant
Ether	Anaesthetic and industrial processes
Ethylene	Plastics
Helium	Fluorescent tubes, laser, balloons
Krypton	Flourescent tubes, high speed photography
Laughing gas (Nitrous oxide)	Mild anaesthetic
Methane	To make chloroform
Neon	Illuminated signs
Propane	Fuel and refrigerant
Radon	Radiotherapy, atomic research
Xenon	Flash lamps and lasers

Table 9.10   Natural Acids

Name	Sources
Acetic acid	Vinegar
Amino acid	Proteins
Ascorbic acid	Vitamin C
Citric acid	Lemon/citrus fruit
Hydrochloric acid	Digestive juices
Lactic acid	Milk

Name	Sources
Malic acid	Unripe apples/fruits
Tannic acid	Tea
Uric acid	Red Meat

INDUSTRIAL CHEMISTRY

Soaps

- Soaps are the alkali salts of higher fatty acids. Washing soap is, sodium salt of strearic acid and toilet soap is potassium salt of oleic acid. These soaps contain a charged $COONa^+$ end and a hydrocarbon end C_nH_{2n+1}.
- The charged end has a tendency to interact with polar substances like water and fibre, while the hydrocarbon part interacts with non-polar material like oil.

Cleansing Action of Soaps: It is based on a surface phenomenon. Oil coats the surface of objects (for example, fibre) involving weak interactions between the polar fibres and the non-polar oil.

- When clothes are soaked with water containing soap then the polar end of the soap orients towards oil.
- The stronger interaction between the charged end of soap and water overweighs the weak interaction between the fibre and oil. Thus the interfacial contact between the oil (dirt etc.) and the fibre (or any other object) is reduced and oil separates in the form of droplets.

Glass

- Glass is a mixture of an alkali silicate with the silicate of a base, that is, silica, sodium silicate (Na_2SiO_3) and calcium or lead silicate.
- The selected materials, that is, sand (silica), soda ash (sodium carbonate) and lime stone (calcium carbonate) are mixed in the required proportion and broken pieces of previously made glass known as 'cullet' are added.
- These help in easier fusion of the mixture. The mixture is heated up to a temperature of 1400°C in a rotary furnace.
- When the mass is completely mixed and melted, the glass is made in various shapes by blowing and moulding.

Cement

- Materials required to manufacture cement are calcium carbonate (limestone, chalk, etc.) aluminium silicate (clay) and a small qantity of gypsum ($CaSO_4.2H_2O$).
- The best cement is Portland cement, the average composition of which is CaO (63%); Fe_2O_3 (3%); MgO (1.5%); Akali (0.5%); SiO_2 (21%); SO_3 (1.5%); Al_2O_3 (7%).
- The raw materials are first crushed and mixed together and ground to a fine powder. The powder is then fed in a kiln (Temperature: 1890 K). At this temperature calcium oxide

(from limestone) combines the aluminium silicate to form calcium silicate and aluminate. The resultant mixture is mixed with 2–3% gypsum and ground to form cement.

Coal

- Coal originates from the remains of trees, bushes, ferns, mosses and other forms of plant life that flourished in swamps and marshes millions of years ago.
- Important products are derived from coal by a process called pyrolysis—heating of coal in the absence of air which produces *coke* (residue) and volatile matter such as coal gas and a liquid known as coal tar.

ORGANIC CHEMISTRY

Carbon Compounds

- Until 1828 scientists believed that organic compounds occur only in living organisms, things that were or had been alive. Therefore, study of those compounds became known as organic chemistry.
- This was based on the so-called vitalist theory, that is, to produce organic compounds, vital energy is required.
- However, the vital force theory was disapproved when in 1828, the German chemist, Friedrich Wohler, prepared an organic compound Urea in his laboratory by evaporating a solution of inorganic compound ammonium cyanide:

$$NH_4CNO \qquad\qquad CO(NH_2)_2$$

Ammonium cyanide   *Urea*

(inorganic compound)   (organic compound)

- Therefore, now organic chemistry is the study of carbon compounds.

Organic and Inorganic Compounds

- Most organic compounds can be burned while most inorganic compounds cannot.
- Most organic compounds are gases, volatile liquids and solids, with relatively low melting points and most inorganic compounds are solids with high melting points.
- While most organic compounds are insoluble in water, a great majority of inorganic compounds are soluble.
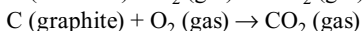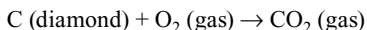
Carbon

- Found in abundance, carbon ranks twelfth among the elements in the earth's crust but in importance it ranks first.
- It is a unique element which readily combines with itself to form large molecules of carbon atoms linked in long chains (rings). This phenomenon is known as catenation. Carbon shows the highest catenation because of its tetravalency.
- In all there are more than a million such combinations.

Different forms of Carbon: Different forms of carbon are— (a) diamond; (b) graphite; (c) charcoal; (d) lamp black; (e) coke; (f) gas carbon; (g) coal and (h) animal charcoal.

Allotropic forms of Carbon: When a substance exists in different crystalline modifications the phenomenon is called allotropy and different distinct forms of the substance are called allotropes.

- Carbon shows allotropy because it exists in different forms. There are two allotropic forms of carbon, namely, (i) Diamond and (ii) Graphite.
- Coke, charcoal, lamp black, etc., were thought to be amorphous forms (without definite shape) of carbon but it is now known that all the amorphous carbons contain microcrystals of graphite.
- Though these allotropes of carbon have different crystal structures and different physical properties, their chemical symbol is the same and show similar chemical properties. Both diamond and graphite have symbol 'C'.
- Both give off carbon dioxide when strongly heated in the presence of oxygen:

$$C \text{ (diamond)} + O_2 \text{ (gas)} \rightarrow CO_2 \text{ (gas)}$$
$$C \text{ (graphite)} + O_2 \text{ (gas)} \rightarrow CO_2 \text{ (gas)}$$

Diamond: Is the hardest substance found in natural form. Its name is derived from the Greek word *'adamas'* which means invincible or adamant. It is the purest form of carbon. It does not allow heat or electricity to pass through. It is inert as it resists action of chemicals but gives out CO_2 when strongly burnt in air. It is insoluble in all solvents.

- Since 1955 diamonds are also prepared synthetically from carbon compounds at high temperature and very high pressure.
- The transparent form of the diamond is used as gems while dark coloured diamonds are used for making cutting-tools.
- The *Koh-i-Noor* is the world's most precious and famous diamond mined in India but was taken away by the British. The Cullinan found in 1905 in South Africa is the largest diamond in the world weighing 570 grams and 2.850 carats.

Graphite: The name graphite is derived from the Greek word graphein that means 'to write'. This suggests that this substance has been used to make lead pencils since ancient times.

- Graphite is dark grey, an opaque solid with a soapy touch and has a metallic shine. It is a good conductor of electricity and heat. It does not undergo any change when mixed with acids or alkalies. However, when heated with nitric acid graphite acid is formed.
- Graphite is used as a lubricant in paints for making electrodes and lead pencils.
- Pure graphite is manufactured by heating coke in an electric furnace to a temperature of about 2500°C in the absence of air.

Petroleum

- Is a mixture of hydrocarbons believed to have originated from bacterial decomposition of animal and vegetable fats under high pressure and atmospheric temperature.
- It is converted into a variety of products by *Fractional Distillation* based on the principle that lower hydrocarbons boil at a lower temperature than the higher ones.

Table 9.11   Products Obtained from Petroleum

S. No	Fraction	Distillation Temperature Range (K)	Approx. %	Uses
1.	Gaseous hydrocarbons	<293	3	As fuel and for gasoline and rubber manufacture
2.	Light distillates—Petroleum ether	293–363	3	As solvent in varnish, dry cleaning
		343–473	32	
	Petrol or gasoline	450–560	18	Motor fuel
	Kerosene oil			Fuel and illuminant
3.	Intermediate distillates— Gas oil, diesel or heavy oil	525–673	20	Fuel
4.	Heavy distillates— Lubricating oils, gaseous and petroleum jelly	>673	—	Used as a Lubricant, in toilet goods ointments
	Paraffin (wax)		—	Candles, boot polish, etc.
5.	Residue— Asphalt, petroleum coke (Bitumen and coke)	Residue	40	Fuel for making electrodes

Liquefied Petroleum Gas (LPG)

- Domestic gas also known as LPG or bottled gas or liquefied petroleum gas is a by-product of petroleum refining and also obtained from natural gas. It is a mixture of hydrocarbons such as propane, butane and pentane.
- These gases can be liquefied under moderate pressure at normal temperature. Because of low boiling point (–44°C) these gases are stored under pressure to keep in a liquid state in gas cylinders.
- Therefore cooking gas cylinders contain the mixture of these gases in liquid form.

Synthetic Rubber

- Produced by polymerization of certain hydrocarbons, namely, (i) Neoprene—a polymer of chloroprene; (ii) BUNA-S—a polymer of styrene and butadiene and (iii) BUNA-N—a polymer of butadiene and acrylonitrile.
- Rubber is made hard by vulcanization, a process of heating rubber with sulphur.

Synthetic Fibre

Nylon: was the first synthetic fibre made as a result of research begun in 1928. It is a polyamide made by polymerizing adipic acid and hexamethylene diamine.

Terylene: Discovered in 1943. Produced from terephthalic acid and ethylene glycol.

Plastics: There are certain synthetic materials which are neither rubber nor fiber but are used as a substitute. These are called plastics.

- Plastics are also polymers. The raw material is basically a polymer of acetylene, the common gas used for welding.

- The polymer is obtained by treating acetylene gas under pressure in presence of a catalyst. The result is a long-chain molecule.

RADIOACTIVITY

- A phenomenon of spontaneous disintegration, first observed in certain naturally occurring heavy elements like radium, actinium, uranium, thorium, etc., with the emission of alpha, beta and gamma rays.
- It is the property of the nuclide to disintegrate in which a transformation takes place of a relatively unstable nuclide to relatively stable nuclide accompanied with the emission of particles or electromagnetic radiation.
- The nuclide that decays is said to be radioactive.

Discovery of Radioactivity: The phenomenon was accidentally discovered in 1896 by French physicist Henry de Becquerel. He observed that uranium mineral gave off invisible radiation. He termed this property of uranium radioactivity. Later Pierre and Madam Curie showed similar phenomenon in other metals like poeonium, francium and radium.

Radioactive Emissions

Sub-atomic Particles (Radiation)
 1. *Alpha (α) particles:* A positively charged helium atom which has very little penetrating power. They can be absorbed by a sheet of paper or stopped by aluminum foil.
 2. *Beta (β) particles:* A negatively charged light particle. Its penetrating power is greater than that of alpha-ray.

Penetrating Particles (Radiation): Also called Gamma (γ) emission. These are electromagnetic radiations of low wavelength, high frequency and high energy. Their penetrating power is very great as they can pass through several centimeter of lead.

X-rays

- X-rays are a form of penetrating electromagnetic radiation similar to light but of shorter wavelength and capable of penetrating solids.
- X-rays are produced when cathode rays fall on anti-cathodes (a metal of high atomic mass like tungsten).

X-ray Photographs: X-ray passes through considerable thickness of matter without being entirely absorbed. although a fraction of the original radiation is always lost.

- Dense materials such as metal and bone, absorb X-rays more strongly than materials such as wood or flesh. Therefore, it is possible to produce X-ray photographs for use in medical diagnosis.

Nuclear Reaction and Atomic Energy

- *Nuclear Reaction:* A nuclear reaction is one in which a nucleus bombarded with an elementary particle (like neutron, proton etc.) or with another nucleus to produce other products in a very short time span. The first nuclear reaction was discovered by *Rutherford* in 1919 when he bombarded nitrogen with alpha particles.

- *Nuclear Fission:* Nuclear fission is the fragmentation of a large nucleus into two smaller nuclei and the liberation of large amount of energy. In 1939 the German scientists Otto Hahn and F. Steersman observed that when uranium was bombarded with slow neutrons, then two smaller products were obtained with a tremendous amount of heat. The splitting of uranium was called nuclear fission

  Types of Nuclear Fission:
  1. *Controlled Nuclear Fission:* Carried out in nuclear reactors in which rate of fission reaction is reduced and energy produced can be used for constructive purposes;
  2. *Uncontrolled Nuclear Fission:* In an atom bomb uncontrolled fission takes place. A very large amount of heat is produced and the process continues until the entire amount of fissionable material is exhausted.
- *First Atom Bomb:* On 6 August 1945, an atom bomb was dropped on Hiroshima city in Japan. The second bomb was dropped on Nagasaki, another city of Japan on 9 August 1945. The bomb was made of plutonium-239.
- *Nuclear Fusion: It* is a nuclear reaction in which lighter nuclei fuse to form a nucleus of greater mass. In this reaction also an enormous amount of heat is produced. By carrying on nuclear fusion under controlled conditions, the large amount of energy could be made available for useful purpose.
- *Atomic Energy (Nuclear Energy):* Energy produced by nuclear fission or nuclear fusion is called nuclear energy or atomic energy. In nuclear reactions there is loss of mass. This mass is converted into energy. It can be transformed into electrical and mechanical energy which can be used for various peaceful purposes.

IMPORTANT LAWS OF CHEMISTRY

Beer's Law
- States that in photo chemistry the proportion of light absorbed by a solution depends on the thickness of the absorbing layer and on the concentration of the absorbing substance in the solution.

Boyle's Law
- States that the volume (V) of a given mass of gas at a constant temperature is inversely proportional to its pressure (p), that is, pV = constant.
- This means that if a gas is compressed threefold its volume is reduced by two-thirds.
- Boyle (1627–90) was the first to define an element as a substance that cannot be broken down into something simpler by a chemical process.

Charle's Law
- States that under constant pressure the volume of a fixed mass of gas varies directly with its absolute temperature.
- The absolute temperature is that measured from absolute zero, about −273° on the Celsius scale.
- In other words, the pressure of a gas increases by 1/273 of its volume at 0°C for every 1°C rise in temperature.

- In other words, if the pressure of a gas remains constant, the volume of a gas increases by 1/273 of its volume at 0°C for every 1°C rise in temperature.
- Alternatively, at constant pressure the volume of a given mass of gas is directly proportional to the absolute temperature.
- The principle was formulated by the French scientist, Jacques Alexandre Charles.

Faraday's Law of Electrolysis

- States that (i) The amount of decomposition during electrolysis is proportional to the quantity of current passed and (ii) For the same quantity of electricity passed through different solutions, the extent of decomposition is proportional to the chemical equivalent of the element or group liberated.
- The law was formulated by an English chemist, Michael Faraday (1791–1867).

Gay-Lussac's Law

- *Law of Gaseous Volume:* States that when gases combine chemically, the volumes of the reactive gases and gaseous products are in simple proportion at the same temperature and pressure. In other words, when gases combine they do so in volumes which are in a simple ratio to each other and to that of the product, if it is also gaseous. For example, One volume of nitrogen combines with three volumes of hydrogen to form two volumes of Ammonia.
- *Law of Thermal Expansion:* It states that at constant pressure all gases expanded by the same amount for the same increase in temperature. These laws were formulated by a French chemist, Joseph Lois Gay-Lussac (1778–1850).

Hess' Law

- States that the heat exchange in a chemical reaction is the same, no matter whether the reaction takes place in one stage or more.
- The principle was formulated by a German chemist Henri Hess (1802–50).

Graham's Law of Diffusion

- States that the rate at which two gases diffuse is inversely proportional to their densities.
- It means that the lighter the gas, the faster it will diffuse through any medium.
- The law was defined by a Scottish chemist, Thomas Graham (1805–60).

Henry's Law

- States that the mass of a gas which is dissolved in a given volume of liquid at constant temperature is directly proportional to the pressure of the gas.
- It applies to gases that do not react with the liquid (solvent).
- The principle was formulated in 1803 by the British chemist William Henry.

Lambert's Law

- States that layers of equal thickness of homogeneous material, for example, coloured filter), absorb equal proportion of light.

Raoult's Law

- States that the lowering of the vapour pressure of a solvent by a solute (dissolved substance) is proportional to the MOLE fraction of the solute, the proportion of solute molecules to the total number of molecules, solute and solvent present.
- Since the lowering of vapour pressure causes an elevation of the boiling point and a depression of the freezing point, it is used to determine the molecular mass of a solute.
- The law is named after the French chemist, Francois Marie Raoult (1840–1901).

Law of Conservation of Mass and Matter

- Matter can neither be created nor destroyed.
- The sum total of mass or matter for a system always remains constant without any increase or decrease in quantity.

IMPORTANT CHEMICAL PROCESSES

- *Bessemer Process*: It is a method of converting pig iron to steel by blowing air through the molten metals to oxidize impurities such as carbon, silicon, phosphorus and manganese normally present in pig iron.
- *Clemmensen Reduction*: It is a process used to convert aldehydes and ketones to the corresponding hydrocarbons by heating with amalgamated zinc and hydrochloric acid.
- *Gattermann Reaction:* It is a process used to convert an aromatic amine into the corresponding halogen derivative through diazonium salt formation using copper as a catalyst.
- *Haber Process*: An industrial process of producing ammonia by the reaction of nitrogen with hydrogen in the presence of a catalyst.
- *Kolbe Reaction:* It is used for the preparation of saturated or unsaturated hydrocarbons by the electrolysis of solutions of the alkali salts of aliphatic carboxylic acids.
- *Solvay Process*: It is a process of snaking sodium carbonate from calcium carbonate and sodium chloride in large scale. The process involves heating of calcium carbonate to give calcium oxide and carbon dioxide which is bubbled into a solution of sodium chloride in ammonia. Sodium hydrogen carbonate is precipitated which on heating gives sodium carbonate.
- *Bayer Process:* A process used to extract aluminium oxide Al_2O_3 or aluminia by treating powdered bauxite with hot caustic soda solution under pressure. The process was developed by German chemist, Karl Joseph Bayer in 1888.
- *Bergius Process:* A process for making lubricants and synthetic fuel for example, petrol, from coal by heating a mixture of powdered coal and heavy oil or tar with hydrogen under pressure in the presence of a catalyst (iron, tin or lead). The process was developed by German chemist, Friedrich Bergius, who shared the 1931 Nobel Prize.
- *Bosch Process:* A process used to make industrial hydrogen by passing steam over white-hot coke to produce water gas (a mixture of carbon monoxide and hydrogen) which in the presence of a catalyst (a metal oxide) reacts with more steam to liberate hydrogen and carbon dioxide. The process is named after the German chemist, Carl Bosch (1874–1940).

- *Down Process:* It is a process of making sodium metal by electrolysis of molten sodium chloride. The molten sodium and calcium formed at the cathode are separated.
- *Frasch Process:* It is used to extract sulphur from subterranean deposits in which superheated water is forced down the deposits which melts the sulphur under the ground. Molten sulphur is collected by forcing compressed air from another side. The process was developed by German chemist, Herman Frasch in 1891.
- *Hall-Heroult Process (Hall-Heroult):* A process used to prepare aluminium by electrolysis in which aluminia (aluminium oxide) is dissolved in cryolite (sodium aluminium fluoride) and electrolyzed. It was developed in 1885 in US by Charles Hall and in France by P. T. Heroult.
- *Parkes Process:* A process used for extraction of silver traces from lead ore galena. Molten zinc is added to molten galena and lead is separated leaving zinc-silver which on heating distills off zinc freeing the silver.

IMPORTANT CHEMICAL TESTS

- *Brown-ring Test:* It is used for chemical analysis of nitrates in which the solution to be tested is mixed with iron sulphate solution in a test tube and concentrated H_2SO_4 (sulphuric acid) is carefully poured along the side of the test tube. In nitrate containing substances a brown ring is formed where the layer of acid touches the solution $(FeNO)SO_4$.
- *Flame Test:* It is used to identify certain elements in which a clean platinum wire is dipped into the mixture to be tested and the wire is heated using a busen flame. The presence of certain elements can be detected by the change in the colour of flame. For example, a brilliant orange-yellow will indicate sodium; crimson, strontium and apple green, barium.
- *Beilstein's Test*: It is used for the detection of halogen in an organic compound in which a clean copper wire is heated in an oxidizing flame till the flame is no longer green. The wire is then dipped in a solution of the substance to be analyzed and heated again. If Cl, Br or I is present the flame turns a bright green.
- *Fehling's Test*: It is used to detect sugars and aldehydes in a solution. Equal amounts of solution of copper sulphate (Fehling A) and sodium tartrate (Fehling B) are mixed in a test tube, On boiling this with a given solution a red precipitate forms if sugar or aldehyde is present.
- *Kjedahl Method*: It is used to measure nitrogen in an organic compound. The compound is boiled with concentrated sulphuric acid and copper sulphate (catalyst) to convert nitrogen to ammonium sulphate. An alkali is added to the mixture and boiled to distill of ammonia which is passed into a standard acid solution and estimated by titrating the solution.
- *Molish's Test*: It is used to detect carbohydrates in a solution. The solution to be tested is mixed with a small quantity of alcoholic alphanaphthol and concentrated sulphuric acid is slowly poured down the side of the test tube. When the two liquids meet the formation of a deep violet rings indicates presence of carbohydrate.
- *Rast's Method*: It is used to determine molecular weight by measuring the depression of freezing point of a camphor by a known weight of the solute.

- *Schiff's Test*: It is used to distinguish between aldehydes and ketones. An aqueous solution of rosaniline and sulphurous acid (Schiff's reagent) is used to test for the presence of aldehydes, which oxidize the reduced form of the dye rosaniline back to its original magenta colour. The aldehydes restore the colour immediately whereas ketones, restore the colour slowly.

Table 9.12 Common Substances and Their Chemical Compositions

Substance	Chemical	Composition	Formula
Alum	Potash	Potassium, Sulphur, Aluminium, Hydrogen and Oxygen	$K_2SO_4Al_2(SO_4)_3$
Bleaching Powder	Calcium hypochlorite	Calcium, Chlorine, Oxygen	$CaCl(OCl)_4H_2O$
Blue Vitriol	Copper sulphate	Copper, Sulphur and Oxygen	$CuSO_45H_2O$
Calomel	Mercurous chloride	Mercury, Chlorine	Hg_2Cl_2
Caustic Lotion	Silver, nitrate	Silver, Nitrogen, Oxygen	$AqNO_3$
Candy Fluid	Potassium permanganate	Potassium Manganese, Oxygen	$KMnO_4$
Caustic Potash	Potassium hydroxide	Potassium, Hydrogen, Oxygen	KOH
Chalk	Calcium carbonate	Calcium, Carbon, Oxygen	$CaCO_3$
Caustic Soda	Sodium hydroxide	Sodium Hydrogen, Oxygen	$HaOH$
Baking Soda	Sodium bicarbonate	Sodium, Hydrogen, Carbon, Oxygen	$NaHCO_3$
Common Salt	Sodium chloride	Sodium, Chlorine	$NaCl$
Epsom Salt	Magnesium sulphate	Magnesium, Sulphur, Oxygen	$MgSO_47H_2O$
Galena	Lead sulphide	Lead and Sulphur	PbS
Green Vitriol	Iron sulphate	Iron, Sulphur, Oxygen	$FeSO_47H_2O$
Glauber's salt	Sodium sulphate	Sodium, Sulphur, Oxygen	$Na_2SO_410H_2O$
	Gypsum	Calcium sulphate, Calcium, Sulphur, Oxygen	$CaSO_42H_2O$
Hypo	Sodium thiosulphate	Sodium, Sulphur, Hydrogen, Oxygen	$Na_2S_2O_35H_2O$
Laughing gas	Nitrous oxide	Nitrogen, Oxygen	N_2O
Lime water	Calcium hydroxide	Calcium, Hydrogen, Oxygen	$Ca(OH)_2$
Litharge	Lead monoxide	Lead, Oxygen	PbO
Nitre	Potassium nitrate	Potassium, Nitrogen, Oxygen	KNO_3
Plaster of Paris	Calcium sulphate	Calcium, Sulphur, Hydrogen, Oxygen	$2CaSO_4H_2O$
Quartz	Sodium silicate	Sodium, Silica, Oxygen	Na_2SiO_3
Ouick lime	Calcium oxide	Calcium, Oxygen	CaO

Substance	Chemical	Composition	Formula
Red lead	Triplumbic tetroxide	Lead, Oxygen	Pb_3O_4
Sal ammoniac	Ammonium chloride	Ammonia, Chlorine	NH_4Cl
Soda ash	Sodium carbonate	Sodium, Carbon, Oxygen	Na_2CO_3
Soda bicarb	Sodium bicarbonate	Sodium Hydrogen, Carbon, Oxygen	$NaHCO_3$
Washing soda	Sodium carbonate	Sodium, Carbon, Oxygen	Na_2CO_3
White vitriol	Zinc sulphate	Zinc, Sulphur, Hydrogen, Oxygen	$ZnSO_47H_2O$

LIFE SCIENCE

VARIOUS SCIENCES

The Cell

Cell is the smallest unit of life that is capable of independent existence.

Historical Background

1. In 1665 Robert Hook, an English scientist, first saw a tiny compartment in a section of cork under his selfmade microscope and named it cell.
2. In 1824, R. J. H. Dutrochet concluded that both animals and plants are made up of cells.
3. In 1831, Robert Brown first observed the nucleus of the cell. Van Mohl and Purkings coined the term *protoplasm* for the fluid content of the cell.

Size of the Cell

1. The average cell size is around 3–30 microns (1 micron = 1/1000 mm).
2. The smallest cell size is of bacteria which is around 0.2–0.5 microns.
3. The largest cell is of an ostrich egg (unfertilized) which is about 18 cm (about 7 inches) in diametre.

Structure

Every cell is surrounded by a membrane or a living coverage through which the cell takes in what it needs from the outside atmosphere and discharges what is superfluous. Within the membrane is the protoplasm.

Parts of the Protoplasm: The nucleus controls and directs the activities of all the other parts of the cell. The remainder is known as Cytoplasm, where many of the vital activities of the cell take place.

A cell shows the following structures under a microscope:

Cell Wall: Found only in plant cells. It consists of non-living substances, for example, lignin, pectin, cellulose, etc.

Cell Membrance (Plasmalemma): It is the outer membrane of the cytoplasm found both in animals and plants. It consists of living substances, such as proteins.

Endoplasm Recticulum (ER): A network of tubes or channels of membrane in the cytoplasm which helps in protein synthesis and conduction of material.

Ribosomes: Externally small, dense, granular, spherical bodies found in a free state in the cytoplasm, composed of RNA and proteins. They help in synthesis of proteins from amino acids.

Golgi Bodies: Bag-like structures formed of stacks of membrane. In plants they are called dictysomes. Their functions include secretion of various substances, secretion of pectic material of cell wall in plants and help in the formation of cell plate during cell division.

Vacuoles: A fluid-filled sac within a cell. In plants cells they are very big and surrounded by a membrane called *Tonoplast*, whereas in animals they are tiny. Functions include osmoregulation, maintenance of cell turgidity.

Mitochondria: Rod-like or spherical semi-solid structures containing DNA in their matrix along with some enzymes which are found in all cells. The synthesize A.T.P. (energy storing molecules).

Plastids: Small bodies found in the cells of higher plants. They are two types:

1. Leucoplasts which are colourless and store starch, protein or lipids.
2. Chromoplasts are coloured and are of two types.
    (a) *Non-photosynthetic* chromoplasts which provide colour to flowers, fruits and leaves.
    (b) *Photosynthetic* chromoplasts which in green plants manufacture food from carbon dioxide and water in the presence of sunlight.

Nucleus: May be round, oval, cylindrical or elongated. Each nucleus is bound by the *nuclear membrane* which contains nucleoplasm. Nucleoplasm consists of *chromatin* and *nucleoli*. Chromatin consists of DNA, RNA and proteins. The nucleus controls all cell activities and its responsible for transfer of heredity characteristics and assists in cell division.

Centrosome: A rather dense area of protoplasm, lies close to nucleus. Usually found in animals cells. In the middle of the centrosome are two small dot-like bodies called centroils. They form a spindle in lower plants during cell division.

Cilia and Flagella: These are fine extensions of the cell surface and are similar in structure. Their functions are to help in locomotion or movement and in some animals they also help in feeding.

Cell Inclusions: These are non-living substances present either in the cytoplasm of the cell or in the vacuoles. In animal cells the inclusions are in the form of secretory granules as in zymogen granules, haemoglobin in RBC, food material in the form of glycogen in liver cells, pigments as in the cells of skin, eye and hair. Whereas in plants cells they are in the form of food particles such as starch, oil globules, or excretory products like resin, gum, etc.

Cell Division

Growth and development of all living things depend upon the growth of cells in size and division whereby increase in number takes place. There are two kinds of cell division.

1. *Mitosis*: Also called somatic cell division. Literally it means division of nucleus but it is generally described as cell as a whole, both nucleus and cytoplasm. It results in formation of two daughter cells with equal number of chromosomes in each, which occur in somatic cells or organs. It is the most common form of cell division which is essential for cell multiplication and growth. Since the number of chromosomes remains the same during mitosis, this division is also referred to as the equational division.
2. *Meiosis*: Occurs in reproductive cells. It causes a reduction in number of chromosomes in the cell besides, formation of gamets which contain half the number of chromosomes. Since the daughter cells have half the number of chromosomes as compared to the mother cell, this division is also called reductional division. It causes hereditary variation in a species due to exchange of genetic material. Before cell division, the cell prepares itself for division and is called *interphase* in which the cell becomes more active. Each cell division has two steps, such as division of the nucleus and division of the cytoplasm. During cell division chromatin material of the cell gets organized into chromosomes.

Plants and Animal Cells

The basic difference between plants and animal cells is that plant cells are enclosed by a rigid cellulosic cell wall made of cellulose surrounding their plasma membrane whereas animal cells have no such wall. Another difference is that the plant cells have a special organelle, the chloroplast with the help of which they are able to photosynthesize. Also plant cells lack centrioles which are concerned with the organization of the mitotic spindle or the flagella and cilia (discussed above). Plant cells have a large sap-filled vacuole.
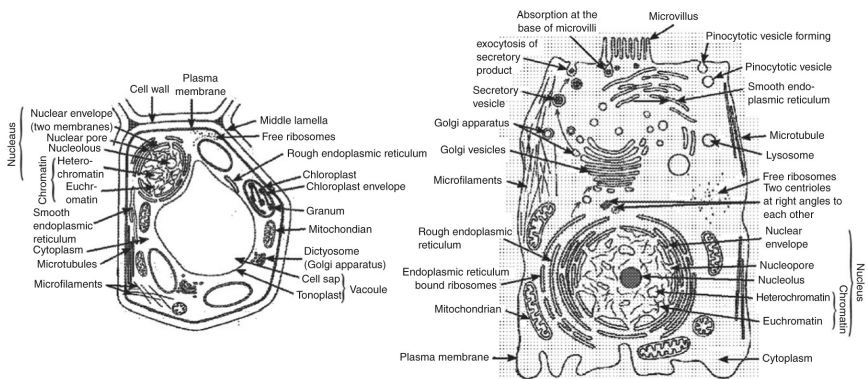
CLASSIFICATION OF THE LIVING ORGANISMS

It has been estimated that around 8.7 million different forms of life are alive in the world today. A large number of these organisms have become extinct and some of these are preserved as fossils. Most modern schemes of classification of living beings are based upon the pioneering work of Carl von Linné.

Scientific Nomenclature

In the 18th century, a Swedish biologist Carl von Linné (in Latin, Carl Linnaeus) developed a scheme of scientific classification and devised a system of scientific nomenclature. According to Linne all organisms, having some important characteristics in common and different from others in one or more ways are placed in a category termed species, for example, cat, monkey, house-fly, frog, etc. Different species having certain common characters are placed in a *genus*. A genus, is therefore, a collection of some related species but they also have some characteristics in common, for example, cat, lion and tiger constitute three different species but they also have some common characteristics and therefore, are placed in the same genus. Similarly, genera are grouped into families and families into orders and orders into classes and classes into phyla. Therefore, the lowest group is species and the highest unit is phylum and various phylum constitute a kingdom, either plant kingdom or animal kingdom. The naming of organisms is also done on a scientific basis.

1. Each organism is given two names, namely: a *generic name* and a *specific name.*
2. The generic name begins with a capital letter and the specific name begins with a small letter.
3. For example, the zoological name of the common house-fly is *Musca domestica* and that of man is *Homo sapiens*. The botanical name of wheat is *Triticum aestivum*. The order of this nomenclature is illustrated below:

Table 9.13   Order of Nomenclature

Classification	Frog	Dog	Man
Kingdom	Animalae	Animalae	Animalae
Sub-kingdom	Metazoa	Metazoa	Matazoa
Phylum	Chordata	Chordata	Chordata
Sub-phylum	Vertebrae	Vertebrae	Vertebrae
Class	Amphibia	Mammalae	Mammalae
Order	Anura	Carnivora	Primate
Family	Ranidae	Canidae	Hominidae
Genus	Rana	Canis	Homo
Species	Pipiens	Familians	Sapiens

General Classification

Traditionally all living organisms were classified under two main kingdoms:

1. The plant kingdom
2. The animal kingdom

Certain unicellular organisms like bacteria, fungi, etc., were earlier classified under the plant kingdom. However, taxonomists in the last few decades have been opposing this classification of unicellular organisms into the plant kingdom and there have been constant endeavours to revise the system of classification. Accordingly, in 1969, R. H.

Whittaker, classified all living organisms into five main kingdoms and this system is now receiving wide acceptance. According to this system the five kingdoms are:

1. Monera (true-bacteria, blue-green algae)
2. Protista (golden algae, yellow-green algae)
3. Fungi (slime molds, bread molds, sac fungi)
4. Plantae
5. Animalae

The kingdom Prokaryotae or Monera is sometimes given to include the viruses. Other systems describe viruses as being outside the normal system of classification.

A brief description of the classification along with sub-classifications is given below:

Monera: They are organisms with prokaryotic cells and diverse nutritional habits, including photosynthesis, chemosynthesis and absorption. Reproduction is a sexual by simple cell division.

For example, true-bacteria, fungus like bacteria, bluegreen algae.

Protista: They are unicellular or colonial eukraryotes with diverse nutritional habits, reproduce both sexual and asexual involving meosis and nuclear fusion. Mobility is by means of more advanced type of flagella.

For example, Euglenophytes, dinoglagellates, golden algae, yellow-green algae.

Fungi: They are multinucleate organisms, with non-photosynthetic nutrition through absorption, lacking tissue differentitation.

For example, slime molds, water molds, white ruts, bread molds, sac fungi, etc.

Plantae: Multicellular organisms with cells being enclosed by a rigid cell wall. Nutrition mostly by photosynthesis with exception of a few species being absorptive. Primarily nonmotile, often anchored to the substratum. Plantae include all botanical organisms.

Animalae: Include all protozoa and metazoa zoological organisms. These are multicellular eukaryotic organisms with cells lacking a rigid cell-wall and photosynthetic apparatus.

IMPORTANT BIOLOGICAL PHENOMENA

Photosynthesis

Process by which green plants are able to utilize energy of sunlight in order to convert water and carbon dioxide into food in the form of simple carbohydrates. The energy from sunlight is trapped in plant cells by choloroplasts which are packed with chlorophyll (gives green colour to the plant and leaves). Incoming sunlight generates tine electric currents in them. These currents convert ADP (adenosine diphosphate) into ATP (adenosine triphosphate) and split water molecules in the cells into oxygen and hydrogen paving the way for the whole complex process of photosynthesis. Thus oxygen is dissipated into the atmosphere and hydrogen combines with carbon dioxide to become glucose, one of the main fuels used by living organisms.

Metabolism

All biochemical reactions of processes taking place in the living organisms have two interwoven aspects, namely,

1. *Anabolism*: Synthesis of complex organic molecules from simple molecules by the living organisms. It is the constructive or synthetic phase of metabolism.
    for example, the formation of proteins from amino acids.

2. *Catabolism*: (also katabolism) Breakdown of complex molecules into simple molecules to release energy, bearing down of hydrocarbons into simpler forms with the release of energy. Metabolism takes place in a controlled manner at body temperature. Enzymes act as bio-catalysts in the process. The energy released in such reactions is stored and used for growth and development. The elimination of waster products generated in the process is called Excretion.

Respiration

A term with two distinct meanings, such as breathing and the transport of oxygen and carbon dioxide to and from the cells known as external respiration. Internal respiration or cell respiration occurs within the cell and constitutes the chemical reactions from which an organism derives energy. Internal respiration using oxygen is termed aerobic while anaerobic respiration may occur in the absence of oxygen. Both plants and animal respire.

Animals need oxygen to release the energy present in their food and get rid of waste, that is, carbon dioxide.

Skin Breathing: Carried out through the skin by slow-moving animals.

Gill Breathing: Fish possess gills which absorb oxygen from water flowing over them taken in through the mouth.

Tracheal Breathing: System developed by insects which include network of tubes which take oxygen to all parts of the body.

Lung Breathing: Acquired by evolved animals.

Fertilization

Is the union of two gametes or sex cells to produce a zygote or fertilized egg which grows into a new offspring.

External Fertilization: Fertilization in frogs and toads is external as it is in fishes, most water creatures and lower plants (for example, Ferns). By this we mean the male gamete swims across a watery surface to fertilize the female gamete or egg. The fertilized egg cell is then able to develop into an individual creature.

Internal Fertilization: Fertilization in mammals, birds, reptiles and insects is internal. That is to say, the sperms are shed directly into the female's body where they fertilize the egg before these are laid as in birds and reptiles whereas in mammals the cell develops into an embryo within the female body.

Fertilization in Flowering Plants: In higher plants it is a complex process involving pollen grains which are transferred to the egg-bearing organism by wind or insects. The process is called pollination in plants. On falling on a stigma each pollen grain of the right kind germinates and sends a *pollen tube* containing a male reproductive cell down through the style and into an ovule where the male cell fuses with an egg cell which can develop into an embryo plant.

Transpiration

Evaporation of water from the stem and leaves of plants. It serves the purpose of cooling the leaves on hot days and protects delicate leaf tissue from drying up. It draws water up from the roots towards the leaves which give out excess water into the atmosphere.

HUMAN BODY

Anatomy and Physiology

Blood

- Blood contained in blood vessels is a connective tissue in the form of a red viscous fluid.
- On an average, a healthy man has about 5 lr of blood in the body while a woman has about 500 ml less than a man.
- Total volume of blood is said to be 60–80 ml per kg of body weight.

Constituents of Blood

- There are two main constituents of blood solid or cellular part called blood cells (35%) and the fluid part called Plasma (65%).
- The blood cells called corpuscles are of two types the Red Blood Corpuscles (RBCs) and White Blood Corpuscles (WBCs).
- Plasma consist of Water (90%), proteins (7%), nutrients, salts, nitrogen waste, carbon dioxide, hormones.
- Blood also has platelets (thrombocytes):
- Normal count = 1,50,000–3,00,000 per mm^3.

Red Blood Corpuscles (RBC)

- *Red Blood Cells (erythrocytes):* 54% of which is haemoglobin. Normal count = 4–6 million per mm^3.
- These are disc-shaped cells without nucleus and contain a pigment called Haemoglobin which gives the red colour to the blood.
- Haemoglobin is an iron-containing pigment.
- RBCs are produced in the spleen and the bone marrow.
- Haemoglobin picks up oxygen in the lungs by forming a chemical compound.

White Blood Corpuscles (WBC)

- *White Blood Cells (leukocytes):* Normal count = 4500–11,000 per mm^3.
- These are round semi-transparent cells containing a nucleus and are a little larger in size than RBC.
- The WBC are the 'soliders' of the body's defence system and their main function is to combat infection.

Blood Grouping

- K. Landsteiner in 1900–1902, classified human blood into four groups: (i) 'A', (ii) 'B', (iii) 'AB' and (iv) 'O'.

- The 'O group' blood can be given to any of the other groups and therefore, a person possessing the 'O group' is known as a *Universal Donor*.
- 'Group AB' is called *Universal Recipient* and can receive 'A', 'B', 'AB' and 'O' blood groups.

Table 9.14   Types of Blood Groups

Blood group	Can donate blood to	Can receive blood from
A	A, AB	A and O
B	B, AB	B and O
AB	Only AB	AB, A, B and O
O	AB, A, B and O	Only O

Blood Clotting

- Blood clotting is a body's defence system to combat bleeding.
- Plasma contains fibrinogen, a soluble 'protein' which produces the insoluble protein called *Fibrin* essential for blood coagulation which is produced in the liver.

Rh Factor

- A blood antigen discovered in 1940 by Landsteiner and A. S. Wiener. It is another blood grouping which has important bearing on blood transfusion along with the 'A', 'AB' and 'O' blood grouping.
- The Rh factor is an agglutinogen found in RBC of most people and is called Rh^+. It was initially found in the rhesus monkey and later on found in man.
- People who do not have this antigen in their blood are called Rh^-.
- The Rh^- blood does not carry anti-Rh antibodies naturally but could synthesize them if sensitized through blood transfusion of Rh^+ blood.
- If Rh^+ blood is transfused into an Rh^- patient, the serum will produce anti-Rh agglutinin.
- If another dose of Rh^+ blood is given, the anti-Rh agglutinin will cause clumping of RBC of the donor's blood as soon as it enters the patient receiving it.

Blood Transfusion

- The injection of blood from one person (the donor) into the circulatory system of another is called blood transfusion. It is used to make up a loss in volume of blood or to improve its composition.
- A rapid loss of 3–3.5 lr of blood can be fatal unless it is properly replaced by transfusion.
- Blood transfusion is done after proper matching of blood groups and the Rh factor.
- The technique was first developed by James Blundell, London in 1825.

Blood Pressure

- Is the force exerted by the blood beating against artery walls. As blood is ejected from the left ventricle into the aorta, there is an increase in blood pressure, that is, the pressure of the blood upon the walls of the blood vessels.

- As the ventricle begins to relax, the pressure falls. The highest point in the pressure range is called *Systolic Pressure* (upper reading) and lowest point in the pressure is called *Diastolic Pressure* (lower reading).
- Blood pressure is measured in a large artery of the arm called the brachial artery by sphygmomanometer. The diastolic pressure is always lower than the systolic pressure.
- The average systolic pressure of a healthy young man of 20 years of age is about 120 mm Hg and the diastolic pressure about 80 mm Hg. that is, 120/80 is the normal blood pressure.
- Any systolic pressure over 140 or diastolic pressure over 100 is considered abnormal. High blood pressure may be caused by excitement and low blood pressure may result from malnutrition, etc.
- High blood pressure is called *Hypertension* and low blood pressure *Hypotension*.
- Blood pressure depends on many other factors including the strength of the heart-beat, volume and thickness of blood, elasticity of the arteries and resistance to blood flow offered by capillaries.

The Skeletal System (Bones)

- There are 206 bones in the skeletal system of an adult.
- Bones of hands and feet alone constitute 50% of the total bones in the human body.
- A new born baby has 300 bones out of which 94 bones fuse together as it grows.
- The *largest* bone of human body is the femur in the thigh which constitutes about 27.5% of a person's stature, average length of this bone is about 50 cm.
- The *shortest* bone in the human body is the stirrup bone in the middle ear.

Functions

1. They are connective tissues in the body
2. They stiffen the body
3. They provide levers upon which muscles work
4. They give shape to the body
5. They protect internal organs
6. The bone marrow produces blood cells.

Composition of Bones

Organic matter	33.30%
Phosphate of lime	51.04%
Carbonate of lime	1.30%
Flouride of calcium	2.00%
Phosphate of magnesia	1.16%
Soda/Chloride of sodium	1.00%

Important Bones

Skull Bones (Cranium): There are eight hones forming the skull (Figure 9.1). One frontal (forehead), two parietals (side of the head), one occipital, two temporals, one sphenoid and one ethmoid.
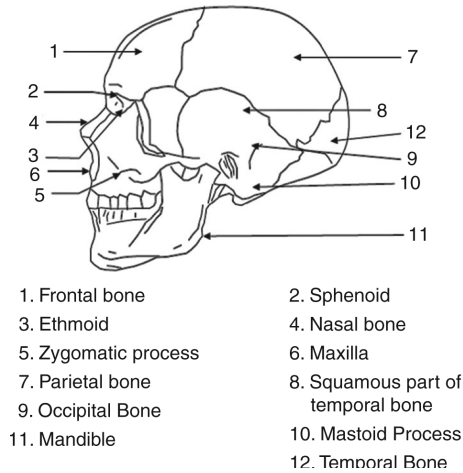
Figure 9.1   Skull

1. Frontal bone
2. Sphenoid
3. Ethmoid
4. Nasal bone
5. Zygomatic process
6. Maxilla
7. Parietal bone
8. Squamous part of temporal bone
9. Occipital Bone
10. Mastoid Process
11. Mandible
12. Temporal Bone

Facial Bones: Facial bones comprise 14 individual bones, two lachrymals, two Os-Nazale or Zygomalicum (nasal bones), two check bones, one vomer, two sponge bones, two palate bones, two superior maxillary (Maxilla) and one mandible (lower jaw).

Upper Extremities: There are 32 individual bones forming the shoulder and the arms. Shoulder bones

1. Two scapula (triangular-shaped shoulder blades)
2. Two clavicles (collar bones).

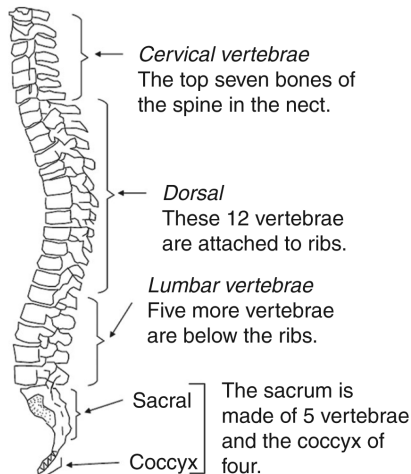*Bones of the Arm*: Each arm has 30 individual bones:

1. One humerus (the largest bone of the arm)
2. One radius (outer bone)
3. One ulna (inner bone)
4. Eight carpals
5. Five metacarpals (forming middle hand)
6. Fourteen phalanges (forming the fingers).

Backbone (the Spine): Also called *vertebrae* which encloses the spinal cord (see nervous system). In childhood, the backbone consists of 33 separate bones but in an adult there are only 26 separate vertebrae as several bones become welded (fused) together. The 26 vertebrae are sub-divided in five regions:

1. Cervical vertebrae (neck bones)—seven
2. Dorsal vertebrae (ribs support)—twelve
3. Lumbar vertebrae (backbones)—five
4. Sacrum (also called 'Sacred Bones') consists of five vertebrae (25th to 29th) fused together in adults and
5. Coccyx (four tail bones fused together in adults).

The Spine: An adults' spine consists of 26 bones called Vertebrae. It is divided into 4 sections.

Cervical vertebrae
The top seven bones of
the spine in the nect.

Dorsal
These 12 vertebrae
are attached to ribs.

Lumbar vertebrae
Five more vertebrae
are below the ribs.

Sacral — The sacrum is
made of 5 vertebrae
and the coccyx of

Coccyx — four.

Chest Bones (The Thorax): The Thorax which is a protective casing for the lungs and heart consists of one sternum (breast bone) and 24 ribs.

Hip Bone (The Pelvis): Each hip bone, originally consists of three bones, the ilium, the ischium (seat bone) and the pubis. These bones become one in a mature adult and called the *oscoxae* or the hip bone. There is a notable difference between male and female pelvis. The female pelvis is proportionately broader (for maternity reasons) and not so deep as that of male which is designed for greater strength (Figure 9.2).
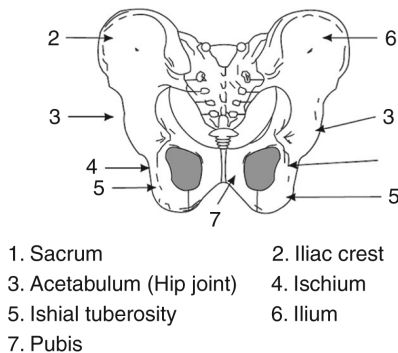

1. Sacrum   2. Iliac crest
3. Acetabulum (Hip joint)   4. Ischium
5. Ishial tuberosity   6. Ilium
7. Pubis

Figure 9.2   Pelvis

Bones of the Leg: Each leg consists of 30 bones. They are

1. Femur (the thigh bone: The longest bone of the human body)—one
2. Tibia (shin bone)—one

3. Fibula (calf bone)
4. Patela (knee cap)
5. Tarsus (ankle bones)—seven
6. Phalanges 14 (toe bones)

Muscular System

Muscles are tissues attached to bones are composed of fibres are capable of contracting and relaxing to effect body movement.

Total Number of Muscles: There are about 630 important muscles in the human body which normally account for 40% of the body weight. There are about 100 joints and about 10,000 km of blood vessels in the human body. Water constitutes about 70% of human body tissues (45 lr).

Largest Muscle: The bulkiest muscle in the body is Gluteus maximum or buttock muscles.

Longest Muscle: Sartorius (Tailor's muscles) is the longest muscle in the body. It has its origin in the upper part of the hip bone, crosses obliquely over the upper portion of the thigh, passes behind the femur and is attached to the tibia bone of the leg.

Smallest Muscle: The smallest muscle in the human body is the Stapedius which controls the stapes, an auditory ossicle in the middle ear. It is less than 1/20 of an inch and 0.127 cm long. The ear also contains one of the few tissues which has no blood supply.

Main Organs
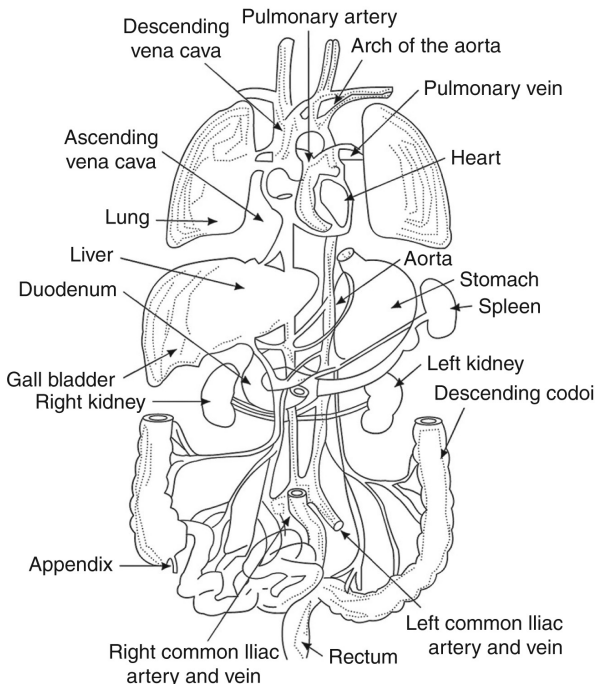
Heart

- The heart is situated in the centre of the thorax, just behind the breast the breast-bone (sternum) and is enclosed in a tough membrane called the *Pericardium*.
- Its average weight is about 340 grams in men and 225 grams in women.
- Contraction and relaxation mechanism of the ventricles results in a heartbeat of about 70–72/min in males and 78–82/min in females.
- Contraction of ventricles is called *Systole* and relaxation is called *Diastole*.
- Circulation of blood in the body is regulated by the heart.

Blood Circulation: The credit of discovering the circulatory system goes to William Harvey (1578–1657). The heart and blood vessels are concerned with blood circulation in the human body (Figure 9.3). Blood vessels consist of:

1. *Arteries*: Thick-walled tubes which carry pure blood away from the heart to the tissues at a high pressure.
   —Largest artery: The elastic aorta which begins at the heart; approximately 2.5 cm in diameter, is the largest artery in the human body.
   —Smallest artery: Arteries that are known as arterioles which are approximately 0.1 mm in diameter.
2. *Veins*: Thin-walled tubes which collect impure blood from the tissues and carry the same to the heart for purification in the lungs. Veins have valves to prevent the backward flow of blood which is carried at low pressure.

- The pulmonary artery (the only artery which carries impure blood) carries blood to the lungs from the heart.
- The pulmonary vein (the only vein which carries pure blood) carries pure blood again to the heart from the lungs to be supplied to the entire body tissues. Both impure and pure blood are forced into two ventricles by contraction of the same.
- The pure blood from the left ventricle goes into the large aorta and impure blood from the right ventricle goes into the pulmonary artery. Thus the aorta takes blood to various parts of the body.
- The pulmonary artery takes impure blood to the lungs. When ventricles relax the auricles are again filled with blood and the same process is repeated.

Body Temperature: Normal human body temperature is about 37°C (98.6°F). Some people might have a norm which is slightly higher or lower-especially young children. Norms change during the day-usually rising a little by mid-afternoon and falling a little during sleep.
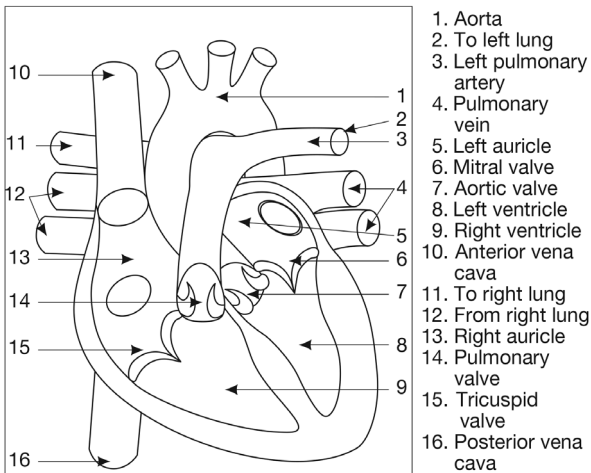
1. Aorta
2. To left lung
3. Left pulmonary artery
4. Pulmonary vein
5. Left auricle
6. Mitral valve
7. Aortic valve
8. Left ventricle
9. Right ventricle
10. Anterior vena cava
11. To right lung
12. From right lung
13. Right auricle
14. Pulmonary valve
15. Tricuspid valve
16. Posterior vena cava

Figure 9.3 The Heart

Lungs

- A pair of spongy organs consisting of elastic tissues situated in the chest cavity (Figure 9.4).
- There are two lungs, the right lung is larger than the left. The right lung weighs approximately 620 g while the left lung weighs about 570 g and together they weigh between 1.18–1.19 kg, in a healthy adult.
- Their main function is to purify blood and supply oxygen to it.
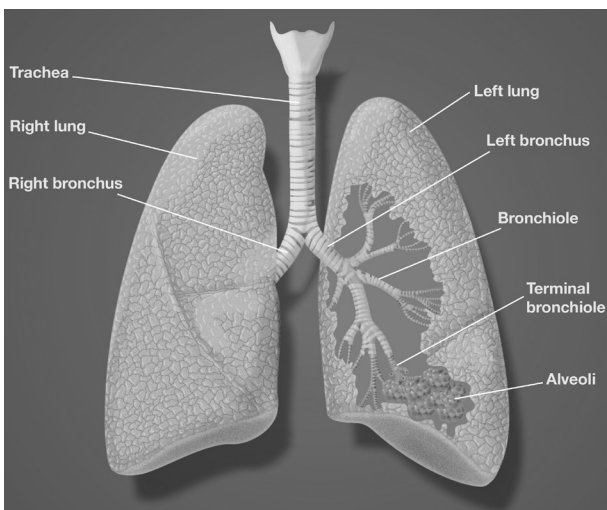- The entire blood supply (4.5–5 l) washes through the lungs about once a minute.

Figure 9.4 The Lungs

Liver

- The liver, situated on the right side of the stomach is the largest gland in the human body.
- It is dark brown in colour and divided into two lobes varying in weight from 1.359–1.812 g.
- The gall bladder is attached to the liver and stores bile produced by it.
- The gall bladder has the storage capacity of 30–60 ml of bile.

Functions: The liver secretes bile, forms and stores glycogen and plays as important part in metabolism of protein and fats. The liver is responsible for

1. The metabolism of the products of digestion.
2. The storage and release of substances (principally glucose) so as to maintain constant level in the blood.
3. The synthesis, conjugation and transformation of substances (for example, formation of proteins, dioxication of poisonous substances, production of carbohydrates from proteins, etc.)

- The bile produced by the liver is an important agent to digestion, especially fats.
- It contains water, bile salts and bile pigments.
- It does not contain digestive enzymes and as such does not take part directly in digestion.
- It contains salts like bicarbonate, glycocholate and taurocholate of sodium.
- The sodium bicarbonate neutralizes the acid and makes the churned food called Chyme Alkaline whereas glycocholate and taurocholate of sodium break down the fats of tissues into small globules.

Kidneys

- The two kidneys are situated in the upper posterior of the abdominal cavity, one on each side of the vertebral column.
- A kidney is approximately 10 cm long, 5 cm wide and 2.5 cm thick. From each kidney emerges a long channel called the Ureter by which the urine passes into the urinary bladder.
- Each kidney has thousands of minute glands in the form of canals known as Uriniferous Tubules.

Functions: They filter nitrogenous waste of the body from the blood and throw them out in the form of urine.

- Kidneys are responsible for the removal of excess water, salts and waste products from the blood and maintaining its pH level (pH value is a number used to express degrees of acidity and alkalinity in a solution).
- To achieve this, blood flows through the wide renal vessels in approximately one quarter of the resting cardiac output, that is, 1.2–1.4 lr/min. The urine expelled by a normal adult is about 1.4 lr per day.
- The human body contains about 45 lr (70%) water.

Spleen

- It is situated near the diaphragm on the left side of the body. It is the *largest lymphatic gland* in the human body. Along with the rest of the lymphoid tissue in the body, the spleen plays a considerable role in the development of immunity. However, this gland is not essential for life and can be removed. Its removal tends to increase the susceptibility of infection.

*Functions*: The main functions of spleen are
1. Formation of lymphocytes and antibodies
2. Formation of red blood cells (RBC)
3. Storage of RBC
4. Helps to remove worn-out RBC and foreign particles from the blood stream.

Human Brain

- It consists of two parts
  1. The brain located in the skull
  2. The spinal cord located in the vertebral column.
- The weight of the average human brain triples between birth and adulthood.
- The final weight of the brain in an adult male is about 1.4 kg and 1.3 kg in the case of a woman which averages about 3% of the body weight. In both sexes the brain makes up a similar proportion of the total body weight.
- The brain uses about 20% of the oxygen a man breathes, 20% of calories a man takes in and about 15% of body blood.
- The average brain contains about 10,000 million neurons, microscopic nerves cells.

Central Nervous System

- The brain and the spinal chord along with nerves constitute the nervous system.
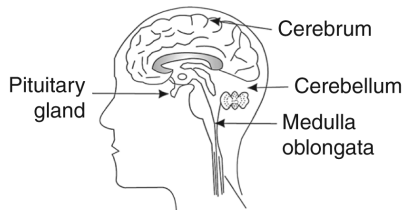
View of exterior brain showing
Convulsion of the cerebrum and the cerebellum

- The brain consists of
  1. *Cerebrum*: The largest part of the brain consists of two hemispheres separated by corpus callosum, a deep median furrow. It controls voluntary actions and is the seat of intelligence, memory association, imagination and will.
  2. *Cerebellum*: The large mass having ridges and furrows, situated above and behind the mediulla and attached to cerebrum (See diagram). It regulates muscular movement of locomotion.
  3. *Medula Oblongata*: It is the lowermost part of the brain which continues as the spinal chord in the vertebral column. It controls involuntary action.
  4. *Spinal Chord*: It is the elongated, nearly cylindrical continuation of the medulla. It is enclosed in vertebrae and runs down the back. The length of the spinal cord in an average man is about one metre (3.3 ft).
  5. *Nerves*: They are whitish cords consisting of large numbers if exceedingly fine filaments (nerve fibres) of variable diameter, bound together in bundles by fibrous tissues.

Function of Nerves

- Nerve fibres transmit messages (nerve impulses) both to and fro from the central nervous system to the various structures of the body.
- The fibres which carry impulses from the central nervous system are called Efferent. Many of these pass to the muscles to make them contract and are called Motor Nerve Fibres. Those which carry impulses to the central nervous system are called afferent fibres. The information which they transmit from the skin and deeper tissues often evokes subjective sensation within the nervous system hence they are called Sensory nerve fibres.

Classification of Nerves

- Cranial nerves are attached to the brain and emerge from the skull (cranium).
- Spinal nerves are attached to the spinal chord which is enclosed in the vertebral column. There are 31 pairs of these, named after the groups of vertebrae between which they emerge—eight cervical, twelve thoracic, five lumbar, five sacral and one coccygeal.

Sense Organs

Skin: Skin covers the muscles of the body and is said to be the largest organ of the human body.

- In an adult man skin cover is about 1.9 m^2 (20 ft^2) and a woman has about 1.6 m^2 (17 ft^2) of skin (Figure 9.5).
- The human skin is composed of two main layers, namely,
    1. The outer layer called Epidermis which has no nerves of blood vessels and is continuously renewed. There are pigment grains located in the basal layer of the epidermis which give colour to the skin.
    2. Inner layer called Dermis is a thick layer below the epidermis which contains nerves, blood vessels, hair follicles, sebaceous and sweat glands.
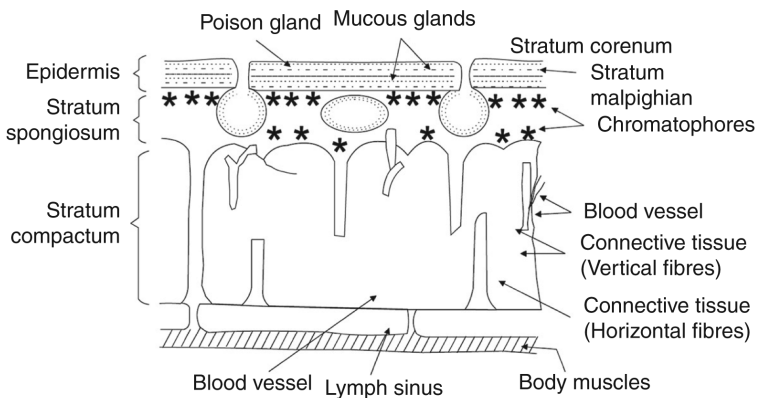

Figure 9.5   Cross Section of Skin

Tongue

- It is the muscular organ in the mouth is the primary organ of taste and important in the formation of speech and in the chewing and swallowing of food.
- The tongue, which is covered by a mucous membrane, extends from the hyoid bone at the back of the mouth upward and forward to the lips. Its upper surface, borders and the forward part of the lower surface are free; elsewhere it is attached to adjacet parts of the mouth.
- Extrinsic muscles attach the tongue to external points and the intrinsic muscle fibres, which run vertically, transversely and longitudinally, allow it a great range of movement.
- The upper surface is convered with small projections called Papillae, which give it a rough texture.
- The colour of the tongue usually pinkish-red, but discoloured by various diseases is an indication of health.
- The tongue serves as an organ of taste, with taste bud scattered over its surface and concentrated towards the back of the tongue (Figure 9.6).
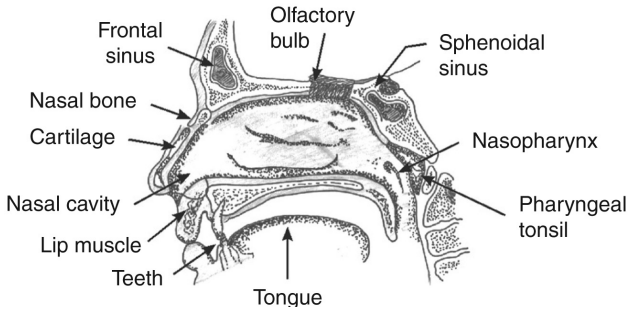

Figure 9.6   Sense of Taste

Nose

- The nose, the main organ of smell is also part of the apparatus responsible for respiration and voice.
- Considered anatomically, it may be divided into an exteranl portion—the visibly projected portion, to which the term nose is popularly restricted—and an internal portion, consisting of two principal cavities or *nasal ffossae* (separated from each other by a vertical septum), subdivided by spongy or turbinated bones that project from the outer wall into three passages (*meatuses*) with which the various siuses in the *ethmoid, sphenoid, frontal* and *superior maxillary bones* communicate through narrow apertures.
- The margins of the nostrils are usually lined with a number of stiff hairs (*vibrissae*) that project across the openings and serve to arrest foreign substances such as dust and small insects, which might otherwise be drawn up with the current of air intented for respiration.
- The skeleton or framework of the nose is partly composed of the bones forming the top and sides of the bridge and partly of cartilage.

Eye

- The eyeball, almost a perfect sphere of 2.5 cm diameter consists of three coatings, namely, sclerotic (upper coating) continuous with the transparent cornea in front (Figure 9.7).
- Within the sclerotic is the middle layer call *choroid* and the inner line called retina. The membrane covering the cornea is conjuctiva.
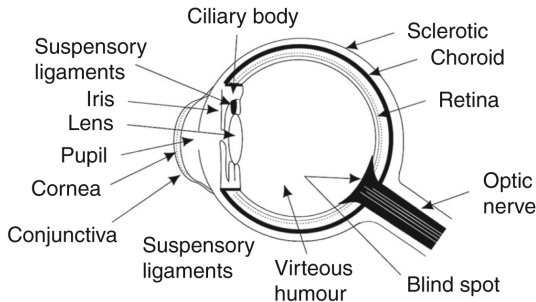- The cavity of the eyeball is filled with aqueous humour and vitreous humour and in front there is a convex lens.

Figure 9.7   Eye

- The lens attached to the ciliary body is situated behind the iris. The iris is the coloured portion of the eyeball situated behind the cornea, which automatically adjusts the size of the pupil (the circular opening or diaphragm in the iris through which light passes) to the intensity of light falling on it.
- In bright light the iris automatically shuts tighter, reducing the amount of light entering the pupil.
- In order to form an image on the retina, light must pass through all the media of the eye (cornea, aqueous humor, lens, vitreous humor) and be brought to a focus on the retina to form an upside down image on it and the process of interpretation takes place in the brain.

Ear

- The ears have two main functions, namely
  1. Defection and analysis of sound
  2. Maintenance of balance of the body.
- Broadly, the ear is divided into three main regions—the outer ear, the middle ear and the inner ear.
- Sound waves or vibrations in the air—are collected by the pinna which acts as a sound collector and travel to the ear-drum which is set into vibration.
- The ossicles transmit the vibration to the inner ear, where they cause waves in the fluid called Perilymph, filling the coiled tube of cochlea, a tube coiled like a small, snail

shell of 2 and a half. These waves vibrate the basilar membrane which divides the tube lengthways.

- The membrane it tuned so that each part responds to a different frequency and along it are some 10,000 sensory structures—the rods or corti.
- These structures convert the basilar membrane's vibrations into nerve impulses, which reach the brain along the auditory nerve where they are intercepted into sound (Figure 9.8).
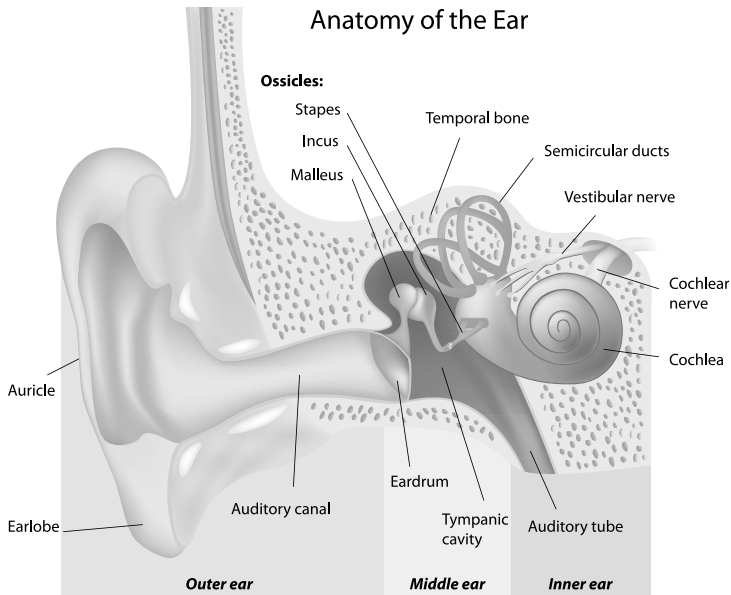

Figure 9.8   Ear

Maintenance of Balance: The second function performed by the ears is the maintenance of balance which is achieved by three semi-circular canals and the utricle and saccule all of which are filled with fluid. The semi-circular canals detect movement in three planes of right angles and so provide a stream of information for the brain on movements of the head. The utricle and saccule detect tilting of the head and combine with the canals to give rapid control of balance in normal circumstances.

Glands of the Human Body

- Organs of the human body which manufacture some liquid products which are secreted from the cells are called Glands. There are two types of glands:
  1. *Ducted Glands*: Ducted glands also called Exocrine glands secrete their product through well-defined ducts.
      For example, *Liver* production of bile; *Lachrymal* secretes tears in the eyes; *Salivary* secretes saliva in the mouth; *Sweat glands in the skin* secrete sweat.
  2. *Ductless Glands*: Also called Endocrine glands or internally secreting glands. They secrete hormones directly into the blood-stream in response to instructions from the brain.

Table 9.15 Ductless Glands

Name of Gland	Function
Thymus	In early childhood it plays some part in building resistance to diseases and physical development
Thyroid	Regulates metabolism
Prostrate	Regulates blood pressure and sexual potency
Gonads	Relates to reproductive system and secretes sex hormones
Adrenal	Causes acceleration of the breath, heightens emotion and a sudden increase in physical strength during fear or anger
Pancreas	Aids in digestion of proteins, carbohydrates and fats; it secretes insulin and deficiency of insulin causes diabetes
Pituitary	Called the master gland as it controls the other ductless glands and influences growth and metabolism.

- *Digestive System*: The process of converting food into energy-giving substances is carried out by the digestive system. The digestive system comprises the alimentary canal and the associated digestive glands like liver and pancreas.
- *Alimentary Canal*: The entire tube-like structure starting from mouth to the anus, is called alimentary canal. It includes various digestive organs.
    For example, mouth, gullet, oesophagus, stomach, small and large intestine, rectum and anus.

Digestive Organs

- *Teeth*: The teeth cut and grind the food with the help of saliva secreted by the mouth.
- *Milk Teeth*: Appear by the age of 7 months and are 20 in number.
- *Adult Teeth*: Milk teeth drop and 32 permanent teeth begin to replace them from the 6th year onwards There are four chisel-shaped incisors, two conical premolars and six molars for crushing and grinding the food. The two wisdom teeth, the rearmost, develop at a later stage and are largely non-functional. In the mouth salivary glands secrete saliva which moistens the food and ptyalin ferment contained in it acts on carbohydrates.
- *Gullet*: Also called oesophagus, is a 25 cm long duct system covering mouth and the food pipe pharynx. The food is carried to the stomach thereon by peristalsis movement (contraction of the wall of the pipe).
- *Stomach*: A warehouse where food can be stored to await the main process of digestion. Gastric juices produced in the stomach help in digestion of food.
- *Small Intestine*: Measuring 6–7 m long and 2 cm in diameter is arranged in coils. Here the food from the stomach is mixed with bile and pancreatic juice and moves forward through peristalsis movement. Part of the intestine near the stomach is called Duodenum where bile and pancreatic juices digest the food.
- *Large Intestine*: A 1.4 m long tube called colon. It receives undigested material from the small intestine and absorbs water. The remaining waste material is sent to the rectum and discharged from the anus.

Process of Digestion

Chewed food is converted into food pulp called Chyme. After being processed by bile and other secretions it becomes an emulsion called chyle. The end product is absorbed through the walls of the small intestines and taken into the blood. The undigested waste part is excreted as faeces.

Digestive Secretions

- *Saliva*: Produced by salivary glands in the mouth (situated under the tongue) saliva helps to lubricate the chewed food making it fit for swallowing. It also contains a ferment called *ptyalin* which acts on starches (carbohydrates) and hydrolyzes the same into maltose.
- *Gastric Juice*: Produced in the stomach, contains hydrochloric acid and enzymes. Hydrochloric acid kills bacteria present in food and the enzymes help to digest the food. It contains 90% water, 5% enzymes (pepsin, renin and gastric lipase) and 5% hydrochloric acid. Pepsin and hydrochloric acid turn protein into peptones and proteoses. Renin curdles milk to form casein and gastric lipase acts on fat to convert it into glycerol and fatty acids.
- *Pancreatic Juice*: Produced in the pancreas, meets the food pulp in the duodenum along with bile juice (alkaline) from the liver plus intestinal juice from the small intestine. Bile produced in the liver is stored in the *gall bladder*. Pancreatic juice contains several enzymes which act on proteins, carbohydrates and fats. Amylase catalyzes hydrolysis of starch, lipase acts on fat which is converted into glycerol and fatty acids.

Table 9.16 Important Hormones

Hormone	Produced by	Action
Adrenalin	Adrenalin	Blood pressure control
Insulin	Pancreas	Sugar metabolism
Oestrogen	Ovary	Affects female organs
Testoterone	Testes	Affects male reproductory function
Thyroxin	Thyroid	Growth and metabolic rate

Table 9.17 Important Digestive Enzymes

Enzyme	Produced by	Converts
Amylase, Ptylain	Salivary glands in mouth	Starch to sugars (Maltose)
Peptin	Gastric glands in stomach	Proteins to amino acids (Peptones)
Trypsin	Pancreas in abdomen	Proteins to Peptones
Amylase	Pancreas	Carbohydrates to Maltose
Lipase	Pancreas	Fats to fatty acids and glycerol
Erepsin	Intestinal glands in small intestines	Peptides to amino acids
Maltase	Intestinal glands	Maltose to glucose
Lactase	Intestinal glands	Lactose to glucose
Sucrase	Intestinal glands	Sucrose to glucose

The Reproductive Organs

- A human reproductive organs or sex organ or primary sexual characteristic narrowly defined is any of those parts of the body (which are not always bodily organs organs according to the strict definition) which are involved in sexual reproduction and constitute the reproductive system in an complex organism namely:
    1. *Female*: Vulva (notably the clitoris), vagina (notably the cervix), labia, uterus, fallopian tubes, ovaries, skene's glands, bartholin's glands.
    2. *Male*: Penis (notably the glans penis and foreskin), testicles, scrotum, prostate, seminal vesicles, epididymis, cowper's glands.
- The latin term genitalia is used to describe the sex organs and in the English language this term and genital area are most often used to describe the externally visible sex organs or external genitalia: in males the penis and scrotum in females the vulva.
- The other parts of the sex organs are called the Internal genitalia.
- A gonad is a sex organ that produces gametes, specifically the testes or ovaries in humans.
- Organs of sexual anatomy originate from a common anlage and differentiate into male or female sex organs. Each organ in one sex has a homologous counterpart in the other one.

Human Cell, Genes and Heredity

Human cell

- The smallest unit of life that is capable of independent existence. It occurs in all living organisms (both plants and animals). The average diameter of a cell is between l/50 and 1/100 millimetre.
- The largest human cell is the ovum. Every square inch of skin of the human body contains about a million cells. The brain is made of 30 million cells. Our blood contains about 20 trillion cells.
- The whole cell is surrounded by a strong membrane called the membrane which is approximately 5,00,000th of an inch in thickness. Each cell has a dense kernel called Nucleus which controls the activities of the rest of the cell.
- Outside the nucleus is cytoplasm, a gelatinous substance The nucleus is enclosed in a thin but strong membrane called Nuclear envelope and contains chromosomes.

Chromosomes

- Chromosomes are carriers of genes (hereditary traits). They are threadlike bodies found in the nucleus of the cell. They are always found in pairs and vary in number in each species of living organisms.
- Human cells have 23 pairs (46 in all) of chromosomes. In every chromosome there are protein molecules and two kinds of nucleic acid molecules called RNA (Ribose Nucleic Acid) and DNA (Deoxyribose Nucleic Acid).
- The DNA is concentrated in the chromosomes while RNA is concentrated in the nucleoli both of which are present in the nucleus.

Genes

- The gene is a hereditary unit located in chromosomes. Transmission of physical and mental traits from parents to offspring is through the base unit of genes.

- The gene consists of DNA molecules in different patterns and hereditary traits are determined by these patterns and they also mastermind the process of life.
- In 1896 Gregor Mendel proved that certain hereditary factors operate in all biological species and it was Wilhelm Johannsen (a Danish biologist) who gave them the name *genes*.
  1. *Isolation of Pure Gene*: In 1969 scientists at Harvard University isolated and photographed the pure gene.
  2. *Artificial Gene*: Dr Hargobind Khorana, an Indian-born American scientist (who received the Nobel Prize in 1968) successfully created an artificial gene in a test tube in 1970 by protein synthesis.
  3. *Genetic Code*: is the code of life by which inherited characteristics pass from generation to generation. It is expressed by the molecular configration of chromosomes of cells in which the code bearing material is DNA.

Genetic Engineering

- Also called Bio-engineering is the artificial manipulation of parental genes to form combinations to give birth to a new organism with predetermined, mental and physical characteristics.
- The beginning of bio-engineering can be traced back to the discover of DNA in 1953 (responsible for carrying hereditary traits) followed by the development of the technique of manipulating DNA in a living cell by recombinant DNA in 1973. The technique is known as Recombinant DNA or gene splicing.
- The genes cut from the donor DNA using chemicals called Enzymes that act as molecular knives.
- The isolated gene is then inserted into the DNA of a bacterium commonly the intestinal bacterium called *E. Coli,* again using an enzymatic reaction.
- The hybrid DNA thus produced is put back into *E. Colli* growing in the culture medium has the hybrid DNA in it, nucleus and is capable of exhibiting the traits and characteristics coded by the foreign gene.
- The four DNA bases Adenine (A), Guanine (G), Thymine (T), and Cytosine (C), like the letters of the alphabet can be used to store information. This genetic information is passed on via RNA or ribonucleic acid consisting of the four bases Adenine (A); Guanine (G); Cytosine (C) and Uracil (U); which provides a template for the assembly of amino acids in a particular sequence, thereby building a protein.
- A group of three DNA or RNA bases is known as a triplet of codon and codes for a particular amino acid. Information is passed from DNA to RNA by complementary pairing: A pairs only with U and G only with C.

Sex Determination

- Out of 46 chromosomes (23 pairs) only 44 (22 pairs) are true homologous (similar). The other two, the X and Y are sex chromosomes.
- Two X chromosomes produce a female and an X and a Y chromosome produce a male. Hence the sex of a child depends entirely on whether the female egg is fertilized by an X-carrying sperm or Y-carrying sperm.

Twins

1. *Fraternal Twins*: If two eggs are released by the ovaries at the same time due to some irregularity and both get fertilized, they develop into two separate babies. Such twins may be of the same sex or of different sex.
2. *Identical Twins*: Develop from a single fertilized egg during the first division of the zygote (egg) into two similar cells that develop into two separate embryos. Since they develop from a single zygote, these twin have the same genetic characters and are always of the same sex. Identical twins who are born joined together, generally at the head, chest or hip are called *Siamese* twins. Siamese twins occur very rarely and can usually be separated surgically unless a vital organ such as heart is shared by both. The first such twins who received wide publicity came from Siam (now Thailand) in the 19th century.

Human Genetics

- Human Genetics is that branch of medical science, which deals with the study of hereditary material passing from one generation to another.
- The study leads to a better understanding of the way by which this hereditary material develops into physical characters under the influence of intrinsic and extrinsic environmental factors.
- In other words, the science deals with transmission of physical, mental and biochemical characteristics from parents to off-springs.
- The science also reasons out why an offspring will not be the exact replica of the parents. The tendency on the part of the offsprings to produce parental features is known as Heredity.
- This science is the youngest branch of medical sciences. During the last six or seven decades, a phenomenal growth of this science has occurred and thus opened up biological thinking towards a better understanding of some of the problems of life as far as health of the future generation is concerned.
- Thus, in the present era Genetics is one of the new and most significant developing branches of medical sciences. There are two main components of this science.
  1. *Heredity*: Study of similar traits passed from parents to their offsprings.
  2. *Variation*: Study of traits influenced by the internal or external forces so that no two individuals are exact replicas of each other.
- For human beings, the knowledge of Genetics can be helpful in many ways:
  1. To understand the underlying cause of the disease and the means of transmission
  2. To understand the reasons of normal variations
  3. To apply the knowledge to the possible means of preventing genetic disorders through counselling and antenatal diagnosis
  4. This knowledge can be applied to solve legal problems like disputed parentage or traits of murderer, etc.
- The study of Genetics can be subdivided into following branches:
  1. *Cytogenetics*: This field gives the knowledge of structure of nucleus of cell and its part. that is, chromosomes which normally lies in the condensed form in the nucleus.

2. *Molecular and Developmental Genetics*: The field dealing with molecular structure of the Genetic materials, its significance during embryogenesis and functional state of individuals during normal as well as abnormal conditions.

3. *Eugenics*: The field dealing with clinical applications of principles of heredity for betterment of mankind.

4. *Physiological Genetics*: The field elucidates the normal functions of various organelles of a cell governed by the genetic material.

5. *Population Genetics*: The field deals with the distribution and behaviour of genetic material in a particular population so that the genes and the genotype frequencies are maintained or changed.

6. *Clinical Genetics*: The field deals with the application of knowledge of genetic material responsible for certain diseases and their transmission from one generation to another. The field also includes, the investigative and preventive methods adopted for diagnosis and preventing their disorders.

7. *Environmental Genetics*: This field deals with the manipulation of genetic material in living form by recent advanced technologies of genetic engineering and recombinant DNA.

8. *Radiation Genetics*: This field deals with the effects of various types of radiation on genetic material producing various diseases.

9. *Biochemical Genetics*: The field deals with the biochemistry of genetic material for normal metabolic processes. This also includes immunogenetics and blood groups, that is, genetic material concerned with the mechanisms of producing antigenes and antibodies.

10. *Genetic Counselling*: The branch deals with the immediate and practical preventive and social health promotional measure, in problems of genetic disorders. The counsellor named as Medical Geneticist can deal with matters pertaining to the causation, incidence, risk and recurrence of inherited defects, radiation hazards, mutant viral strains in biological warfare. Some newer drugs including the anticancer drugs which can cause genetic problems duo to mutation also come under the purview of the counsellor.

Human Diet

- Balanced Diet is one which contains all the necessary nutrients required for growth and maintenance of the human body in the right proportion.
- Normally, a balanced diet:
  —should be able to provide about 3000 calories per day for a normal adult.
  —should contain all essential elements in appropriate proportion.
- An average person requires approximately 400–500 g of carbohydrates, 70 g of proteins and 75 g of fat, that is, the ratio of fat, protein and carbohydrates should be around 1 : 1 : 6.
- Food should be in a form that can be easily digested and properly cooked so as to remove any harmful bacteria.
- The requirement of carbohydrates, proteins and fat is greater for growing children, nursing mothers and patients suffering from certain diseases.
- A sportsman needs two-and-a-half times more carbohydrates than an ordinary person.

Table 9.18 Vitamins

Vitamin	Source	Deficiency results in
Vitamin A	Animal fat, eggs, carrots, mangoes, papayas, tomatoes, spinach, whole milk	Poor growth, rough and dry skin and less resistance to infection; also causes night blindness
Vitamin B Complex	Brewer's yeast, cereals, eggs, fruits, liver, meat, pulses	Poor growth and also causes beri-beri, pellagra, diarrhoea
Vitamin C	Fresh fruit, oranges, lemons, milk, fresh vegetables	Sore mouth and gums, capillary bleeding, delayed healing of wounds, scurvy
Vitamin D	Oily fish, dairy products, eggs, milk, sun's rays, butter	Ricketts in children, osteomalacia and osteoporosis in adults
Vitamin E	Wheat germ, milk, cereals, egg yolk, beef, liver, mutton, spinach, soyabeans	Thought to interfere with reproduction and also causes certain degenerative diseases of the nervous system, liver damage, haemorrhage; also abortion, menstruation irregularities
Vitamin K	Green leafy vegetables, oats, fish, rye, peas	Delayed clotting of blood, liver damage, increased tendency to haemorrhage
Vitamin P	In almost all sources of vitamin C like oranges, lemons and other citrus fruits.	Unhealthy blood capillaries

DISEASES OF HUMAN BODY

Acquired Immuno-Deficiency Syndrome

AIDS is a killer disease. Its full form is 'Acquired Immuno-Deficiency Syndrome'. The disease was first reported in early 1981 from the United States and created a worldwide scare. The World Health Organization's great concern during the decade is to combat the spread of this fatal incurable disease.

- *Causes*: AIDS is transmitted by a virus known as HLV-III, which disrupts the entire immunity system of the human body. When AIDS was first detected, it was thought to be a sexually transmitted disease found in homosexuals only. However, later investigations revealed that the principal mode of its transmission was through blood by way of:
  1. Shared needles for injecting drugs
  2. Transfusion of contaminated blood
  3. Anal sex which often damages blood vessels making entry of the virus easy
  4. Sexual relations with an infected person also spreads the virus
- *Symptoms*: The most common symptoms are a form of severe lung infection known as *Pneumocystis* carnii pneumonia and cancerous skill tumour known as *Caposi's Sarcoma*. Death mainly occurs as a result of skin tumours and other complications including brain damage and severe diarrhoea.

- *Treatment*: There is no specific treatment yet available for AIDS. However, encouraging results have been achieved by administration of AZT (Short for 3-azido-3-deoxythy-midine) taken orally four times a day. However, its long term effects are not yet known. It in fact does not cure AIDS but only keeps the multiplication of new virus in check. Efforts are afoot to develop a vaccine against this virus. According to medical circles in the US a vaccine against AIDS, even if successfully developed would not be available for general use at least till 1999.

COMMON DISEASES

Malaria

An insect borne tropical disease.
- *Cause*: Malaria parasite (Plasmodium) which enters the blood through a mosquito bite (female anopheles).
- *Symptoms*: Shivering, fever. Repeated attacks lead to enlargement of spleen. Also leads to anaemia, pigmentation of the face and general weakness.
- *Cure/prevention*: Administration of quinine or plaurdine. Prevented by keeping the atmosphere free from mosquitoes.

Tuberculosis

An infectious and endemic disease, both airborne and caused by food, unhealthy living and working conditions.
- *Cause*: *Mycobacterium tuberculosis* (detected by Robert Koch in the mid-19th century), a type of bacteria. It attacks a person suffering from malnutrition, weak chest, unhealthy living and working conditions.
- *Symptoms*: General weakness, regular temperature (generally in the evening and not very high), coughing, bloodstained sputum.
- *Cure/Prevention*: Streptomycin and surgery. Prevented by BCG inoculation and healthy living and working atmosphere. *BCG,* the vaccine was developed in 1906 by Calmette Guerin in Paris and called BCG.

Cholera

An acute epidemic, water and food-borne disease.
- *Cause*: *Cholera vibrio* or *Vibrio cholerae* which attacks during exposure to chill when stomach is empty for long duration, eating of unripe or overripe fruits and stale food.
- *Symptoms*: Vomitting, stomach ache, loose stools with high frequency followed by temperature and unconsciousness.
- *Cure/Prevention*: Avoiding consumption of cut fruits exposed to flies and contaminated water. Anti-cholera drugs are administered.

Tetanus

- *Cause*: *Bacillus tetanus* and *Clostridum tetani* which live in soil, dust, cow and horse dung. It attacks an open wound exposed to dust and soil.

- *Symptoms*: Painful contraction of muscles, usually of neck and jaws, followed by paralysis of thoracic muscle.
- *Cure/Prevention*: Preventing exposure of wounds to dust and administering of Anti-Tetanus (ATS) injection.

Diphtheria

An acute infectious disease of the throat.
- *Cause*: Acute infection by diphtheria *bacillus/corynebacterium* diphtheria causing infection of throat.
- *Symptoms*: Inflammation of throat where a grey membrane (a false membrane on mucous surface) is formed. Pain and swelling of throat with fever.
- *Cure/Prevention*: Immunization vaccine/injection of diphtheria antitoxin within 12–24 hours of appearance of symptoms.

Typhoid

A food and water-borne infectious disease.
- *Cause*: *Salmonella typhi* bacillus transmitted through contaminated food and water, either directly by sewage or indirectly by hands and faulty hygiene.
- *Symptoms*: Temperature, slow pulse, abdominal tenderness, rose-coloured rash.
- *Cure/Prevention*: Rest and administration of Chloromycetin, proper sanitation, protection of eatables.

Plague

A contagious disease which takes the form of an epidemic.
- *Cause*: *Pasteurella pestis* spread by infected rats. Transfer of infection from rat to man through flea bite or accidental contact with infected rats.
- *Symptoms*: Acute body ache, reddish eyes, sudden rise of temperature, inflammation of neck glands and glands in armpit and thighs.
- *Cure/Prevention*: Antiplague inoculation, isolation of patient, disinfection of patient's clothes and utensils, burning of killed rats. Sulpha drugs and streptomycine administration.

Typhus

A viral infection.
- *Cause*: *Rickettsia prowazekii*, usually caused by poor hygiene and malnutrition. *Symptoms*: High fever, skin eruptions and severe headache.
- *Cure/Prevention*: Sulphonamides and antibiotics.

Pneumonia

- *Cause*: Diplococus pneumonia
- *Symptoms*: Chills, pain in chest, rusty sputum, rapid breathing, abdominal pain.
- *Cure/Prevention*: Antibiotics.

Gonorrhoea

A venereal disease.
- *Cause*: *Neisseria gonorrhea*, through sexual intercourse with infected person.
- *Symptoms*: Redness, swelling, pus discharge through urethra, painful urination.
- *Cure/Prevention*: Penicillin G. Tetracycline.

Syphillis

- *Cause*: *Treponema pallidum* transmitted through sexual contact.
- *Symptoms*: A hard painless sore on the genitalia, skin eruption.
- *Cure/Prevention*: Penicillin, protected sexual intercourse.

Whooping Cough

Chiefly occurs among infants and children.
- *Cause*: *Nemophilus pertusis* transmitted through air.
- *Symptoms*: Severe cough, usually at night.
- *Cure/Prevention*: Immunization of infants with immunity serum.

Some Blood Diseases

- *Anaemia*: A condition where the RBC are seriously reduced in number or else are deficient in haemoglobin. This results in reduced supply of oxygen to tissues which retards normal functioning of the body systems.
- *Leukemia*: Also called Blood Cancer is caused by over production of WBC. The WBC overrun the bone marrow and crowd out the RBC causing anaemia. The disease is caused due to malfunctioning of bone marrow and is normally incurable. However, bone marrow transfusion is believed to yield good results.
- *Agranulocytosis*: A condition where there are two few WBC. This lowers body resistance to disease and causes secondary infections whereby the patient may die from infections he cannot resist.
- *Thrombocytopenia*: A condition where there are too few platelets in the blood, as a result blood seeps out of the circulatory system making black and blue bruise spots. If not properly treated, it may result in fatal bleeding.
- *Haemophilia*: A hereditary bleeding tendency due to inadequate clotting of blood. It is a rare disease almost always seen only in males.
- *Haemorrhage*: Loss of blood from the blood vessels which may be from external wounds and occur in the tissues or escape into the body cavity.

Diseases of the Eyes

- *Hypermetropia (Far-Sightedness)*: A vision defect when a person cannot see objects near at hand because the light focuses behind the retina. This can be corrected with convex lenses.
- *Myopia (Near-Sightedness)*: A vision defect when a person cannot see distant objects because the light entering the eyes focuses in front of the retina. The lens refracts the parallel rays entering the eye. This can be corrected by using concave lenses.

- *Astigmatism (Distorted vision)*: A condition in which light focuses on a line instead of at a point (when cornea is not spherical). This line may focus behind the retina in which case it is called *Hyperopia astigmatism* or *Myopic astigmatism* when in front of the retina. This defect can be corrected by using cylindrical lenses.
- *Presbyopia*: Lack of normal focusing power of the eye on objects near at hand and common in most persons after 40–42 years of age. Presbyopia causes difficulty in reading and working with objects close at hand. This defect can be corrected by the use of *convex* lenses.
- *Conjunctivitis*: Inflammation of the eyes resulting in itchiness and reddening of eyes making them sensitive to light. For cure, the affected eye is daubed with a simple solution of weak, salt water or boric acid and use of antibiotic eyedrops.
- *Trachoma*: Caused by a germ called *chalmydiae* and spreads by direct contact. It always affects both eyes and causes mild itching and irritation. For cure tetracyline group orally is administered.
- *Cataract*: A condition of opacity of lens which occurs with ageing, causing progressive blurring of vision. Distant view is mostly affected whereas near vision is often improved in early stages. Cataract can be cured by operation called *Lens extraction*.

Common Body Disorders

- *Allergy*: A special reaction to a certain substance such as pollen (causes sneezing) or certain foods (causes skin rash). Allergy can be from any material even by colour of clothes and furnishings, etc.
- *Arthritis*: Inflammation of joints.
- *Asthma*: A respiratory disorder caused by narrowing of bronchial tubes. It is caused both by infection and due to allergy to dust-ridden atmosphere.
- *Bronchitis*: Inflammation of bronchial tubes caused by bacteria or virus. A fatal disease among infants and secondary infection among adults.
- *Cancer*: An abnormal growth of body cells, often resulting in a malignant tumour. There are several causes for this dreaded disease and certain cancers are yet incurable.
- *Diabetes*: Excess sugar in the body when the body is not able to control level of blood sugar due to malfunctioning of the pancreas (digestive gland) that is, when it produces inadequate *insulin*. A controlled diet (less carbohydrates) and intake of insulin is the treatment for diabetes.
- *Epilepsy*: Unwarned and periodic loss of consciousness along with convulsions due to nervous disorders.
- *Glandular Fever (Mumps)*: An acute infection probably caused by a virus occurs particularly in children and young adults following swelling of the glands of the neck and high fever.
- *Hepatitis*: Any infectious or inflammatory disease of the liver commonly identified by its primary symptoms of jaundice.
- *Hernia*: A weakness of the muscle surrounding an organ allowing it to bulge through, often found in the groin. It is cured by operation.

- *Jaundice*: Excessive bilirubbin (present in bile juice secreted by liver) in the blood, causes yellowing of the skin, eyes and yellowish urine.
- *Leukemia*: Also called blood cancer.
- *Measles*: A contagious disease caused by virus, a red rash appears on the body along with fever. Disappears gradually after about ten days.
- *Migraine*: A type of a headache followed by disturbed vision and speech accompanied by nausea.
- *Pellagra*: A disease caused by deficiency of nicotinic acid (Vitamin B Complex). The symptoms are diarrhoea, mental laziness and symmetrical dermatitis. Skin becomes red and itchy.
- *Osteomalacia*: A disease caused by shortage of Vitamin D which results in softening of bones, pain causing frequent fractures and bending of the backbone.
- *Pleurisy*: Inflammation of the membrane that covers the lungs and lines the chest cavity
- *Rabies*: A virus disease transmitted by the saliva of infected animals, symptoms include convulsions and revulsion to water (Hydrophobia).
- *Ringworm*: A skin disease causing circular swelling on the skin. Transmitted through air-borne spores and contact with infected patient.
- *Scarlet Fever*: Caused by haemolytic streptococcal infection, symptoms are fever, sore throat and a red rash.
- *Slipped Disc*: A painful condition in which a cartilage disc in the spine is displaced putting pressure on the nearest nerve.
- *Small Pox*: A contagious virus disease, common among children, characterized by a rash of pustules that leave permanent scars on skin. The WHO started a sustained campaign in the 1960s and 1970s to eradicate small pox by mass vaccination. In 1980 WHO declared that small pox was eradicated. It was the *first disease to be eradicated* from the face of the earth.
- *Thrombosis*: Formation of a blood clot in a blood vessel or in the heart which results in death of the patient.
- *Ulcer*: An inflamed open sore on the skin or the membrane of a body cavity. Peptic ulcer is a state when there are ulcers in the food pipe associated with indigestion and mental tension a common disease among people working in an industrial society.

Common Drugs

- *Anaesthetics*: Drugs that block sensory nerves and make a patient fully unconscious to prevent him from feeling pain. In case of local anaesthesia a particular area is made senseless temporarily. Used for surgical operations and includes drugs like chloroform, ether, sodium pentothal, etc.
- *Analgesics*: Drugs used to prevent or relieve pain like aspirin (acetylsalicyclic acid) or analgesic tablets.
- *Antibiotics*: Drugs used to prevent growth of body germs and to destroy them as soon as possible. Most common drugs under this category are penicillin, terramycetin, etc.
- *Antihistamines*: These drugs are used to relieve symptoms of asthma, hay fever and other allergies.

- *Antipyretics*: Drugs used to lower body temperature.
- *Hormones*: Drugs used to combat hormone deficiency that causes diseases. Drugs like insulin (for diabetics) or adrenalin come under this category.
- *Narcotics*: Drugs that deaden the nervous system and prevent a person from feeling pain, e.g., opium and its derivatives such as codeine, heroin, morphine, etc.
- *Sedatives*: Drugs used to induce sleep like barbiturates and bromides.
- Tranquillizers Drugs that calm nervous system and prevent worry, tension, etc.
- *Vaccines*: Drugs that are injected to help the body to develop resistance to disease or immunization of the body.

10 Computers

INTRODUCTION

- A computer is an electronic, data processing device which can read and write, compute and compare, store and process large volumes of data with high speed, accuracy and reliability.
- It works on the instructions given to it, that is, on the stored programme concept.
- Once the data and the instructions set are fed into its memory, it obeys the instructions, performs instructions on the data and produces results.
- Its working is automatic.
- It uses electronic components: Transistors, Resistors, Diodes and Circuits.
- All types of computers consists of two basic parts:
  (i) Hardware: For example, monitor, CPU, keyboard, etc.,
  (ii) Software: For example, Microsoft word, web-browser, games, etc.
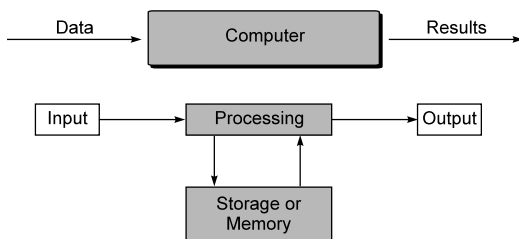
Figure 10.1 Functioning of a Computer

Input Data is collected and entered into the computer. This is called input process.

Storage What is entered into the computer is stored in the memory, called physical memory of the computer. Physical memory is supported by another memory called auxiliary memory.

Processing Actions are taken on the data stored in physical memory to get required results which is termed as processing. Results are stored back in the physical memory.

Output Stored results are taken out of physical memory. This process is known as output.

CHARACTERISTICS OF COMPUTERS

Speed Electronic pulses travel at incredible speed and as the computer is electronic, its internal speed is virtually instantaneous. The units of speed are the microsecond, the nanosecond and even picosecond.

Storage As a human being acquires new knowledge, the brain subconsciously selects what it feels to be important and worth retaining in its memory and relegates unimportant details to the back of the mind or forgets them. However, in computers, the internal memory of the CPU is large enough to retain a certain amount of information. It is therefore impossible to store inside the computer each and every bit of information. All of this data is stored outside the memory of the CPU in auxiliary or secondary storage devices.

Accuracy The accuracy of computers is consistently high. Most of the er rors in computing are human rather than those of the machines.

Versatility Computers are seen as capable of performing almost any task, provided that the task can be reduced to a series of logical steps.

Automation Once a programme is in the computer's memory, the individual instructions are then transferred, one after the other, to control unit for execution. The CPU follows these instructions until it meets a last instruction which says 'Stop Programme Execution', hence leading to automation.

Diligence Being a machine, a computer does not suffer from the human traits of tiredness and lack of concentration. It will perform the millionth calculation with exactly the same accuracy and with very high speed, in fraction of records.

ADVANTAGES

Scientific Research

There are worldwide networks linking universities and scientific establishments. Through these networks, the information related to new inventions can be shared.

Business Applications

Computers perform the following business applications:

1. A/C Package
2. Payroll Package
3. Financial Analysis Package
4. Stock Control System

Office Automation

1. Word Processing
2. Desktop Publishing

Banking/Aid to Management/Industrial Applications There are a lot of computer based, industrial applications which can provide help in industrial processing, e.g., in tool industry, with the help of the computers the designing process for tools has become fast and accurate.

Communication Communication is the way through which one person can express his ideas and can understand the ideas of others. Computers have facilitated the communication process. Here, through satellite, information from one place can be sent to a distant place within a few seconds. This type of communication is possible by using the modems. Modem is a device which converts the analog signals to digital, and vice- versa. It stands for modulation-demodulation.

Traffic Control   With the help of computers, the problem of traffic control can be solved—coordination, synchronization, fallback, diversion.

Medicine   The computer is also helpful in the field of medicine and can be used to diagnose various diseases after knowing their proper symptoms. This type of diagnosis is mainly used in homoeopathy.

Computers are also being used in the following areas:

- *Weather Processing*
- *Education: Teaching and Learning*
- *Space Research*

COMPUTER ARCHITECTURE

A typical computer system essentially consists of:

- Input devices
- Output devices
- CPU (Brain of computer)

Input Device   This device is used for Man to Machine communication. Data which is to be processed in the computer is entered through this device, e.g., keyboard, optical character reader, mark reader, magnetic ink character reader.

Output Device   This device is used for Machine to Man communication. Processed results are retrieved from the system through these devices, e.g., Video Display Unit, printers, plotters, etc.

C.P.U.   The Central Processing Unit controls the whole system by coordinating and organizing all the operations of the computer. It obeys the instructions issued to it by various input devices such as the keyboard and organizes the output to the various peripheral units such as the printer. It is responsible for fetching instructions that are stored in the primary storage, interpreting them and then issuing commands to all the hardware units that are necessary to carry out the instructions.

A.L.U.   It is responsible for performing all the arithmetic and logical operations of the computer. The arithmetic operations are used to compare numbers and include 'less than',

'equal to' and 'greater than'. The ALU can handle text as well as numbers. Some computers are equipped with an arithmetic co-processor which is a second microprocessor dedicated to perform arithmetic functions only. The advantage of coprocessor is the increased speed of performing calculations.

Memory Unit   It is used to store the data and the programme. The whole memory is partitioned into two parts. One part consists of a large number of labelled boxes—one box per data item. Other stores the algorithm. A datum in a box in the memory may be retrieved by referring to the label or name of the box. When a datum is used from a box, a copy of the datum is used; the original datum is not destroyed. When a datum is written in the memory, this datum is stored in the specified box in the memory and old contents of the box are destroyed.

Primary Storage Unit It is the computer's memor y where infor mation is stored permanently. There are two distinct types of memories:

1. **Read Only Memory (ROM)** It contains all the infor mation and instr uctions necessary to make the computer operate when it is switched on. This information is ROM resident and is put in during the manufacturing and remains stored on the chip permanently. This memory is capable of being read from only but not of being written to and hence known as ROM. It is non-volatile memory.
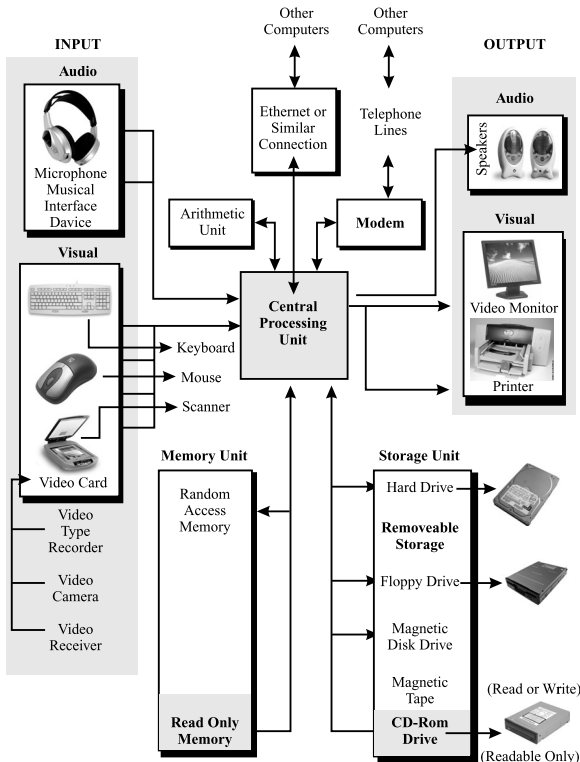
Figure 10.2 Primary Storage of a Computer

Various types of ROM are:

- *PROM*: It is Programmable ROM chip which can be programmed by a user to perform specific functions.
- *EPROM*: Erasable Programmable ROM Chips. These chips can be programmed.
- *EEROM*: Electrically Erasable ROM. Already existing information on these chips can be erased using electrical signals.

2. **Random Access Memory (RAM)** It is volatile memory. It is used to store temporary information in the form of data and instructions in the RAM. RAM can be written into as well as read from semiconductor memory within a few nanoseconds.

Secondary Storage Devices   There are a number of secondary storage devices which are used to store the data permanently. These devices are also called auxiliary memories, e.g., hard disk, magnetic tapes, floppy, CD-ROM.

INPUT/OUTPUT DEVICES

- Essential part of the computer system.
- Without these 'man to machine' and 'machine to man' communication is impossible.
- Information link between the outside world and CPU.
- Act as an interface between man and machine.

Input Devices

Keyboard   It is used to input data to the computer. This device allows data to be entered directly into the computers. The electrical contacts and circuits just below the keys translate the information directly into binary. Main drawback of this device is slow speed (It is because speed of work is dependent on the typing speed).

Optical Mark Reader (OMR)   It involves recognition of marks or characters. OMR is able to scan forms completed in pen as well as in pencil. The forms or cards are passed under a light source and pressure of a mark is detected by measuring very accurately by the infrared light levels.

An advantage of OMR is that it requires no specialist skills to collect and input data. Data collection can be practised at the point at which the information first becomes available, e.g., on the factory floor, on the building site, etc.

Magnetic Ink Character Recognition (MICR)   The magnetized ink induces a current reading the circuit. The current induced will be directly proportional to the area of the ink being scanned. The patterns of the varying currents can then be compared with, and specified as bit patterns of the selected character. MICR system employs character styles designed specifically for magnetic ink character recognition. Thus, characters have to be accurately formed. They also require magnetic ink. This factor makes printing expensive. The advantage of this device is that characters printed with ink containing magnetisable particles can still be read even when overstamped as may be the case with bank cheques. MICR reader can only identify a cheque, someone still has to verify information like amount, to whom the cheque has to be paid, signature, etc.

Optical Character Reader (OCR)   It examines each character as if it were made up of a collection of minute spots. Once the whole character has been scanned, the pattern detected is matched against a set of patterns stored in the computer, whichever pattern it matches or nearly matches is considered to be the character read.

Output Units

Printers   Used for hard copy printing.

Plotters   Line drawing devices which move a pen under computer control in such a way that continuous lines and curves can be drawn. Used to produce outputs demanding continuous high-precision line drawing, e.g., maps, graphs, mathematical cur ves, engineering drawings, etc.

Graphic VDU

These are video display units on which, by selecting a suitable combination of axis, scales and colours, output can be displayed in the pictorial form, e.g., CRT monitors and LCD monitors.

SOME COMMONLY USED TERMS

Programme   It is a set of instructions given to the computer in a particular sequence for solving a given problem. In other words, it contains a set of actions to be performed by the computer on the data to produce necessary results. Programming is done in one of the computer languages.

Software   It is a collection of programmes written to bring the hardware of a computer system into operation. We cannot do any thing useful with the computer hardware on its own. It has to be driven by certain utility programmes called software which are stored in the computer system.

There are two types of software:

- **Application Software**   It refers to programmes or sets of programmes that perform a specific processing application, e.g., payroll and inventory control.
- **System Software**   It consists of sets of programmes that act as an interface between the user and hardware, e.g., operating system like Windows, Macs, UNIX etc.

Hardware   It is the term given to the machinery itself and to the various individual pieces of electronic equipment.

Liveware   The users working on the system are termed as 'liveware'.

Firmware   It is defined as software embedded into the hardware, e.g., ROM, which has the basic input-output system (BIOS).

Compiler   A programme which translates a high-level language programme into machine language.

Interpreter   A programme that translates each instruction of high level language and executes it before passing on to the next instruction.

Assembler   A programme which converts assembly language programme into machine language programme. It is a system software.

Multiprocessing   In this type of processing, the CPU has a number of processors which operate in parallel, thereby allowing simultaneous execution of several programmes.

Multiprogramming   This type of processing enables more than one programme to reside in the central memory at the same time, and share the available processor time and peripheral units.

Distributed Data Processing   It is also called decentralized processing. This approach involves using a network of computers interconnected by datacommunication lines where each remote location has a small computer or minicomputer for input-output communication with a central computer and some local processing.

Bit   It is the basic unit of digital information. It can have only two values—one and zero.

Nibble   Combination of four bits.

Byte   Combination of eight bits.

- 1 Kilobyte—1024 bytes
- 1 Megabyte—(1024) × (1024) bytes
- 1 Gigabyte—(1024) × (1024) × (1024) bytes

Word   Combination of two or more than two bytes.

Database   It is a general collection of data shared by a variety of users. In particular, it has the following features:

- Redundancy of data is eliminated.
- Data is independent of any programme.
- Data is usable by many users, simultaneously.

Time Sharing   It is the concurrent use of a single computer system by many independent users. In time sharing, many terminals can be attached to a central computer. The terminal users can thus share time on the computer, that is, time sharing. The operating system can allocate the CPU time of the various users by giving each a time slice, each operating independently without awareness of use by others.

Microprocessor   It is a single chip based device which is a complete processor in itself and is capable of performing arithmetic and logical operations.

Modem   An electronic device used to convert computer (digital) electronic signals to communication channel (analog) electronic signals and vice versa. It is used in distributed data processing where terminals are joined by a telecommunication link to the host computer.

DIFFERENT TYPES OF LANGUAGES

There are two types of languages in computer:

1. Low Level Languages
2. High Level Languages

Low Level Languages

Machine Language   These instructions may be coded in the language the machine is capable of understanding. This language is in the form of binary codes—the combination of binary zeros and ones.

Assembly Language   A machine language programme is the only kind of programme that can be executed by a computer. But it is too hard for the user to remember instructions in the form of zeros and ones. It is also time consuming to write programmes in the machine language. Therefore, another language called assembly language was developed which greatly simplified programming. In this language, instructions are written in mnemonic codes such as ADD, SUB, MPY, DIV, etc.

Writing programmes in the assembly language is more convenient for the programmer but it creates a gap as the computer recognises only a programme in binary code. One method of bridging this gap is an assembly programme which translates the programme written by the programmer in assembly language into a programme in machine language.

High Level Languages

These languages resemble the normal languages of the intended application area (e.g., business or mathematical) rather than that of a computer. Since problem or procedure or iented lang uages are not directly u nderstood by computers, special computer programmes called compilers and interpreters are needed so that the computer itself can translate the problem or procedure oriented language programmes into a machine language programme which can be run on the computer. These languages have found great acceptance in the business accounting and science engineering worlds because they greatly facilitate the use of computer by non professional programmers, e.g., COBOL, FORTRAN, C, C++, ALGOL, LISP, etc.

OPERATING SYSTEM (OS)

It is an organized collection of routines and procedures for operating a computer. It acts as an intermediary between a computer user and the computer hardware. The basic purpose of the OS is to provide an environment in which a user can execute programmes. It is used to make the computer convenient to operate. Another goal is to use the computer hardware in an efficient manner, e.g., DOS, UNIX, XENIX, WINDOWS etc.

Uses of Operating System

The components of a computer are hardware, software and data. The operating system provides the means for the proper use of these resources in the operation of the computer system. Like a government, the OS performs no useful function by itself. It simply provides an environment within which other programmes can do useful work.

Resource Allocator   A computer system has many resources (Hardware, Software) that may be required to solve a problem. CPU, memory space, file storage space, Input/ Outputs devices, and so on. The OS acts as the manager of these resources and allocates them to specific programmes and users, as necessary. The operating system must decide which requests are essential resources to operate the computer system efficiently and fairly.

Control Programme   It controls the execution of user programmes to prevent errors and improper use of the computer. Its functions include—Controlling operation in multi-programming, multi-processing and time sharing module.

NETWORKING

It means interconnecting of the terminals wherein these are linked to the server and each terminal has its own processors.

Advantages of Networking are

1. Sharing of Data
2. Transfer of files is possible without CD
3. Distinct advantage in medicine, engineering, etc.
4. Data security

5. Less memory usage
6. Common hardware, software resources, e.g., printers, memory
7. Less expensive

The two types of networks (i) Local Area Network (LAN) and (ii) Wide Area Network (WAN) are by far the most popular network types. There are others that have gradually emerged over many years of technology evolution, these are Wireless Local Area Network (WLAN), Metropolitan Area Network (MAN), Campus Area Network (CAN), Storage Area Network (SAN), Personal Area Network (PAN) and Desk Area Network (DAN).

LAN

A local area network, which is basically a digital communication network, interconnects different computing devices located in a well defined locality which can be a building, office or a campus. A LAN is characterized by high speed transmission rates and low error rate due to transmission. It mainly consists of the following three components:

Medium   Over which data transfer takes place. It can be a telephone line; a coaxial cable or a fiber optical cable.

Network Interface Unit (NIU)   It provides an interface between the LAN medium and the computer hardware, generally a N IU directly interfaces with the main system.

Network Software   Runs in each of the computer systems connected to LAN and provides network-wide communication capabilities to the user software. A part of this software resides in the network interface unit.

Most Popularly Used LAN Configuration

Star Configuration   Here all the nodes in the network are connected to a central mode to form a star-like picture.
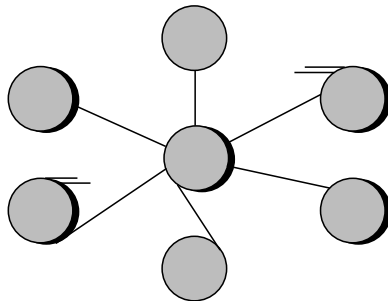

Figure 10.3   Star Configuration

Bus Configuration   Here all the nodes on a LAN share the same cable and there is no centralized node.
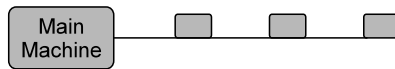
Figure 10.4 Bus Configuration

Ring Configuration In this scheme, nodes are connected in series and form a complete ring. The data flows from one node to other which is picked by the appropriate target node.
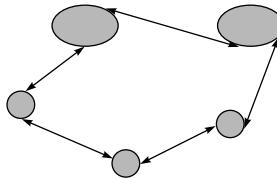
Figure 10.5 Ring Configuration

Wide Area Network (WAN)

A WAN is a geographically dispersed collection of LANs and spans a large distance or area. The biggest example of is 'The Internet' which is the largest WAN, spanning the globe. A network device called a router connects LANs to a WAN. In IP networking, the router maintains both a LAN address and a WAN address.

INTERNET

What Is Internet?

The internet, sometimes called the 'information superhighway', is a vast network of computer networks. It is estimated that there are 2.4 billion internet users worldwide at present. Some other facts about the Internet:

- The Internet is accessible in more than 180 countries, and there are more than 1 million Web servers worldwide.
- An average World Wide Web page contains about 500 words, and experts put the number of Web pages somewhere between 30 million and 50 million.
- The average Web user is 35.2 years old and accesses the Web primarily from home.

The Inter net is neither owned nor funded by any one institution, organization, or government. It does not have a CEO and is not a commercial service. The Internet is, however, directed by the Internet Society (ISOC), composed of volunteers. The ISOC appoints a sub-council, the Internet Architecture Board (IAB), which works out issues of standards, network resources, network addresses, and so on. Another volunteer group, the Internet Engineering Task Force (IETF), handles day-to-day issues of Internet operation.

Practically speaking, the Internet is composed of people, hardware, and software. With proper equipments on both ends, you can sit at your computer and communicate with someone sitting at any place in the world. You can also use the Internet to access vast amounts of information, including text, graphics, sound, and video. From your computer, you can send e-mail, chat with others, work with others on an electronic whiteboard, and with appropriate equipments, video-conferencing is also possible.

How Did It Originate?

The Internet grew out of a series of developments in the academic, governmental, and information technology communities. Listed below are some of the major milestones:

- In 1969, ARPAnet, an experimental 4-computer network, was established by the Advanced Research Projects Agency (ARPA) of the US Department of Defence so that research scientists could communicate.
- By 1971, ARPAnet linked almost 2 dozen sites, including MIT and Harvard. By 1974, there were over 200 sites.
- During the 1980s, more and more computers using different operating systems were connected. In 1983, the military portion of ARPAnet was moved onto the MILnet, and ARPAnet was officially disbanded in 1990.
- In the late 1980s, the National Science Foundation's NSFnet began its own network and allowed everyone to access it. It was, however, primarily the domain of 'techies,' computer-science graduates, and university professors.
- In 1991, Al Gore, then a US senator, proposed widening the NSFnet to include more schools and colleges. Resulting legislation expanded NSFnet, renamed it NREN (National Research and Educational Network), and allowed businesses to purchase part of the network for commercial uses. The mass commercialization of today's Internet is a result of this legislation.
- In 1992, the World Wide Web system and software were released, and in 1993, the National Center for Supercomputing Applications released versions of Mosaic (first graphical Web browser) for Microsoft Win-dows, for Unix systems running the X Window System, and for the Apple Macintosh.
- In 1994, Netscape Communications released the Netscape Navigator browser, and in 1995, Microsoft released Internet Explorer. By mid-1997, these browsers were in head-to-head competition for a place on each Internet user's computer.

How Can You Get There?

First, you need the equipment. You can get basic Internet access with any computer that has a modem connected to a phone line. However, to take full advantage of all that Internet offer, you need either a Macintosh that has a 68040 or higher CPU or a PC that has an 80486 or higher CPU. With either system, you also need the following:

- At least 2 Gegabytes of RAM (4 is recommended)
- A 250-Gegabyte hard drive
- A 1 Mbps modem

An Internet service provider (ISP) is a company that provides access to the Internet. Some ISPs also provide content and e-mail. The world's best-known ISPs are the commercial online services such as America Online, CompuServe, Prodigy, and MSN (The Microsoft Network). National companies (for example, Satyam or Dishnet) and local and regional companies also provide Internet access. ISPs generally charge a monthly subscription rate.

Internet Resources

What you can do on the Internet depends on which resource you access. *E-mail*, Electronic mail is probably the most popular and widely used resource on the Internet. To use it you must know and accurately input the recipient's address. An e-mail address consists of a username, a service, and a domain. For example, in Pearsonindia@satyam.com (The Pearson Education's address) Pearsonindia is the username, 'satyam' the service (in this case, Satyam Online), and '.com' the domain (in this case, a commercial organisation). Domains are identified in the Domain Name Service, also known as the Domain Name System. A consortium between AT&T and Network Solutions, called InterNIC (Internet Network Information Center), manages the task of registering addresses, or domain names. In mid-1997 com, org. and net domain names cost $ 100 for 2 years (and $ 50 per year thereafter). Here are the most familiar domains:

Domain	What It Is
com	a commercial organization, business, or a company
edu	an educational institution
gov	a nonmilitary government entity
int	an international organization
mil	a military organization
net	a network administration
org	some other organization
res	research institute

In general, the final part of a domain name represents the name of the country where the site is located—for example, 'in' for India, 'jp' for Japan, 'uk' for Great Britain, etc.

FAQs

Frequentiy Asked Questions documents contain answers to common Internet questions. Reading some of these documents should help Internet newcomers.

FTP

File Transfer Protocol is a method of transferring files on Internet and a type of Internet site. Using FTP you can log on to a remote site, usually a server, view the available files and copy them to your computer. The address for an FTP site begins with ftp.

Gopher

Developed at the University of Minnesota, home of the Golden Gophers, Gopher is a hierarchy of menus one can use to browse the Internet or search for a specific file. These menus are available on numerous Gopher servers on the Internet. Any Internet address that begins with gopher, points to a location on a Gopher server.

Newsgroup

Newsgroup, a classic institution of the Internet, are found on the part of the Internet called Usenet. In a newsgroup, messages concerning a particular topic are posted in public forum. You can simply read the postings, or you can post an article yourself.

World Wide Web

The Web may be the most complete realization of the Internet to date. It was developed in the early 1990s at the European Center for Nuclear Research as an environment in which scientists in Geneva and Switzerland could share information. It has evolved into a medium that consists of text, graphics, audio, animation, and video. The address of a **Website** usually begins with **www**. The World Wide Web is a graphical environment that can be navigated through hyperlinks. From one site you can click on hyperlinks to go to any number of related sites.

How the World Wide Web Works?

The Internet involves 3 fundamental elements: server, client, and network. A server is a computer program that makes data available to other programs on the same or other computers—it 'serves' them. A **client** is a computer that requests data from a server. A **network** is an interconnected system in which multiple computers can communicate. The communication may be via copper wire, coaxial cable, fiber-optic cable, satellite transmission, etc. The software by which one can access Internet resources is called the **browser**. When you go to a **site** on the World Wide Web, you access the site's files. Following are the steps used to open and access a file:

- In the browser, specify the address, or URL of the Web site.
- The browser sends your request to the Internet service provider's server.
- That server sends the request to the server at the specified URL.
- The file is sent to the Internet service provider's server, which sends the file back to the browser, which displays the file.

RECENT DEVELOPMENTS

Pen Drive

USB Pen Drive is a small sized device that can be used to easily transfer files between USB-compatible systems. Available in a range of capacities (and in some cases, with an MP3 player built-in) this handy little gizmo can save all those data-transfer hassles.

Thumb Drive

A thumb drive is portable memory storage. It is re-writeable and holds its memory without a power supply, unlike RAM. Thumb drives will fit into any USB port on a computer. They will also 'hot swap,' which means a user can plug the drive into a computer and will not have to restart it to access the thumb drive. The drives are small, about the size of a human thumb—hence, their name—and are very stable memory storage devices.

Fla sh Drive

A small, portable flash memory card that plugs into a computer's USB port and functions as a portable hard drive. USB flash drives are easy-to-use as they are small enough to be carried in a pocket and can plug into any computer with a USB drive. USB flash drives have less storage capacity than an external hard drive, but they are smaller and more durable because they do not contain any internal moving parts.

Windows Vista

Windows Vista (formerly code named Longhorn) is the next evolution of Microsoft's operating system. Vista offers an advancement in reliability, security, ease of deployment, performance and manageability over Windows XP.

Blog

Short for Web log, a blog is a Web page that serves as a publicly accessible personal journal for an individual. Typically updated daily, blogs often reflect the personality of the author.

Viruses

A malacious program that is loaded onto your computer without your knowledge and runs against your wishes. Viruses can also replicate themselves. All computer viruses are manmade. A simple virus that can make a copy of itself over and over again is relatively easy to produce. Even such a simple virus is dangerous because it will quickly use all available memory and bring the system to a halt. An even more dangerous type of virus is capable of transmitting itself across networks and by passing security systems.

Wireless Access

The word wireless is dictionary defined as 'having no wires'. In networking terminology, wireless is the term used to describe any computer network where there is no physical wired connection between sender and receiver, but rather the network is connected by radio waves and/or microwaves to maintain communications. Wireless networking utilizes specific equipment such as NICs, APs and routers in place of wires (copper or optical fiber) for connectivity.

Bluetooth

Bluetooth is a technology that describes how mobile phone, computers and personal digital assistants (PDAs) can easily intercon nect with each other and with home and business phones and computers using a shor t-range wireless con nection. The technology requires that a low-cost trans receiver chip be included in each device. Each device is equipped with a microchip trans receiver that transmits and received in a previously unused frequency band of 2.45 GHz that is available globally. In addition to the data, upto three voice channels are available. Each device has a unique 48 bit address from the IEEE 802 standard. The maximum range is 10 metres. Data can be exchanged at a rate of 1 megabit per second (up to 2 Mbps in the second generation of the technology).

Laptops/Note Books

A laptop computer, now referred to as notebook computer by manufacturers, is a battery or AC-powered personal computer generally smaller than a briefcase that can easily be transported and conveniently used in temporary spaces such as on airplanes, in libraries, temporary offices, and at meetings. A laptop typically weighs less than 5 pounds and is 3

inches or less in thickness. Among the best-known makers of laptop computers are IBM, Apple, Compaq, Dell, Toshiba, Asus, HP and Lenovo.

Servers

A computer program that provides services to other computer programs in the same or other computers. The computer that runs a server program is also referred to as a server. In client/server model, a server is a program that awaits and fulfills requests from client programs in the same or other computers.

Mailing System

Mailing has become a key part of the communications network of most modern offices. Data and messages can be transmitted from one computer to another using telephone lines, microwave links, communication satellites, or other telecommunication equipment. The same message can be sent to a number of different addresses.

A specialized type of mail system, voice mail, is a relatively simple, computer-linked technology for recording, storing, retrieving, and forwarding phone messages. It is called voice mail, or voice-messaging, because the messages are spoken and left in a 'voice mailbox.'

Multimedia

The use of computers to present text, graphics, video, animation, and sound in an integrated way. Long touted as the future revolution in computing, multimedia applications were, until the mid-90s, uncommon due to the expensive hardware required. With increase in performance and decrease in price, however, multimedia is now commonplace. Nearly all PCs are capable of displaying video, though the resolution available depends on the power of the computer's video adapter and CPU.

New Technologies

RFID (Radio-frequency Identification)

Radio-frequency identification (RFID) is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders. An RFID tag is an object that can be attached to or incorporated into a product, animal, or person for the purpose of identification using radio waves. Chip-based RFID tags contain silicon chips and antennas. Passive tags require no internal power source, whereas active tags require a power source.

Retina Scan

A retinal scan is a biometric technique that uses the unique patterns on a person's retina to identify them. The human retina is stable from birth to death, making it the most accurate biometric to measure. It has been possible to take a retina scan since the 1930s, when research suggested that each individual had unique retina patterns. The research was validated and we know that the blood vessels at the back of the eye have a unique pattern, from eye to eye and person to person. A retinal scan involves the use of low-intensity light source and coupler that are used to read the blood vessel patterns, producing very accurate biometric data.

WiMAX

WiMAX is defined as Worldwide Interoperability for Microwave Access by the WiMAX Forum, formed in June 2001 to promote conformance and interoperability of the IEEE 802.16 standard, officially known as Wireless MAN. WiMAX aims to provide wireless data over long distances, in a variety of different ways, from point to point links to full mobile cellular type access. The Forum describes WiMAX as a standards-based technology enabling the delivery of last mile wireless broadband access as an alternative to cable and DSL (Digital Subscribers Link).

Websites

A website (or web site) is a collection of web pages, images, videos and other digital assets and hosted on a particular domain or sub domain on the World Wide Web. A web page is a document, typically written in HTML (Hyper Text Markup Language) that is almost always accessible via HTTP (Hyper Text Transfer Protocol), a protocol that transfers information from the website's server to display in the user's web browser. All publicly accessible websites are seen collectively as constituting the 'World Wide Web'. The pages of websites can usually be accessed from a common root URL (Universal Resource Location) called the homepages, and usually reside on the same physical server. The URLs of the pages organize them into a hierarchy, although the hyperlinks between them control how the reader perceives the overall structure and how the traffic flows between the different parts of the sites.

Next-Generation Internet and Communication Technologies

Today, among the technologies developed, the Internet is one of the most important technical infrastructures in existence. The future is poised to see the present internet to be catalyst for much of our innovation and development. However, the Inter net that we use right now would be incapable to meet so many of our needs and requests for long. Scientists and innovators envision that the new technologies, protocols, and standards have to be developed to successfully meet the demands of humans in future and they consider the further research on this new Internet as a challenge. The immediate next-generation Internet and communication technologies mostly focus on the design, engineering, protocols, and operation. The hot topics in this domains arethe 3G/4G/B4G/ LTE, Cloud computing, Internet of things (IoT) are among the hot topics.

3G/4G/B4G/LTE the "G" means for Generation of wireless technologies and every generation has to be faster, more secure and more reliable. The reliability factor is the hardest obstacle to overcome. It is important to note that the 1G was not used to identify wireless technology until 2G, or the second generation, was released.

3G has set the standards for most of the wireless technology that is capable of handling around 2 Megabits per second. This has helped the development of technologies such as web browsing, emails, video downloading, picture sharing and other Smartphone technology.

4G The speed of wireless technologies needs to be at least 100 Megabits per second and up to 1 Gigabit per second to pass as 4G. Coverage of true 4G had been limited to large metros and larger cities to being with. Outside of the covered areas, 4G phones regress to the 3G standards.

4G LTE   Long Term Evolution, is a version of 4G that is becoming the latest advertised technology but still not true 4G as the standards are set. However, there are technologies like LTE Advanced and WIMAX Release 2, that are next and are the two formats realized by the International Telecommunications Union as True 4G at this time.

Internet of Things (IoT)   the Inter net of Things are the next level of inter net experience in everyday life of humans. It is analogous to machine-to-machine (M2M) communication in industry. Smart products, products and services that are being build using M2M communication capabilities, are on the rise. The core element in IoT can either be a person, thing or process and it is assigned an IP address through with it becomes capable of communicating over a network. Think of possibilities like, your home refrigerator communicating with your smart phone, a biochip transponder fitted in the body of humans or animal, or a robotic arm fitted at an automobile assembly line, all communicating with gadgets in a network over internet.

Data Lake   It's a storage repository with capacity where huge data can be dumped in its native format for future use. The industrial term data lake is often related with Hadoop-oriented object storage. In such a set-up, data is initially uploaded data into the Hadoop framework, and then business analytics and data mining tools are applied to the data where it exist in on Hadoop's cluster nodes of commodity computers. The Hadoop framework is used by major computer science and information technology organizations such as Google, Yahoo and IBM, largely for applications involving search engines and advertising.

Cloud storage is a facility model in which data is preserved, archived and administered while it is remotely backed and made available to users over a network through Internet.

Cloud computing is a common term for computing services that involves delivering hosted services over the Inter net and can be either private, public or hybrid. Cloud computing cab be classified as: (i) Infrastructure-as-a-Service (IaaS), (ii) Platform-as-a- Service (PaaS) and (iii) Software-as-a-Service (SaaS).

Deep analytics is applying refined data processing systems to produce purposeful information by analysing large and typically multi-source data sets comprised of both unstructured and semi-structured data.

Encryption as a Service (EaaS)   is a subscription model that allows cloud service customers to take benefit of the safety in terms of security services with "as a service" concept that encryption offers without having to install and use encryption on their own. Through EaaS data encryption becomes simple, affordable (pay-as-you go), and convenient service (customer purchases from their cloud provider).

Drive is a cloud storage service that offers 5 gigabytes free storage.

iCloud is an Apple email, storage and data synchronization subscription service

Google Drive   is a freemium (free and premium) cloud storage service that is combined with the organization's other services and systems—including Google Docs, Gmail, Android, Chrome, YouTube, Picassa, Google Video, Google Analytics and Google+. Google Drive is a cloud storage service that offers 5 gigabytes free storage.

iCloud   is an Apple email, storage and data synchronization subscription service that provides 5GB of storage for free.

Zero client also known as ultrathin client, is a server-based computing model in which the end user's computing device has no local storage. A zero client is analogous to a thin client, which retains the operating system and each device's specific configuration settings in flash memory. A typical zero client product is a small box that serves to connect a keyboard, mouse, monitor and Ethernet connection to a remote server. The server, which hosts the client's operating system (OS) and software applications, can be accessed wirelessly or with cable. Zero clients are often used in a virtual desktop infrastructure (VDI) environment.

Artificial intelligence (AI) is the field of technology that works on the synthesis and analysis of information on a computational agents that act intelligently. The core functional and technological goal of AI is to comprehend the principles that construct intelligent behaviour thinkable in natural or artificial systems. An agent can be anything, humans, robots, animals, machines, organizations, teams, countries and even processes the central for the AI is what an agent would do; that is, how it acts and responds. An agent responds and acts intelligently when what it does is appropriate for its circumstances and its goals,

- it is elastic to altering environments and varying goals,
- it acquires information and decision making capabilities from experience, and
- it makes suitable choices given its perceptual and computational limits.

Swarm intelligence (SI) character ises the shared and co-operative conduct of decentralized, self-organized systems. Usually, the SI systems would contain of a population of simple agents interacting with each other and with the external environment simultaneously. The inspiration of SI originates from biological systems and in inspired from systems that allows ant colonies, bird flocking, animal herding, bacterial growth, and fish schooling. SI is being working in various fields such as library management, materials acquisition, medical records classification, logistics and planning processes, objects tracking in a system, patter n recognition, statistical prediction and other conventional optimization problems successfully.

Social Networking It's an online platform, usually a website, App or service, that allows one to create of social networks or social relations among people who with common interests in life, professional or personal. Every user here is represented (often a profile) with its social links, and a variety of additional services. Social networking sites allow users to share ideas, activities, events, and interests within their individual networks.

Online community Such services are analogous to the social network service, with the major difference being social network service to be an individual-centred service whereas online community services are group-centred.

Table 10.1 Computer Terminology

Term	Meaning
Access Time	The time taken to retrieve data from a storage device or to obtain data from peripheral unit
Alphanumeric	Pertaining to a character set that contains letters, digits and usually other characters such as punctuation marks

(Continued)

Term	Meaning
Background Job	A job in an operating system which has a lower priority than jobs being run simultaneously which involve any online activity
Binary Digit	The digit 0 or 1
Binary Number System	Number system with a base of two
Bit	Smallest possible unit of information (Binary digit)
Bug	Any mistake or malfunction of computer (programme or system)
Bus	A line or circuit used for transmitting data or power to a large number of devices
Central Processing Unit	The computer unit that performs the execution of instructions
Character Set	A set of unique symbols arranged in a fixed order used by a device or language to denote information
Chip	The tiny bit of silicon that forms the heart of an integrated circuit
Cobol	Common Business Oriented Language
Compile	To translate a computer programme written in a higher level source language into a machine language programme
Computer System	A central processor and associated peripheral units
Data Processing	The operations performed on data
Debug	To locate and correct any errors in a computer programme or to correct malfunctions in the computer or its peripheral equipment
Downtime	The period during which a computer is not operating correctly due to mechanical or electronic failure or malfunction
EDP	Electronic Data Processing; the processing of data with electronic equipment
Executive	A programme that helps manage the operation of a computer system
Flowchart	A graphic representation of the definition analysis or solution to a problem in which symbols are used to represent operations, data flow or equipment
FORTRAN	A high level programming language for scientific and mathematical use (Formula Translation)
Hardware	Physical equipment such as mechanical, magnetic, electrical or electronic devices
Hexadecimal Number System	Number system with a base of 16
High-level Language	Developed to make the task of programming easier
Input	The actual data which must be put into the computer to accomplish some task
Label	A group of characters used as a symbol to identify an item of data, an area of memory
Machine Language	Refers to instructions written in machine code which can be immediately obeyed by a computer without translation

(*Continued*)

Term	Meaning
Main Storage	The storage from which instructions are executed
Memory	The chips in the computer where information and instructions are stored in Binary code
Micro Second	One millionth of a second
Milli Second	One thousandth of a second
Octal Number System	Number system with a base of 8
Offline	Not connected directly to the main computer system
Online	Refers to any equipment or process that sends information directly to the computer for immediate processing and immediate results
Operating System	An integrated collection of computer programmes which supervises the sequencing of programme by a computer
Output	The results of the computer's processing
Over Flow	A quantity of data that exceeds the memory capacity of the storage register or location which is to receive the result
Packaged Programme	Programmes and subroutines written and supplied by the computer manufacturers to their customers
Processing	Manipulation of information data in order to produce a specific result
Processor	A general term for any device capable of carrying out operations on data; sometimes used as a synonym for central processor
Programme	A sequence of instructions written in computer language
Programmer	A person who prepares problem solving procedures and flowcharts and who may also write and debug routines
Programming Language	A special language, such as COBOL or BASIC, in which a programme is written so the computer can understand it
Queue	A line or group of items of tasks in a computer system awaiting service
Random Access Memory	The part of the computer's memory where data, instructions are stored temporarily
Read Only Memory	The part of the computer's memory where permanent instructions are stored
Real-time	Method of operation where data is absorbed by the computer at the actual time of its occurrence
Reserve Words	Words that cannot be used as data names, filenames or procedure names
Remote Access	Communication between a computer system and one or more stations that are located at a distance from the actual computer system
Response time	In time-sharing system, the elapsed time between the generation of a message at a terminal and the receipt

(*Continued*)

Term	Meaning
Routine	A set of coded instructions arranged in proper sequence to direct the computer to perform a specific operation or series of operations.
Serial	The handling of operations or processes in a single device in sequential order, one at a time
Software	A set of computer programmes or procedures concerned with the operation of data processing
Source Language	A language used by the programmer to write a computer programme
Storage	Synonymous with memory
String	A line of symbols of indefinite length treated as a single unit
Structured Programming	A systematic procedure for writing programmes in modular form with a clear logical structure
System	A combination of processes, procedures or techniques that work together in an organized effort to accomplish specific and desired operations or tasks
Systems Analyst	Person trained in the analysis of business problems from solution with the aid of a computing system
Systems Programme	Controls the operations of the computer system
Terminal	A device or a point for communicating with the computer
Time-sharing	A mode of operation in which several users, through numerous terminal devices, share access to a central computer concurrently and interact with the programmes during execution
Time-slicing	Mode of operation in which the computer performs on one programme for a short while, then goes to work on another programme for another short time and so forth.
Track	The actual path on a moving storage medium on which data is recorded
Zero Suppression	Deleting leading zeros from number in order to make results more readable

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11 Basic General Knowledge

Table 11.1 Famous Books/Plays

Name of the Book/Play	Author
A	
Adventures of Sherlock Holmes	Arthur Conan Doyle
Adventures of Tom Sawyer	Mark Twain (Samuel Longhorn Clemens)
Affluent Society	J. K. Galbraith
After the Dark Night	S. M. Ali
Agony and the Ecstasy, The	Irving Stone
Airport	Arthur Hailey
Ain-i-Akbari	Abul Fazal
Alchemist, The	Ben Jonson
Alice in Wonderland	Lewis Carroll
All's Well that Ends Well	William Shakespeare
All the President's Men	Carl Bernstein and Bob Woodward
All the Prime Minister's Men	Janardhan Thakur
All Things Bright and Beautiful	James Herriot
Ambassador's Journal	J. K. Galbraith
Ambassador's Report	Chester Bowles
An American Tragedy	Theodore Dreiser
An Eye to China	David Selbourne
An Idealist View of Life	Dr S. Radhakrishnan
Anand Math	Bankimchandra Chatterjee
Androcles and the Lion	George Bernard Shaw
Animal Farm	George Orwell
Antony and Cleopatra	William Shakespeare
Ape and Essence	A. Huxley
Apple Cart	George Bernard Shaw
Arabian Nights	Sir Richard Burton (Translator of one of the most widely known English translations)
Area of Darkness	V. S. Naipaul
Arthashastra	Kautilya
Arms and the Man	George Bernard Shaw
Around the World in Eighty Days	Jules Verne
Arrival and Departure	Arthur Koestler
As You Like it	William Shakespeare
Ascent to Everest	Sir John Hunt
Asian Drama	Gunnar Myrdal

(*Continued*)

Name of the Book/Play	Author
Atoms of Hope	Mohan Sundar Rajan
Autobiography of an Unknown Indian	Nirad C. Choudhary
B	
Baburnama	Babur (Translated into English by John Falkland)
Back to Methuselah	George Bernard Shaw
Bang-e-Dara	Mohd Iqbal
Bend in the Ganges, A	Manohar Malgaonkar
Ben Hur	Lewis Wallace
Best and the Brightest, The	David Halberstam
Between the Lines	Kuldip Nayar
Bharat Bharati	Maithili Sharan Gupt
Bisarjan	Rabindranath Tagore
Birth and Death of the Sun	George Bernard Shaw
Bitter Sweet	Noel Coward
Blind Beauty, The	Boris Pasternak
Born Free	Joy Adamson
Brave New World	Aldous Huxley
Bread, Beauty and Revolution	Khwaja Ahmad Abbas
Bride for the Sahib and Other Stories, The	Khushwant Singh
Bride's Book of Beauty, The	Mulk Raj Anand
Broken Wing	Sarojini Naidu
Bunch of Old Letters, A	Jawaharlal Nehru
C	
Caesar and Cleopatra	George Bernard Shaw
Candida	George Bernard Shaw
Canterbury Tales	Geoffrey Chaucer
Chitra	Rabindranath Tagore
Comedy of Errors	William Shakespeare
Coolie	Mulk Raj Anand
Crime and Punishment	Fyodor Dostoevsky
Crisis in India	Ronald Segal
Culture in the Vanity Bag, The	Nirad C. Choudhary
D	
Darkness at Noon	Arthur Koestler
Dark Room, The	R. K. Narayan
Das Kapital	Karl Marx
David Copperfield	Charles Dickens
Days of His Grace	Eyvind Johnson
Death of a City	Amrita Pritam
Death of a President	William Manchester
Decline and Fall of the Roman Empire	Edward Gibbon
Defence without Drift	P. V. R. Rao

(*Continued*)

Name of the Book/Play	Author
Decline of the West	O. Spengler
Descent of Man	Charles Darwin
Devdas	Sharatchandra Chatterjee
Dilemma of Our Time	Harold Laski
Discovery of India	Jawaharlal Nehru
Distant Neighbours	Kuldip Nayar
Divine Comedy	Dante Alighieri
Divine Life	Swami Sivananda
Doctor's Dilemma	George Bernard Shaw
Doctor Zhivago	Boris Pasternak
Don Juan	Lord Byron
E	
End of an Era	C. S. Pandit
Ends and Means	Aldous Huxley
Essays for Poor to the Rich	John Kenneth Galbraith
Essays of Elia	Charles Lamb
Expanding Universe	Arthur Stanley Eddington
Experiments with Untruth	Michael Anderson
Eye of the Storm	Patrick White
Eternal Himalayas	Maj. H. P. S. Ahluwalia
F	
Faces of Everest	Maj. H. P. S. Ahluwalia
Face to Face	Lasse and Lisa Berg
Family Reunion	T. S. Eliot
Far from the Madding Crowd	Thomas Hardy
Farewell to Arms, A	Ernest Hemingway
Farewell to Trumpets	James Morris
Fathers and Sons	Ivan Turgenev
First Among Equals	Jeffrey Archer
For Whom the Bell Tolls	Ernest Hemingway
Freedom at Midnight	Larry Collins and Dominique Lapierre
Friends, Not Masters	Ayub Khan
From Here to an Eternity	James Jones
Future Shock	Alvin Toffler
G	
Gardener, The	Rabindranath Tagore
Geet Govinda	Jaya Dev
Gitanjali	Rabindranath Tagore
Gita Rahasya	Bal Gangadhar Tilak
Glimpses of World History	Jawaharlal Nehru
Godan	Munshi Prem Chand
Golden Threshold	Sarojini Naidu
Going After Cacciato	Tim O'Brien
Golden Gate, The	Vikram Seth

(*Continued*)

Name of the Book/Play	Author
Gone with the Wind	Margaret Mitchell
Good Earth	Pearl S. Buck
Gora	Rabindranath Tagore
Grammar of Politics	Harold Laski
Great Expectations	Charles Dickens
Great Illusion	Norman Angell
Guide, The	R. K. Narayan
Gul-e-Naghma	Raghupati Sahai Firaq
Gulistan Bostan	Sheikh Saadi
Gulliver's Travels	Jonathan Swift
H	
Hamlet	William Shakespeare
Harsha Charita	Bana Bhatt
Heat and Dust	Ruth P. Jhabwala
Henry Esmond	W. M. Thackeray
Hero of Our Time	Richard Hough
Heroes and Hero Worship	Thomas Carlyle
Himalayan Blunder	Brig. J. P. Dalvi
Hindu Civilisation	J. M. Barrier
History of the Congress Party	Dr Shankar Ghose
Hindu View of Life	Dr Radhakrishnan
House Divided	Pearl S. Buck
Human Factor	Graham Greene
Hungry Stones	Rabindranath Tagore
I	
I Am Not An Island	K. A. Abbas
I Follow the Mahatma	K. M. Munshi
Idiot, The	Fyodor Dostoevsky
If I am Assassinated	Z. A. Bhutto
Illiad	Homer
Importance of Being Earnest	Oscar Wilde
India Divided	Rajendra Prasad
India from Curzon to Nehru and After	Durga Dass
India We Left, The	Humphrey Trevelyan
India Wins Freedom	Maulana Abul Kalam Azad
Indian Home Rule	M. K. Gandhi
Indian Philosophy	Dr S. Radhakrishnan
Indian Muslims	Prof. Mohammed Mujeeb
Indo-Pakistan Conflict, The	Russel Brines
India-China War	Neville Maxwell
Inside Asia	John Gunther
Inside Europe	John Gunther
Invisible Man	H. G. Wells
Iron in the Soul	Jean Paul Sartre
Ivanhoe	Walter Scott

Name of the Book/Play	Author
J	
Jai Som Nath	K. M. Munshi
Jane Eyre	Charlotte Bronte
Jean Christopher	Romain Rolland
Judgement, The	Kuldip Nayar
Judge's Miscellany, A	A. M. Hidayatullah
Julius Caesar	William Shakespeare
Jungle Book	Rudyard Kipling
K	
Kadambari	Bana Bhatt
Kagaz Te Kanwas	Amrita Pritam
Kamsutra	Vatsyayan
Kamayani	Jai Shanker Prasad
Kapal Kundala	Bankim Chandra Chatterjee
Kaya Kalp	Munshi Prem Chand
Khak-i-Dil	Jan Nissar Akhtar
Kidnapped	Robert Louis Stevenson
Killer Angles	Michael Shaara
King of Dark Chamber	Rabindranath Tagore
King Lear	William Shakespeare
Kora Kagaz	Amrita Pritam
Kumar Sambhava	Kalidas
L	
Lady Chatterley's Lover	D. H. Lawrence
Life Divine	Aurobindo Ghosh
Living Room	Graham Greene
Letters from a Father to his Daughter	Jawaharlal Nehru
Light That Failed	Rudyard Kipling
Lipika	Rabindranath Tagore
Lolita	Vladimir Nabokov
Lost Child	Mulk Raj Anand
Love Story	Eric Segal
M	
Macbeth	William Shakespeare
Magic Mountain	Thomas Mann
Mahabharata	Maharishi Ved Vyas
Major Barbara	George Bernard Shaw
Man and Superman	George Bernard Shaw
Man of Destiny	George Bernard Shaw
Man the Unknown	Lewis Carroll
Man for All Seasons, A	Robert Bolt
Marriage and Morals	Bertrand Russell
Mayor of Casterbridge	Thomas Hardy

Name of the Book/Play	Author
Moti Mahal	Gopinath Mohanty
Meghdoot	Kalidas
Memories of World War II	Winston Churchill
Men Who Kept the Secret	Thomas Powers
Men Who Killed Gandhi, The	Manohar Malgonkar
Merchant of Venice	William Shakespeare
Middle March	George Eliot
Midnight's Children	Salman Rushdie
Midsummer Night's Dream, A	William Shakespeare
Mill on the Floss	George Eliot
Modern Painters	John Ruskin
Mother	Maxim Gorky
Mother India	Katherine Mayo
Mountbatten and Independent India	Larry Collins and Dominique Lapierre
Mountbatten and Partition of India	Larry Collins and Dominique Lapierre
Warren's Profession	George Bernard Shaw
Much Ado About Nothing	William Shakespeare
Mudra Rakshas	Vishakadutta
Murder in the Cathedral	T. S. Eliot
Muslim Dilemma in India	M. R. A. Baig
My Early Life	Mahatma Gandhi
My Experiments with Truth	Mahatma Gandhi
My India	S. Nihal Singh
My Life, Law and Other Things	M. C. Setalvad
My Music, My Life	Ravi Shankar
My Truth	Indira Gandhi
N	
Naganandan	HarshaVardhan
Naked Face, The	Sydney Sheldon
Naked Came the Stranger	Penelope Ashe
Naked Triangle	Balwant Gargi
Natya Shastra	Bharat Muni
Nehru: The Making of India	M. J. Akbar
Nehru Family and Sikhs	Harbans Singh
Netaji Dead or Alive	Samar Guha
Nine Days Wonder	John Masefield
Nineteen Eighty Four	George Orwell
Non-Violence in Peace and War	Mahatma Gandhi
O	
Odakkuzhal	G. Shankara Kurup
Odyssey	Homer
Of Human Bondage	W. Somerset Maugham
Oh, Calcutta	Kenneth Tynan
Oliver Twist	Charles Dickens
Old Man and the Sea, The	Ernest Hemingway

Name of the Book/Play	Author
One World	Wendell Wilkie
One Hundred Years of Solitude	Gabriel Garcia Marquez
Origin of Species	Charles Darwin
One Life	Christian Barnard
Othello	William Shakespeare
Other Side of Midnight, The	Sydney Sheldon
Our India	Minoo Masani
P	
Painter of Signs	R. K. Narayan
Pair of Blue Eyes, A	Thomas Hardy
Pakistan Crisis	David Loshak
Pakistan Cut to Size	D. R. Mankeikar
Panchagram	Tarashankar Bandyopadhyay
Panchali Sapatham	Subramania Bharati
Panchatantra	Vishnu Sharma
Passage to England, A	Nirad C. Choudhary
Paradise Lost	John Milton
Paradise Regained	John Milton
Passage to India, A	E. M. Forster
Past and Present	Thomas Carlyle
Patriot, The	Pearl S. Buck
Pickwick Papers	Charles Dickens
Pinjar	Amrita Pritam
Post Office	Rabindranath Tagore
Prem Pachisi	Munshi Prem Chand
Premonitions	P. N. Haksar
Pride and Prejudice	Jane Austen
Principia	Isaac Newton
Prison Diary	Jayaprakash Narayan
Promises to Keep	Chester Bowles
R	
Raghuvamsa	Kalidas
Rainbow, The	Pearl S. Buck
Ram Charita Manas	Tulsidas
Ramayana	Maharishi Valmiki
Rangbhoomi	Munshi Prem Chand
Rape of Bangladesh	Anthony Mascarenhas
Ratnavali	Harsha Vardhan
Red Star Over China	Edgar Snow
Reminiscences of the Nehru Age	M. O. Mathai
Republic, The	Plato
Resurrection	Leo Tolstoy
Return of the Native, The	Thomas Hardy
Revenue Stamp, The	Amrita Pritam
Ritu Samhara	Kalidas

Name of the Book/Play	Author
Road to Folly	Leslie Ford
Robe, The	L. C. Douglas
Romeo and Juliet	William Shakespeare
Rubaiyat	Omar Khayyam
S	
Sadar-i-Riyasat	Karan Singh
Saket	Maithili Sharan Gupt
Satyartha Prakash	Swami Dayanand
Savitri	Aurobindo Ghosh
Scholar Extraordinary	Nirad C. Choudhary
Search for Home, A	Sashti Brata
Sense and Sensibility	Jane Austen
Seven Lamps of Architecture	John Ruskin
Satanic Verses, The	Salman Rushdie
Seven Summers	Mulk Raj Anand
Shahnama	Firdausi
Shakuntala	Kalidas
Shall We Tell the President	JeffreyArcher
Shape of Things to Come	H. G. Wells
Shame	Salman Rushdie
She Stoops to Conquer	Oliver Goldsmith
Shivaji, The Great Patriot	Lala Lajpat Rai
Sohrab and Rustum	Mathew Arnold
Song of India, The	Sarojini Naidu
Sons and Lovers	D. H. Lawrence
Saz-i-Watan	Munshi Prem Chand
St. Joan George	Bernard Shaw
Story of My Life	Moshe Dayan
Sunny Days	Sunil Gavaskar
T	
Tale of Two Cities, A	Charles Dickens
Tales from Shakespeare	Charles Lamb
Tempest, The	William Shakespeare
Tess of the D'Urbervilles	Thomas Hardy
Three Musketeers	Alexander Dumas
Through the Looking Glass	Lewis Carroll
Time Machine	H. G. Wells
To Each His Stranger	S. H. Vatsyayan
To Live or Not to Live	Nirad C. Choudhary
Treasure Island	Robert Louis Stevenson
Triumph	John Kenneth Galbraith
Twelfth Night	William Shakespeare
Twenty Years After	Alexander Dumas
Two Leaves and a Bud	Mulk Raj Anand

(*Continued*)

Name of the Book/Play	Author
U	
Ulysses	James Joyce
Uncle Tom's Cabin	H. B. Stowe
Unhappy India	Lala Lajpat Rai
Universe Around Us	James Jeans
Unto This Last	John Ruskin
Utopia	Thomas Moore
Uttar Ramcharita	Bhavbhuti
V	
Valley of Dolls	Jacqueline Susann
Vanity Fair	William Thackeray
Vendor of Sweets, The	R. K. Narayan
View from the UN	U. Thant
Village, The	Mulk Raj Anand
Vinay Patrika	Tulsidas
View from Delhi, A	Chester Bowles
Virginians, The	William Thackeray
Vish Vriksha	Bankimchandra Chatterjee
Voice of Conscience	V. V. Giri
W	
Wake up India	Annie Besant
Walls of Glass, The	K. A. Abbas
War and Peace	Leo Tolstoy
War of Indian Independence	Vir Savarkar
War of the Worlds, The	H. G. Wells
Waste Land, The	T. S. Eliot
Way of All Flesh	Samuel Butler
Wealth of Nations	Adam Smith
We Indians	Khuswant Singh
Wonder That Was India, The	A. L. Basham
Wreck, The	Rabindranath Tagore
Y	
Yama	Mahadevi Verma
Yashodhara	Maithili Sharan Gupt
Year of the Vulture, The	Amita Malik

WORLD'S GREAT PERSONALITIES

This section includes a brief life sketch of those great personalities who distinguished themselves in various fields.

A

Abdullah, Sheikh (1906 to 1982)   Indian political leader and founder of National Conference, Chief Minister of Jammu and Kashmir.

Acton, Lord John (1834 to 1902)   British historian who authored the adage 'power tends to corrupt and absolute power corrupts absolutely'.

Adams, Gerry (1948)   President of Sinn-Fein since 1983, an Irish Republican Army's political wing. Under him Sinn-Fein became an organized political party rather than just being a political voice of IRA.

Addison, Thomas (1793 to 1860)   The British physician known for his discovery of what is now known as Addison's disease and for his works on ductless glands.

Adiseshaiah, Malcolm (1910 to 1994)   Celebrated Indian educationist and economist, former vice-chancellor of Madras University and Deputy Director General of UNESCO, Padma Bhushan.

Adler, Alfred (1870 to 1937)   Celebrated psychologist from Vienna credited with introducing concept of inferiority complex.

Advani, Lal Krishan (1927)   Former deputy prime minister of India, former union minister for information, home minister during Vajpayee government, head of opposition during Manmohan Singh's UPA government. He is a distinguished BJP politician.

Aeschylus (524 to 456 BC)   Greek dramatist, poet and founder of Greek tragic drama.

Aesop (600 BC)   The Greek author of *Aesop's Fables* (moral tales with animal protagonists). The famous title *'The Tortoise and the Hare'* was his creation.

Agarwal, Mahindra (1966)   Won 'Mathematical Prize 2002', for finding a quick and simple algorithm that conclusively tests for primality. He works as professor of Computer Science of IIT Kanpur.

Agassi, Andre (1970)   American tennis star. Has won Wimbledon (1992), US Open (1994, 1999), Australian Open (1995). He retired in September 2006.

Ahmed, Fakruddin Ali (1905 to 1977)   Fifth president of India (1974 to 1977), a freedom fighter, socialist and campaigner of social justice.

Aiken, Howard H. (1900 to 1973)   US mathematician, credited with designing forerunner of digital computer.

Akbar, Jalaluddin Muhammad (1542 to 1605)   The greatest Mughal Emperor of India, he reigned from 1556 to 1605.

Akhtar, Begum (1914 to 1974)   The ghazal queen of India who died in 1974. She was awarded Padma Bhushan posthumously in 1975.

Alberuni (AD 973 to 1048)   The famous Arab historian who visited India along with the army of Mahmud of Ghazni and wrote an account of India.

Alexander the Great (356 to 323 BC)   King of Macedonia, who conquered most of Asia Minor and defeated Porus (India) in 327 BC. A mutiny in his army prevented him from advancing further into India and he died in 323 BC.

Ali, Muhammed (1942)   Originally Cassius Marcellus Clay. Most popular American pugilist, remembered for his unorthodox style and versatile personality. First boxer to win the heavyweight title thrice.

Ali, Salim (1896 to 1987)   Remembered as 'The Birdman of India', he was a reputed ornithologist of India.

Allende, Salvador (1909 to 1973)   Former president of Chile (1970), become the first Marxist head of a government in South America.

Ambani, Dhirubhai (Dhirajlal Hirachand)   (1932 to 2002) Founder of Reliance Industries. One of the largest private sector company in modern India.

Ambedkar, Dr Bhimrao Ramji (1891 to 1956)   Emancipator of the 'untouchables' and campaigner for social justice. He is also called Father of the Indian constitution. Minister in Nehru's cabinet. Bharat Ratna in 1990. Remembered as an able jurist, social worker, politician, writer, educationist.

Amin, Idi (1925 to 2003)   Former President of Uganda (1971 to 1979). He is remembered as the harshest dictators in Africa's recent history.

Ampere, Andre-Marie (1775 to 1836)   A French scientist who formulated Ampere's Law. The SI unit of electric current is named after him.

Amritraj, Vijay (1953)   India's former captain to Davis Cup. He is only player to win Hall of Fame in Tennis thrice. The versatile sports person has acted in various Hollywood movies and TV serials.

Amte, Baba (Murlidhar Devidas) (1914 to 2008)   Indian social activists, best known for his work among leprosy patients. He has been awarded the prestigious Magasaysay award, Templeton award, Padma Vibhushan.

Anand, Dev (1922–2011)   Evergreen Indian cine-star and director. He was awarded Padma Bhushan in 2001 and Dada Saheb Phalke award in 2002. In 2007 his autobiography, *Romancing With Life*, was released by Prime Minister Manmohan Singh. He died on 3 December 2011.

Anand, Mulk Raj (1905 to 2004)   Prominent novelist who wrote in English and is considered one of the founding fathers of Indian English Novel along with Raja Rao and R. K. Narayan. His notable works include *Untouchable*, *Coolie* and *Two Leaves and a Bud*.

Anand, Viswanathan (1969)   Winner of Arjuna award, Padmashri, Rajiv Gandhi Khel Ratna award, Grandmaster Vishwanathan Anand was World No. 1 in speed chess. He was also the youngest Asian to win International Master's title.

Andrews, Charles Freer (1871 to 1940)   A British missionary and close associate of Mahatma Gandhi who came to India in 1904 and devoted himself to India's freedom struggle. He came to be known as *Deenabandhu*.

Annadurai, Kanchipuram Natarajan (1909 to 1969)   He was the most popular Chief Minister (1967) of Tamil Nadu, an eminent writer in Tamil. He was founder–member of Dravida Munnetra Kazkhakam.

Annan, Kofi (1938)   Nobel Prize winner (2001) and Secretary General of United Nations from Ghana (1997 to 2006).

Arafat, Yasser (1929 to 2004)   Chairman of the Palestine Liberation Organization (PLO) (1969 to 2004); President of the Palestinian National Authority (PNA) (1993 to 2004) and a co-recipient of the 1994 Nobel Peace Prize alongside Shimon Peres and Yitzhak Rabin, for the successful negotiations of the 1993 Oslo Accords.

Archimedes (287 to 212 BC)   The Greek scientist and mathematician known for his discovery of the unique principle of buoyancy (Law of floating). Also discovered and analysed the principle of the lever and invented the Archimedes screw to raise water.

Aristotle (384 to 322 BC)   Greek philosopher and teacher of the young prince Alexander of Macedonia. He had written many books like *The Nicomachean Ethics*, *De Anima, Poetics*.

Arnold, Mathew (1822 to 1888)   A famous English poet and critic, some of Arnold's famous poems are *Sohrab and Rustam* and *Scholar Gipsy.*

Aryabhatta (AD 476 to 520)   The Indian astronomer who adorned the court of Chandrgupta Vikramaditya. India's first satellite is named after him.

Asaf Ali, Aruna (1909 to 1996)   Important Indian freedom fighter and a devoted socialist, radical in her views. She was awarded Bharat Ratna in 1997 posthumously.

Ashoka the Great (264 to 228 BC)   Grandson of Chandragupta, Ashoka was a great emperor of India. After the battle of Kalinga, he renounced violence and embraced Buddhism.

Ataturk, Kemal (1881 to 1938)   Reformer and builder of modern Turkey.

Attlee, Clement Richard (1883 to 1967)   Labour Prime Minister of Britain, 1945 to 1951. His Government granted independence to India.

Azad, Chandra Sekhar (1906 to 1931)   Indian revolutionary; involved in the Assembly bomb incident, Delhi conspiracy, Lahore conspiracy.

Azharuddin, Mohammed (1963)   Former captain of the Indian cricket team. He announced his arrival in the international arena in 1984 to 1985 test series against England in England where he hit three-consecutive test centuries in as many tests. He was implicated in the match fixing scandal in 2000, but later in November 2012. The Andhra Pradesh High Court ruled in his favour by lifting the life ban on him. He became a politician for the Indian National Congress and won from Muradabad constituency in Uttar Pradesh to become a member of the Lok Sabha.

Azmi, Shabana (1954)   Social activist and renowned film actress. She was also a Rajya Sabha member. She has won National Film Award for best actress, incredibly, for five times. She has been honoured with Padam Shri in 1988.

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B

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Babbage, Charles (1792 to 1871)   He developed first 'calculating machines' which later gave foundation to modern computer technology.

Bachchan, Amitabh (1942)   Famous superstar of Indian cinema. He has acted in over 100 movies and given many blockbusters through out his brilliant career. He was awarded Padma Shri in 1982.

Bacon, Roger (1214 to 1294)   Bacon was an English scientist, encyclopaedist, philosopher and inventor of the magnifying glass and gun powder.

Bahuguna, Sunderlal (1927)   Social activist and environmentalist. Played pivotal role during Chipko movement and agitation against erection of the Tehri Dam.

Bai, Tara (1675 to 1761)   She was the daughter-in-law of Shivji. She married Shivaji's son Rajaram and had kept alive resistance against Mughal occupation of Maratha territories after his death in 1700.

Baird, John Logie (1888 to 1946)   The Scottish television pioneer, who invented television in 1926.

Bajaj, Jamanalal (1886 to 1942)   Active member during freedom struggle, also founded Satyagraha Ashram at Wardha. He was Gandhiji's associate and presented a village to Gandhi who named it Sevagram.

Bakr, Abu (AD 573 to 634)   A leading general of Prophet Mohammed who was the first Caliph of the Muslim empire and ruled from 632 AD. He made Islam a political and military force in Arabia.

Banabhatt   Noted Sanskrit scholar and court poet of Harshavardhana who wrote the *Kadambari* and *Harshacharita*.

Banerjea, Surendranath (1848 to 1952)   First Indian to crack the Indian Civil Services Examination. Twice he held the presidentship of Indian National Congress in 1898 and 1904.

Batuta, Ibn (1304 to 1368/1377)   A great scholar and traveller from Somalia who visited India in AD 1333 during the reign of Muhammad-bin-Tughlaq and wrote a chronicle on him. He spent 8 years in India on his way to China.

Becker, Boris (1967)   Famous tennis-star who became the youngest Wimbledon champion. He was known for winning lengthy five-set matches during his brilliant career. To

his credit he has six Grand slam trophies (three Wimbledon, two Australian open and one US open). He retired in June 1999.

Beckham, David (1975) Captain of the English football team during 2006 World Cup. He was target of advertising media as well as tabloid press because of his style-following and also for marrying Victoria Adams (one of the spice girls). He has represented major clubs like Manchester United, Real Madrid, Los Angle Galaxy and Paris Saint-Germain in his career. He announced his retirement of a 20 year career in May 2013.

Bedi, Kiran (1949) Became first woman Indian Police Service Officer in 1972. She has been awarded of Magsaysay award (1995) and UN medal for outstanding service (2004). In 2007, she had applied for retirement which was accepted by the government. An important member of Team Anna's Lokpal Bill agitation.

Behn, Mira (1892 to 1982) An English woman named Madeline Slade, who became Gandhiji's disciple and was later called *Mira Behn* in view of her dedication to India and to Gandhiji's teachings.

Beethovan, Ludwig (1770 to 1827) is one of the most respected composers of classical music. He played a crucial role in the transition of classical to romantic music.

Benedict XVI, Pope (1927) Born Joseph Alois Ratzinger Pope Benedict XVI succeeded Pope John Paul II and is the 265th Pope of the Roman Catholic Church. He was pope from 2005 to 2013 and was succeeded by Pope Francis.

Benegal, Shyam (1934) Talented film director who gave some very good films like *Ankur*, *Akrosh* and *Mandi* to Indian cinema. He was awarded Padma Shri in 1976 and Padma Bhushan in 1991. He was awarded the highest award for life-time achievement Dada Saheb Phalke award in 2005.

Bentinck, Lord William (1774 to 1839) Governor-general of India, famous for the sati reforms and suppression of human sacrifice. He also introduced English education in India.

Bernier, Francois (1625 to 1688) The French traveller who served as physician to Aurangzeb during his stay in India.

Bhaskara I An astronomer of the seventh century and a contemporary of Brahmagupta, India's second satellite is named after him.

Bhaskaracharya (1114 to 1185) The greatest astronomer, also known as *Bhaskara II*, lived in the twelfth century. He wrote Sidhanta Siromani in 1150.

Bhatia, Sabeer (1968) Founded the Hotmail email service and Jaxter. 'Hotmail' to Microsoft for a whopping sum of US $400 million. The other portals and Websites launched by Bhatia are www.arzoo.com, www.blogeverywhere.com and www.sabsebolo.com.

Bhatnagar, Shanti Swarup (1894 to 1955) An Indian scientist remembered for creating a chain of national laboratories.

Bhave, Vinoba (1895 to 1982) Eminent activist who played significant role in the Bhoodan movement. He is also recipient of Bharat Ratna and Magsaysay award.

Bhutia, Baichung (1976) The torchbearer of the Indian football in the international areas. He is Arjuna Award and Padma Shri to his credit. He announced his retirement in August 2011 and played his farewell match with the Indian National Football team against Bayern Munich in January.

Benazir Bhutto (21 June 1953 to 27 December 2007) was the first women elected to lead a Muslim state. Bhutto served as Prime Minister of Pakistan between (1988–1990, and 1993–1996). Benazir was the daughter of former prime minister Zulfikar Ali Bhutto. Her family came from the Bhutto tribe of Sindh and she was born in Karachi, Sindh. Whilst

campaigning for the PPF in the upcoming 2008 elections, she was assassinated on 27 December 2007, in Rawalpindi.

Bhutto, Zulfiqar Ali (1928 to 1979)   President of Pakistan in 1971 and subsequently prime minister of Pakistan. He was deposed by an army coup led by Ziaul-Haq and executed in 1979.

Bonaparte, Napoleon (1769 to 1821)   He was a French statesman and later became King of France (1769 to 1797), Napoleon was the most brilliant general of his time; he won a series of splendid victories against England, Russia and Austria in 1805. He was defeated in the Battle of Waterloo in June 1815 and exiled to St Helena, where he died in 1821.

Bonnerjee, Womesh Chandra (1844 to 1906)   The first president of the Indian National Congress.

Borg, Bjorn (1956)   One of the finest tennis player in the history whose elaborative career is studded with five consecutive Wimbledon titles and three consecutive French Open Titles. He retired from professional tennis in April 1983 and made a comeback after retirement in 1991 before ultimately saying Good bye in 1993. He is considered as the first 'Rockstar' in the professional tennis circuit and first earn one million dollars in prize money in a single season.

Bose, Satyendra Nath (1894 to 1974)   Indian physicist who worked on quantum mechanics. Collaborated with A.Einstein to found Bose-Einstein statistics and Bose-Einstein condensate.

Bose, Jagdish Chandra (1858 to 1937)   Eminent physicist and botanist, he was the founder of the Bose Research Institute, Calcutta. Bose was a pioneer in the identification of life in plants and is also said to have developed wireless telegraphy independent of Marconi.

Boyle, Robert (1627 to 1691)   An Irish chemist, famous for his Boyle's law of gases.

Bradman, Sir Donald (1908 to 2001)   Australian cricketer and greatest batsman in the history of cricket who holds unmatched record of career average 99.94 in tests.

Braille, Louis (1809 to 1852)   French inventor of the Braille system (raised point lettering), a system of writing and printing for the blind. He himself became blind at the age of 3 and became a teacher for the blind in 1828.

Brutus, Marcus Junius (85 to 82 BC)   Roman governor and principal assassin in the murder of Julius Caesar.

Bubka, Sergei (1964)   35 times world record breaker for Men's Pole Vaulting event (17 outdoor and 18 indoor events). He is an eminent athlete from Ukraine (erstwhile Russia) and was first to breach 6.0 m height (and later 6.10 m) in this event.

Buddha, Gautam (523 to 453 BC)   Founder of Buddhism, Buddha was born in Lumbini near Nepal. He was the son of Sudhodana, king of Kapilvastu in Nepal. He renounced the world and later came to be known as the *Buddha*.

Bunsen, Robert Wilhelm (1811 to 1899)   A German scientist who invented the Bunsen burner.

Bush, George Herbert Walker (1924)   41st president of the USA during 1989 to 1993. The first gulf war was fought during his term. He is the father of the 43rd US President George W. Bush.

C

Caesar, Julius (100 to 44 BC)   Roman general and statesman who invaded Britain and returned to Rome as a popular hero. He fell in love with Cleopatra the Egyptian queen, who followed him to Rome. He was given a mandate by the people to rule as a dictator and

was worshipped as a god in his lifetime. However, he was murdered by a group of trusted friends led by Marcus Juniues Brutus.

Cariappa, Field Marshall Kodandera Madappa (1900 to 1993)   First Indian Commander-in-Chief of Indian Army, 1943 to 1953.

Castro, Fidel (1926 –)   Cuban revolutionary and President of Cuba. Castro led Cuba in a Communist revolution which led to a profound change in the economic and political fortunes of the country. He is lauded by many for promoting education, social values, egalitarianism and standing up to 'US imperialism'. He is also criticized by many for the suppression of dissent, lack of democracy and worsening the Cuban economy.

Chaitanya (1445 to 1533)   A pioneer of the Bhakti movement in Bengal, he was a devotee of Lord Krishna. He popularized the chanting *Hare Krishna*. He spent his last 24 years in Puri, Orissa. He has written a series of verses known as the *Siksastaka*, meaning eight verses of instruction. His life and teachings are detailed in his biography, *Chaitanya Charitamrita*.

Chanakya (350 to 275 BC)   He is also known as Kautilya, Chanakya was the writer of the famed treatise Arthashastra, a book on statecraft. He was Prime Minister during Chandragupta Maurya's reign.

Chand, Dhyan (1905 to 1979)   A great hockey player, he captained the Indian hockey team which won a gold medal in the historic 1936 Berlin Olympics. He scored 101 goals at the Olympic games and 300 goals in the international matches and his record is still unbroken. It earned him the title 'Hockey Wizard'.

Chandragupta ll (Vikramaditya) (376 to 414 AD)   A brave emperor of the Gupta dynasty during whose reign art and literature flourished. The era was known as the *Golden Age of the Guptas*.

Chaplin, Charlie (1889 to 1977)   Sir Charles Spencer Chaplin was a Great British comedian, film actor, director, producer and composer.

Charles, Jacques (1764 to 1823)   A French physicist, known for his Charles' Law and Gay-Lussac's Law of gases.

Chatterjee, Bankim Chandra (1838 to 1894)   Author of Vande Mataram, the national song of India, taken from his work *Anand Math*. He was a celebrated Bengali novelist.

Chaucer,Geoffrey (1342 to 1400)   The English poet who is considered the father of English poetry. His famous works include *The Book of Dutches* (1369) and *Canterbury Tales* (a collection of stories).

Chaudhuri, Nirad Chandra (1897 to 1999)   Famous Indian writer in English language, his important works are *A Passage to England* and *Autobiography of an Unknown Indian.*

Chawla, Kalpana (1961 to 2003)   The first woman Indian-American astronaut. She lost her life during her second space mission aboard Colombia.

Chinmoy, Sri (1931 to 2007)   born in India, Sri Chinmoy spent 20 years in the Sri Aurobindo Ashram before coming to the US in 1964. He established many meditation centres around the world and created the Sri Chinmoy Oneness Home Peace Run.

Chou-en-Lai (1898 to 1976)   Chinese revolutionary and Prime Minister from 1949 to 1958, he was instrumental in involving China world diplomacy. He played key role in nearly every major political and diplomatic event or crisis involving China till his death in 1976.

Churchill, Sir Winston (1874 to 1965)   British statesman and war leader, who was Prime Minister of Britain during World War II. His publication *The Second World War* (in 6 vol-

umes) became very famous and earned him the Nobel Prize in 1953. He resigned as Prime Minister in 1955 and published his major work *A History of the English Speaking People.*

Cleopatra (69 to 30 BC)   Queen of Egypt, noted for her beauty. Cleopatra was the daughter of Ptolemy XI of Egypt and succeeded him as queen in 51 BC.

Clive, Robert (1725 to 1774)   He came to India as a clerk in the East India Company. He became Commander-in-Chief and fought against the French in India. He defeated Siraj-ud-daulah in the battle of Plassey in 1737. Later he ruled India as Governor (1765) and committed suicide in 1774.

Columbus, Christopher (1451 to 1506)   Italian explorer, Columbus was the first modern European to discover the Americas in 1492. He reached Bahamas in 1492 and discovered Puerto Rico and Jamaica as well. In 1498 to 1500 he reached Trinidad and South America.

Compton, Arthur Holly (1892 to 1962)   American scientist noted for his research on X-rays; won the Nobel Prize in 1927. During World War II he was in charge of 'Metallurgical Lab' where he worked to produce chain reaction from Uranium to produce atomic bomb.

Confucius or K'ung Fu-Tse (551 to 478 BC)   Founder of 'Confucianism', he was an eminent Chinese thinker and philosopher.

Cook, Capt. James (1728 to 1779)   Cook was a great British explorer and navigator. He travelled to New Zealand and eastern Australia from 1768 to 1771 in his ship *Endeavour*. On his second voyage he reached the Antarctic circle and he discovered the Hawaiian Islands on the third voyage. He also wrote the classic work *Voyage Round the World*.

Cook, Thomas (1908 to 1982)   British Baptist priest turned tour operator, established Thomas Cook. Father of modern tourism.

Copernicus, Nicolaus (1473 to 1543)   Polish astronomer known for his discovery of heavenly bodies, their movement around the sun and that the sun is the centre of the universe.

Corbusier, Le (1887 to 1965)   An eminent French architect, born in Switzerland, is famous for designing the Chandigarh City. His original name was Charles Edouard Jeanneret.

Cornwallis, Lord (1738 to 1805)   The British statesman who commanded the British Army in South Carolina during the War of American independence in 1781. He was Governor-General of India for two terms and is well known for his land reforms.

Cromwell, Oliver (1599 to 1655)   Cromwell was an English soldier and statesman, who established a commonwealth in Britain and became its head with the title 'Lord Protector'. He ruled the country for 5 years between 1653 and 1658.

Crooks, William (1832 to 1919)   British chemist and physicist who discovered the element Thallium in 1861, invented the radiometer and also pioneered research on cathode rays.

Curie, Madam Marie (1867 to 1934)   Madam Curie was the only person to have won two Nobel Prizes. She was a Polish chemist who discovered Radium (1898). Along with her husband Pierre Curie, a French scientist, she carried out research in radioactivity and they were awarded the Nobel Prize for Physics in 1903. After her husband's death, she *Continued* her research and in 1911 was awarded the second Nobel Prize in Chemistry for her discovery of radium and polonium.

Curzon, Lord (1859 to 1925)   His full name was George Nathaniel Curzon and was Viceroy of India during 1889 to 1905, he became a prominent figure after the World War I. The Universities Act 1904 was introduced by him and the partition of Bengal in 1905 was

affected during his term. He completely changed the bureaucratic machinery in India and even the offices of ICS officials came under his scrutiny.

D

Da Gama, Vasco (1460 to 1524)   He discovered the sea route from western Europe to India. He was a great navigator and sea-traveller from Portugal.

Da Vinci, Leonardo (1452 to 1519)   The great Italian painter, sculptor and architect who has been described as a genius of the Renaissance. His masterpiece *Monalisa* brought him universal fame. *The Last Supper* is also one of his well-known paintings. Over and above he excelled as an inventor, mathematician, engineer, naturalist and anatomist. In anatomy, he learnt about the working of the body by dissecting more than 30 corpses. He also created moulds of organs such as the heart, lungs and womb.

Daimler, Gottleib (1834 to 1900)   The German scientist who developed the petrol driven internal combustion engine. He founded the Daimler Motor Company in 1890, which built the first Mercedes.

Dalai Lama (1935)   Tenzing Gyatso is the current, 14th Dalai Lama. He is a Nobel Prize winner (1989) and spiritual leader of Tibet. He has established official government of Tiber (in exile) at Dharamsala in Himachal Pradesh, India (1959) after he fled from his homeland.

Dalton, John (1766 to 1844)   An English chemist who postulated the Atomic theory and defined atomic weight, he was also famous for Dalton's Law—the pressure of a mixture of gases is the sum of the partial pressures of the components of the mixture.

Dame, Michel De Notre (1503 to 1566)   Also known as Nostradamus. Noted astrologer form France who is known for his prophecies.

Dante, Alighieri (1265 to 1321)   Italian poet, author of *Divine Commedia*, a philosophical poem telling the story of an imaginary journey through Hell. He also wrote love poems which were collected under the title *La Vita Nuova*.

Darwin, Charles Robert (1809 to 1882)   The British naturalist who put forward his theory of evolution based on natural selection. He studied fossils and diverse plant and animal life during his voyage (l831 to 1836) around South America and the Pacific. His works, *The Origin of Species* (1859) and *Descent of Man* (1871), revolutionized man's knowledge of evolution.

Davy, Sir Humphrey (1778 to 1828)   A renowned British chemist, Davy invented the safety lamp for miners. He also discovered the anaesthetic properties of nitrous oxide (laughing gas), the fact that the chlorine is an element and that diamonds are a form of carbon.

De Albuquerque, Alfonso (1453 to 1515)   Founder of the Portuguese empire in the East, he conquered Goa in 1510 and died in 1515.

Desai, Morarji (1896 to 1995)   Eminent politician and Indian Prime Minister (1977 to 1979).

Dhanvantari An Indian physician who adorned the court of Chandragupta Vikramaditya.

Diaz, Bartholomew (1450 to 1500)   A Portuguese navigator who was the first European to sail round the Cape of Good Hope (the southern tip of the African continent).

Dickens, Charles (1812 to 1870)   He was an English novelist. Some of Dickens' famous works are *David Copperfield, Oliver Twist* and *Great Expectations*.

Diesel, Rudolf (1858 to 1913)   A German engineer who invented the diesel engine in 1893.

Disney, Walt (1901 to 1966)   US film producer, he is famous as the creator of cartoon films starring the popular cartoon characters Mickey Mouse and Donald Duck.

Dorjee, Ang (1970)   A Nepalese Sherpa, who climbed Mt Everest in 1984 with Bachendri Pal, the first Indian woman to conquer Mt Everest. He has the distinction of having climbed Mt Everest twice without the use of oxygen.

Doyale, Arthur Conan (1859 to 1930)   British writer and creator of characters like detective Sherlock Holmes and Dr Watson.

Drucker, Peter Ferdinand (1909 to 2005)   Eminent Management guru and writer of global fame. He wrote more than 30 books of which some are *The End of Economic Man, Concept of the Corporation* and *Drucker on Asia*.

Dutt, Nargis (1929 to 1981)   The first Indian actress to have been nominated to the Rajya Sabha, she was a recipient of the Padmashri and is well known for her film *Mother India*.

E

Edison, Thomas Alva (1847 to 1931)   US-born inventor with more than 1300 US and foreign patents to his credit for his inventions; most of them concerned with electricity. Some of his important inventions are the *incandescent lamp*, *phonograph* (gramophone), *carbon telephone transmitters* and *microphone*.

Einstein, Albert (1879 to 1955)   One of the most illustrious scientists of the twentieth century, he was born in 1879 at Ulma in Germany and completed his education in Switzerland. He made the revolutionary discovery of the Theory of Relativity in 1905, which established his reputation among the physicists of Europe. In 1921 he was awarded the Nobel Prize in Physics. He died in the USA on 18 April 1955.

Eisenhower, Dwight David (1890 to 1969)   US general and president between 1953 to 1961. In 1950 he was made supreme commander of NATO but resigned when he won the US presidential elections of 1952. He won his second term in 1956.

Elizabeth I, Queen (1533 to 1603)   Queen Elizabeth I of England (1558 to 1603) was the daughter of Henry VIII. Her reign saw the development of English literature. William Shakespeare lived during her time.

Elizabeth II, Queen (1926)   Queen Elizabeth of Great Britain and northern Ireland ascended the throne in 1954. She was married to Prince Phillip, Duke of Edinburgh in 1947. Charles, Prince of Wales, is her heir apparent.

Epicurus (342 to 270 BC)   A Greek philosopher who founded 'Epicurean' philosophy, which describes a life of indulgent pleasure-seeking, i.e., virtues should be followed because they lead to happiness.

Euclid (350 to 300 BC)   Greek mathematician, his important contribution was the use of deductive principles of logic as the basis of geometry. He propounded the geometrical theorems.

Evert, Chris (1954)   Tennis legend from United States. She won seven French open, six US open, three Wimbledon and two Australia open grand slams during her illustrious career from 1972–1989.

F

Fa-hien (399 to 414 AD)   The first Buddhist pilgrim of China to visit India during the reign of Chandragupta Vikramaditya.

Fahrenheit, Gabriel Daniel (1686 to 1736)   German physicist and resident of Holland, he developed the mercury thermometer in 1714 and later devised its temperature scale.

Faiz, Faiz Ahmed (1911 to 1984)   A revolutionary Urdu poet of Pakistan. He died in 1984.

Faraday, Michael (1791 to 1867)   The British scientist who discovered electromagnetism, Faraday also discovered benzene, liquid gases and optical glass. In 1841, he discov-

ered the induction of electric current, which led to the invention of the electric motor. He also contributed to the development of electrolysis.

Fazal, Abul (1561 to 1602)   The author of *Ain-i-Akbari* and *Akbarnama*. He was the celebrated Mughal court poet and Prime Minister during Akbar's reign.

Firdausi (935 to 1020)   A Persian poet, well known for his epic *Shahnama*.

Fischer, Bobby (1943 to 2008)   American chess wizard who held the World Chess Champion title during 1972 to 75. His rivalry with Boris Spassky of former USSR is one of the finest legends of the game.

Ford, Henry (1863 to 1947)   was an industrialist who changed the face of automobile industry in America, becoming the epitome of American Capitalism. He lent his name to 'Fordism' – efficient mass production.

Foster, Edward Morgan (1879 to 1970)   Famous British writer who wrote numerous books on India. Author of *Where Angels Fear to Tread, A Room with a View, Howards End* and *A Passage to India.*

Franck, Rene (1899 to 1983)   President of the International Hockey Federation for 17 years. He died in 1983.

Franklin, Benjamin (1706 to 1790)   US statesman who promoted the American Declaration of Independence (1776) and was involved in the work of drafting the Constitution of America.

Freud, Sigmund (1856 to 1939)   A renowned Austrian psychologist, who developed the theory of psychoanalysis. He authored *The Interpretation of Dreams* and *The Ego and the Id.*

G

Gaddafi, Muammar al (1942–2011)   Military dictator from Libya who masterminded the coup in 1969 to come to power. He was ousted in the Libyan civil war, captured and killed on October 20, 2011 at an age of 69 years.

Galileo (1564 to 1642)   The Italian astronomer, who developed the telescope and discovered four satellites of Jupiter. His belief that Copernicus was right in advocating that the sun is at the centre of universe led to his persecution. While dying he said 'But it (earth) does move'. He also discovered that the movement of the pendulum produces a regular time measurement. The pendulum clock was later invented by Huygens.

Gandhi, Indira (1917 to 1984)   First women prime minister of India (1966 to 1977, 1980 to 1984). She was daughter of former Indian Prime Minister Jawaharlal Nehru. Her assassination in 1984 resulted in nationwide attacks on Sikh community.

Gandhi, Rajiv (1944 to 1991)   He was son of Indira Gandhi and came to power after her assassination. He remained Indian prime minister till 1989 and was assassinated in 1991.

Gandhi, Sonia (1946)   Widow of Rajiv Gandhi, she reluctantly joined Congress party in 1997. Under her leadership Congress came to power in 2004 but she declined to become Prime Minister of India. She is of Italian origin.

Gates, Bill (1956)   One of the world's richest individual and owner of Microsoft Corp. USA. He retired from the day-to-day activities of the company to turn full-time philanthropist along with his wife.

Gaulle, Charles de (1890 to 1970)   He was a prominent French general and statesman.

Gavaskar, Sunil (1949)   Cricket legend from India who once held the world record of 34 test-centuries and maximum number of runs (10,000) in Test Cricket. He is now a popular commentator and columnist.

Ghali, Boutros-Boutros (1922)   Eminent Egyptian politician who became the first African Secretary General of United Nations (1992 to 1996).

Ghalib, Mirza (Asadullah Khan) (1796 to 1868)   Renowned Urdu poet. His *Diwan-e-Ghalib* is considered to be one of the most significant Urdu literary works.

Ghosh, Amitav (1956)   One of India's most distinguished English-language novelist. His novels include, *Shadow Lines*, *The Circle of Reason*, *The Glass Palace* and *The Hungry Tide*. He won Sahitya Akademi award for *Shadow Lines*. He was awarded Padma Shri in 2007

Ghosh, Aurobindo (1872 to 1950)   An exponent of Indian nationalism; a philosopher, poet and saint. His famous works include *Life Divine* and *Essays on the Gita*.

Giri, Varahagiri Venkata (1894 to 1980)   The third vice-president (1967 to 1969) and the fourth president of India (in 1969 he was acting President). He was a recipient of the Bharat Ratna in 1975. He died in 1980.

Goethe, Johann Wolfgang von (1749 to 1834)   German writer, scientist and a major figure in the world of literature, he devoted his life to writing poetry, novels and plays. His most famous work is *Faust*, a two-part drama.

Gogh, Vincent Van (1853 to 1890)   was an artist of exceptional talent. Influenced by the impressionist painters of that period, he developed this with his own instinctive, spontaneous style. Van Gogh became one of the most celebrated artists of the twentieth century and played a key role in the development of modern art.

Gopalakrishnan, Adoor (1941)   Eminent scriptwriter and film director from Kerala. His important works include *Swayamvaram, Kathapurushan, Nizhal Kuthu.* He is the winner of 2004 Dadasaheb Phalke award. He is also the recipient of the Padma Vibhushan award.

Gorbachev, Mikhail (1931)   Eminent Soviet leader responsible for the political transformation with policies of *'glasnost'* and *'perestroika'* in 1989.

Gowda, Deve H. D. (1933)   Full name Hardanahalli Doddegowda Deva Gowda. He is a veteran politician form Karnataka and Janata Dal Leader who became India's Prime Minister (1996 to 1997) in United Front government.

Graham Bell, Alexander (1847 to 1922)   The Scottish–American scientist who invented telephone in 1876.

Gujaral, Inder Kumar (1919–2012)   Former Prime Minister of India (1997) who worked extensively for improvement in Indo-Pak relations.

Gupta, Maithili Saran (1886 to 1964)   Eminent poet who made significant contributions to the modern Hindi literature.

H

Haasan, Kamal (1954)   South Indian film star who gave many blockbusters to Hindi as well as Tamil, Telugu and Malayalam cinema, he won three national awards and 15 Filmfare awards in his acting career spanning more than four decades.

Hawking, Stephen (1942)   Outstanding English astrophysicist, who despite being the victim of a degenerative nerve disease became one of the top physicist of the history. He is the author of popular books such as *A brief History of Time* and *Black Holes.*

Hazare, Anna (1937)   Kisan Baburao Hazare (full name) resident of village Ralegan Siddhi, distt. Ahmednagar, Maharashtra is a social activist and leader of various movements to uphold rural development, government transparency, fight against corruption. In April 2011 was in prominance to promote Jan Lokpal Bill, led through fast a nation-wide protest, that led to government issuing a gazette notification of formation of joint committee consisting of civil society representatives and government to draft a legislation.

Hazarika, Bhupen Kumar (1926–2011)   Eminent film director, lyricist and music composer. He was awarded the Dada Sahib Phalke Award in 1993. He died on 5 Nov. 2011.

Hitler, Adolf (1889 to 1945)   The Austria-born German dictator, also called Führer, who influenced the course of history in the twentieth century. He served in the German Army in World War I. He later founded the Nazi party and became chancellor in 1933. He pushed the countries of the world into World War II, in which five million people lost their lives. In 1939 his troops invaded Poland, causing the outbreak of World War II and in 1945 Germany faced total defeat. He married his mistress Eva Braun in April 1945 and the next day they are said to have committed suicide.

Homer (Ninth century BC)   The Greek writer is considered to be the author of the classic epics *The Iliad* and *The Odyssey,* which rank among the most precious treasures of world literature.

Hussain, Zakir (1897 to 1969)   He was the third president of India (1957 to 1969) and died in office in 3 May 1969. He was also India's second vice-president (1962 to 1967).

Huygens, Christian (1629 to 1695)   Dutch mathematician and physicist renowned for evolving the wave theory of light. He invented the pendulum clock based on Galileo's theory (1580). He also discovered the rings of Saturn and its fourth satellite.

I

Iacocca, Lee (1924)   Italian-born American President of Ford Motor Company who is credited for converting Ford Motor into one of the most successful companies of the world.

J

Jackson, Michael (1958–2009)   Outstanding black American singer who gave hits like *Thriller, Dangerous, History*. He got dragged into lot of controversies, prominent being the child-abuse case. He died on 25 June 2009.

Jayadeva   Lived in the twelfth century and is the author of *Gita Govinda.* The book is a noble work of lyrical poetry and describes the love of Lord Krishna and his beloved Radha and their separation and reunion.

Jayalalithaa, Jayaram (1948)   Tamil film-star who turned politician and became Chief Minister of Tamil Nadu in 1991. She is presently the leader of AIADMK.

Jenner, Edward (1749 to 1823)   The English physician and surgeon who developed the small pox vaccination.

Jinnah, Mohammed Ali (1879 to 1948)   Founder of the separate Muslim state of Pakistan. He was the president of the Muslim League for many years and after partition of India, became the first governor of Pakistan in 1947.

Joan of Arc (1412 to 1431)   A brave French girl, also known as the *Maid of Orleans*, Joan led the French resistance that forced the English to raise the siege of Orleans (1429). At the age of 17 she led an army of 12,000 to Reims and persuaded Charles VII to go there to be crowned as King of France. She was ultimately captured and sold to the English (1430) by the Burgundians and was burnt at the stake in Roven.

Johnson, Lyndon (1908 to 1973)   was the 36th President of the US from 1963 to 1969. It was one of the most turbulent and influential periods in the history of American politics. Lyndon Johnson helped to implement 'great society' reforms – extending welfare support and civil rights legislation. He also presided over an escalation of American involvement in Vietnam which proved to be increasingly controversial.

Jordan, Michael (1963) Outstanding basketball player of USA who is hailed as NBA-superstar. He represented the Chicago Bulls and retired in 1999.

Joule, James Prescott (1818 to 1889) The British physicist who was the first to measure the mechanical equivalent of heat; the measuring unit of which has been named after him.

K

Kabir (1440 to 1518) Hindi poet who was one of the greatest exponents of the Bhakti movement—a socio-religious movement. He believed in the equality of all religions and unity of Hindus and Muslims.

Kalam, Dr Avul Pakir Jainulabdeen (1931) Known as the Missile-man of India, he was the president of India from 2002 to July 2007.

Kalashnikov, Mikhail (1919 to 2013) Russian businessman and creator of the famous Kalashnikov rifle, AK-47 and AK-56.

Kalelkar, Kaka Saheb (1885 to 1981) Philosopher and educationist, he was vice-chancellor of Gujarat University and one of the oldest disciples of Gandhiji. He died on 21 August 1991, at the age of 96. He authored more than 120 books in Gujarati, Marathi, Hindi, and English.

Kalhana A Kashmiri poet of the eleventh century and author of *Rajatarangini,* the book describes the history of Kashmir up to tenth century.

Kalidas (AD 400) India's one of the greatest Hindi poet and dramatist, Kalidas lived during the reign of Chandragupta Vikramaditya. His famous works are *Shakuntala, Raghuvamsa, Meghdoot* and *Kumara Sambhava.* He is also referred to as Mahakavi Kalidas

Kanishka (AD 120 to 162) The greatest King of Kushan dynasty, he was a great conqueror but later became a follower of Buddha. He was the only ruler of India whose territory extended up to central Asia.

Kant, Krishan (1927 to 2002) Vice-president of India during 1997 to 2002.

Kapoor, Raj (1924 to 1988) Outstanding actor and film-maker of Indian film industry, hailed as one of the greatest entertainers from the legendary Kapoor family. He was the recipient of Dadasaheb Phalke Award in 1987.

Karnad, Girish Raghunath (1938) Eminent playwright, actor and director of Indian cinema. He has received Padma Shri and Padma Bhushan awards, besides being the recipient of India's highest literary award, the Jnanpith Award. His most famous plays include *Tughlaq*, *Hayavadana*, *Nagamandala*, *Bali*, *Agni mattu Male* (The Fire and the Rain) and *Yayaathi*.

Kaur, Rajkumari Amrit (1887 to 1964) Indian freedom fighter. She was also the Health Minister in the Nehru Cabinet.

Keats, John (1795 to 1821) An English poet, whose works include *La Belle Dame Sans Merci*, *Endymion* (A thing of beauty is a joy forever), *The Eve of St Agnes* and *Ode to a Nightingale*, among others.

Kelvin, William Thompson (1824 to 1907) British physicist who put forward the idea of an absolute measurement of temperature and invented the Kelvin scale of temperature.

Kennedy, John Fitzgerald (1917 to 1963) One of the most popular Presidents of the USA. He was the first Roman Catholic President and the youngest American to be elected to the Office of President of USA. He wrote several books, among which *Why England Slept* and *Profile in Courage* are his two most famous books. He was assassinated on 23 November 1963.

Keynes, John M (1883 to 1946)   was a British economist. His ground breaking work in the 1930s led to the development of a whole new economic discipline dedicated to macroeconomics. In particular, his economic theories termed 'Keynesianism' advocated government intervention to end the Great Depression.

Khan, Abdul Ghaffar (1890 to 1988)   He was also called 'Frontier Gandhi' because he organized the people of the North west Frontier Province (NWFP) of undivided India (now merged with Pakistan) on Gandhian principles. He was a staunch Congress man who called himself a soldier of the freedom struggle. His admirers called him Badshah Khan. He was awarded the Bharat Ratna in 1987.

Khan, Ali Akbar (1922 to 2009)   Sarod Player. Khan popularised Indian classical music in the West and often played with Ravi Shankar.

Khan, Bairam   He was Akbar's uncle and also his tutor and was known as *Khan-i-Khana*.

Khan, Bismillah (1916 to 2004)   Legendary *shehnai* maestro. He was decorated with highest Indian civilian award, Bharat Ratna, in 2001.

Khan, Changez (1162 to 1227)   The Mongol conqueror who came to India during the reign of Iltutmish (1210 to 1236).

Khan, Kublai (1216 to 1294)   A Mongolian emperor who conquered most of Asia. He was the grandson of Genghis Khan.

Khan, Liaquat Ali (1895 to 1951)   Leader of the Muslim League and first premier of independent Pakistan (1947).

Khan, Sir Syed Ahmed (1817 to 1898)   An educationist and reformer of the Muslim community in India, he established the MAO College at Aligarh in 1875, which later became the Aligarh Muslim University.

Khan, Ustad Allauddin of Malhar (1862 to 1972)   Legendary Hindustani music maestro.

Khan IV, Aga (1936)   Spiritual head of 20 million Shia Ismaili Muslims in the world. He is 49th Nizari Ismaili Imam

Khilji, Ala-ud-din   He ruled north India between 1296 and 1316. He was the strongest ruler of the Khilji Dynasty and during his reign the Muslims progressed towards the Narmada River in the Deccan.

Khorana, Har Gobind (1922–2011)   Indo-American molecular biologist who shared the Nobel Prize in 1968 with Robert W. Holley and Marshall Warren Nirenberg for synthesizing the first wholly artificial gene. He was first to demonstrate the role of nucleotides in protein synthesis.

Khosla, Vinod (1955)   Founder-partner of one of the world's most significant venture capitalists, *Sun Microsystems*.

Khrushchev, Nikita (1894 to 1971)   A Russian follower of Joseph Stalin, Khrushchev was head of the Soviet Republic. When Stalin died he became the first secretary of the Soviet Communist Party and was Prime Minister during 1958 to 1964. He died in 1971.

Khusro, Amir (1253 to 1325)   The father of *qawalli* and an eminent poet in medieval Delhi. He was a disciple of Nizam-ud-din Auliya. He was a prolific writer and an inventive musician who introduced many styles of vocal singing and invented musical instruments like tabla and sitar. He also played a huge role in shaping the language of entire northern part of the subcontinent.

King, Billie Jean (1943)   Legendary tennis player who studded his outstanding career with six Wimbledon titles, four US titles and one each of the Australian open and Fencer open titles. She retired in 1983.

King, Martin Luther (1929 to 1968) A Black American clergyman and civil rights leader, he led a non-violent movement to obtain full civil rights for American Negroes and became a martyr for his cause. He was awarded the Nobel Prize for Peace in 1964. He was assassinated on 5 April 1968 by a White fanatic.

Kingsley, Ben (1944) British actor who is best known for the role of Mahatma Gandhi in Attenborough's film, *Gandhi.* His other important films include *Schindler's List* and He was given *Knighthood* in 2002.

Kiplin, Rudyard (1865 to 1936) English writer, whose famous works include *Tales From the Hills, The Light That Failed, Jungle Book, Barrack Room Ballads, Kim, Just-so Stories, Puck of Pook's Hill.* He was awarded the Nobel Prize for Literature in 1907, which he later returned.

Kisitiakowsky, Dr George B. (1870 to 1952) A chemist and professor at Harvard, he worked on the first atomic bomb and later strongly advocated the banning of nuclear weapons. He died at the age of 82 in 1952.

Kissinger, Henry (1923) US foreign policy adviser, he was born in Germany, but fled from the Nazis to live in the USA. He remained Secretary of State under President Nixon. He helped to negotiate the Vietnam issue (1973), for which he shared the Nobel Prize for Peace (1973) along with North Vietnam's negotiator Le Duc Tho. He was credited with the Theory of Realpolitik.

Kitchlew, Saifuddin (1888 to 1963) Freedom fighter and member–founder president of the All India Peace Council.

Kohl, Helmut (1930) He was chancellor of West Germany and was pivotal in unification of Germany. He became the first chancellor of United Germany in 1990.

Kotnis, Dr Dwarkanath (1910 to 1942) Noted doctor from India whose dedication and duty influenced many during the Indian medical mission to war-torn China in 1938.

Krugman, Paul (1953 -) is an American economist and professor of economics at Princeton University. He is a leading liberal voice in American policy debate and has been labelled one of the most influential academic thinkers in America. He was awarded the Nobel Prize for economics in 2008 in recognition for his work on international economics.

Kumar, Ashok (1911 to 2002) Legendary film actor in Indian film industry whose career spanned more than six decades. He received the National Film Award for Best Actor in 1969 for *Ashirwaad* and Dadasaheb Phalke Award in 1988. His real name was Kumudlal Kunjilal Ganguly.

Kumar, Dilip (1922) Dilip Kumar is the screen name of Yusuf Khan who is widely accepted as one of the greatest actors of the Hindi film industry. He has been called 'tragedy king' for his intense portrayal characters. In 1994, he was awarded the Dadasaheb Phalke Award. He also received the Nishan-e-Imtiaz in 1998, the highest civilian award conferred by the government of Pakistan.

Kurien, Dr Verghese (1921–2012) Hailed as the 'Father of India's White revolution' and 'Operation Flood' he is the former chairman of the National Dairy Development Board. Also called the 'Milkman of India', he is considered to be the force behind the success of brand Amul. He was recipient of World Food Prize (1989), Padma Vibhusan (1999) and Ramon Magsaysay Award (1963).

Kyi, Aung San Suu (1945) Nobel Prize winner and the greatest advocate of democracy in Myanmar, she is kept under house arrest by the military junta of Myanmar. She remained under house arrest for almost 15 years, till she was released in November 2011. She now campaigns for the National League for Democracy in Burma.

L

Laden, Osama Bin (1957–2011)   Notorious terrorist who headed terrorist organization Al-Qaeda which was behind 9/11 attack on WTC, USA. He was killed by US Navy SEALS and CIA paramilitary operatives on 1 May 2011.

Lakshmibai, Rani of Jhansi (1835 to 1858)   The ruler of Jhansi, she was a great warrior who took part in the first war of independence in 1857 (Indian Mutiny).

Laxman, Rashipuram Krishnaswami (1927–2015)   He is India's best-known cartoonist, the creator of 'Common Man'. He is brother of famous novelist R. K. Narayan.

Lenin, Vladimir Illich (1870 to 1924)   Also known as Nikolai Lenin, he was a Russian revolutionary leader. He was exiled to Siberia in 1895 where he *Continued* to guide the revolutionary struggle of the Russian people. In 1898 he created a new party—the Bolshevik Party—to bring about a communist revolution in Russia. On 7 November 1917, a new Socialist government was formed under the leadership of Lenin.

Lewis, Carl (1961)   Noted athlete who shot to fame in 1984 Olympics when he clinched four gold medals (overall eight Olympic gold medals). He was a wonderful athlete and held the world record of being the fastest in 100 m event.

Lincoln, Abraham (1809 to 1865)   The 16th president of USA, who succeeded in abolishing slavery. He was re-elected as President in 1864 and assassinated by John Wilkes Booth in l865.

Lopez, Jennifer (1970)   Peurto-Rica born singer and entertainer became famous with her charbuster debut album. She was at one time the highest paid South American actress in Hollywood.

Loren, Sophia (1934)   Noted Hollywood actress and entertainer from Italy. In 2011, she gave voice to the character 'Mama Topolino' in the film 'Cars 2'.

Louis, XIV (1638 to 1715)   Eminent French ruler who reigned France for more than six decades.

Luther, Martin (1483 to 1546)   Noted German monk, priest, theologian and church reformer. His teachings inspired the Reformation and deeply influenced the doctrines and culture of the Lutheran and Protestant traditions, as well as the course of Western civilization.

M

Madhavacharya (1238 to 1317)   Greatest advocate of Dwaita philosophy. He is credited with interpreting *Upanishads* differently and also for writing commentaries on *Gita*.

Madonna, Lousie Ciccone Veronica (1958)   Legendary American female pop star, who is considered to be one of the greatest pop music performer of all times.

Magellan, Ferdinand (1480 to 1521)   The Portuguese navigator who crossed the ocean which he named Pacific, reaching the Marianas and the Philippines.

Mahapatra Jayanta (1928)   One of India's best known poet in English language.

Mahapatra, Kelucharan (1926 to 2004)   Master dancer, Odissi form, who is credited with coaching world-class dancers.

Mahavira (599 to 527 BC)   Born in Kundagram near Vaishali (Bihar), he was an apostle of non-violence, who preached the observance of chastity, penance, contemplation and self-mortification. He attained enlightenment under a sala tree. He went on to found Jainism, a major religious sect in India.

Mal, Todar (1556 to 1605)   One of the nine gems and revenue minister in the court of Akbar, known for his reforms in policies of land revenue.

Malaviya, Madan Mohan (1861 to 1946)   A prominent lawyer of Allahabad, he also founded the Banaras Hindu University. He served as President of Indian National Congress and was an Indian delegate at the Round Table Conference in 1931.

Malcolm X (1925 to 1965)   Noted black militant leader from USA who advocated a seperate black society in America to be created by violence. His original name was El Hajj Malik El-Shabass, also known as Malcolm Little.

Malleswari, Karnam (1976)   She became the first Indian female sports person to win an Olympic medal when she cliched bronze medal in the weight-lifting.

Mandela, Nelson Rolihlala (1918 to 2013)   Nobel Prize winner in 1993, he was in jail for 27 years fighting for a non-racist democracy in South Africa. He became the first black President of South Africa in 1994 and was in office till 1999.

Mangeshkar, Lata (1929)   Outstanding playback singer with her career spanning more than five decades. She is known as the melody queen of India. Her name entered the Guinnes Book of world record (1984) for the most recorded artist in the history for the period 1948–1987. She has been the recipient of Bharat Ratna (2001), Padma Bhushan (1969), Padma Vibhusan (1999), Dada Sahib Phalke Award (1989) and The National Film Award among many other awards.

Mansingh, Sonal (1944)   Noted Indian classical dancer credited with first female dancer to learn *Chhau* form.

Manu   Regarded as the ancient law giver of India and author of *Manu Samriti.*

Maradona, Diego (1961)   Legendary football player from Argentina. Controversies remained part of his career which included the infamous 'hand of God' goal against England and drug-abuse ban during his playing days.

Marconi, Gugeliemo (1874 to 1937)   Italian physicist who invented the radio and wireless system. He shared the Nobel Prize in Physics with Ferdinand Braun of Germany in 1909 for the development of the wireless.

Marx, Karl (1818 to 1883)   German philosopher, sociologist, economist and journalist who propounded the doctrine of Communism, also known as *Marxism*. He was the author of *Das Kapital*.

Maurya, Chandragupta (321 to 298 BC)   Founder of the Mauryan Dynasty in India, Chandragupta spread his empire beyond India. Kautilya (Chanakya) was his minister.

Megasthenes (302 to 298 BC)   He was the Greek ambassador, sent by Seleucus, in the court of Chandragupta Maurya. He wrote a detailed account of India in his work *Indica.*

Mehta, Zubin (1936)   Noted musician who conducted Israel Philharmonic Orchestra. Indian-born maestro conducted a 130-member New York Philharmonic Orchestra.

Miller, Henry (1891 to 1980)   Controversial American novelist, author of *Tropic of Cancer* (1934) and *Tropic of Capricorn* (1939) which were published in Paris but banned in USA until the 1960s because of their frank sexual themes.

Milton, John (1608 to 1674)   An English poet, he wrote a poem in support of free press tilted *Areopagitica* (1644), essays *Tenure of Kings and Magistrates* (1649). His epic poem *Paradise Lost* was published in 10 volumes in 1667 and in 12 volumes in 1674. *Paradise Regained* and *Samson Agonistes* were his other major works published in 1671. He was totally blind for a good many years of his life.

Modi, Sohrab (1897 to 1984)   The Grand Old Man of Indian cinema and winner of the Dada Saheb Phalke Award in 1978, he produced India's first technicolour film *Jhansi ki*

Rani in the early 1950s. Another film *Mirza Ghalib* was the first Hindi film to receive the President's Gold Medal in 1955.

Monroe, Marilyn (1926 to 1962)   American actress, singer and model.

Muhammed, Prophet (570 to 632)   Established the religion of Islam and the Muslim community (Ummah). Muslims believe him to have been God's final prophet, to whom the *Quran* was revealed.

Montessori, Maria (1870 to 1952)   Italian educationist and founder of the Montessori system of education that stresses on the development of a child's own initiative and natural abilities, especially through practical play and individual guidance rather than through strict control.

More, Thomas, Sir (1478 to 1535)   Legendary English author who revolted against supremacy of Henry VIII over the church.

Mountbatten, Lord (1900 to 1979)   Britain's supreme allied Commander in south-east Asia in World War II; he became the last Viceroy of India. He declared India a free nation and became the first Governor-General of independent India.

Mueller, Prof. Max (1823 to 1900)   An eminent educationist, indologist and linguist from Germany. He was a sought-after teacher of Sanskrit language at Oxford University.

Munshi, Kanhaiyalal Maneklal (1887 to 1971)   A great writer, educationist and constitutional law expert; he played an active role in India's freedom struggle.

Murdoch, Rupert (1931)   Australian-born American media baron who owns various top-class media companies—News Corporation, Fox Broadcasting Company, 20th Century Fox, Direct-TV, HarperCollins, The Times and The Sun. In 2011, his companies were in news for hacking the phones of royalty, celebration and public citizens. Also the British and US authorities investigated his involvement in being bay and other cases of unethical business practices.

Murthy, Nagawara Ramarao Narayan (1946)   Former Chairman and Chief Mentor of Infosys Technologies. He is the most prominent information technology leader of modern India.

N

Naidu, Sarojini (1879 to 1948)   Also called 'Nightingale of India', she was a great poetess in English. She participated in India's freedom struggle and became President of the Indian National Congress in 1925 and the first woman Governor of a state (UP).

Naipaul Vidiadhar Surajprasad (1932)   A prolific writer from United Kingdom who won the Nobel Prize in 2001. His latest non-fiction work was released in 2010, the Masque of Africa: Glimpses of African Belief was Knighted in 1990.

Nanak, Guru (1469 to 1538)   Founder of the Sikh religion, Guru Nanak was born in Nankana Sahib, now located in Pakistan. He was a contemporary of the Mughal ruler Akbar.

Narayan, Jayaprakash (1902 to 1979)   Also known as 'Loknayak', he formed the Janata Party and defeated the Congress party in 1977. He was awarded Bharat Ratan posthumously in 1998.

Narayanan, Kocheril Raman (1921 to 2005)   He was President of India during 1997 to 2002 and Vice-President during 1992 to 1997. He was the only Dalit and the only Malayali to have held the Presidency.

Narlikar, Dr Jayant V. (1938)   Noted Indian astrophysics scientist and researcher who worked on 'black holes' in the Universe at the Cambridge university.

Nasser, Gamal Abdul (1918 to 1970)   President of Egypt who is credited with nationalizing the Suez Canal in 1956. An influential Arab leader, he was pivotal in constituting NAM.

Navratilova, Martina (1956)   Outstanding superstar of women tennis, she won about 331 tennis titles (167 singles and 164 doubles) during her elaborate career. The Czech-born US citizen has won as many as nine Wimbledon and four US Open titles.

Neguib, Mohammed (1901 to 1984)   The first President of Egypt, he was put under house arrest in 1954 by Abdel Gamel Nasser. Seventeen years, later President Anwar Sadat freed him in 1971.

Newton, Sir Issac (1642 to 1727)   English mathematician and physicist, famous for his discovery of the Law of Gravitation and three Laws of Motion.

Nightingale, Florence (1820 to 1920)   Also known as the 'Lady with the Lamp'. She was a devoted British nurse who reformed the nursing profession and was the first woman to receive the Order of Merit (1907).

Nikhanj, Kapil Dev (1959)   Legendary Indian cricket all rounder under whose captaincy India won the Cricket World Cup in 1983. Kapil Dev held many world records including fastest-100-wicket haul in tests, unique double of 4000 runs/400 wickets and highest test wickets of 434.

Norgay, Tenzing (1914 to 1986)   Indian mountaineer; the first to conquer Mt Everest on 29 May 1953 along with Sir Edmund Hillary. He was awarded the Padma Bhushan in 1959.

O

Ogilvy, David (1912 to 1999)   A well-known name in the advertising and media world, established Ogilvy and Mather.

Osho (1931 to 1990)   He assumed many names such as Acharya Rajneesh, Bhagwan Shri Rajneesh, Osho Rajneesh though his real name was Chandra Mohan Jain. He was a philosophy teacher in Madhya Pradesh before he acquired international fame as a controversial and charismatic godman of India with ashrams at Pune and Oregon (US).

Orwell, George (1903 to 1950)   British author of 1984, *Animal Farm*.

Oprah, Winfrey (1954 –)   Influential talk show host, author, philanthropist, actress and media personality. Oprah Winfrey has played a key role in modern American life, shaping cultural trends and promoting various liberal causes. Through her talk shows and books, she has focused on many issues, faced by American women. She has been an important role model for black American women, breaking down many invisible barriers.

Obama, Barak (1961 –)   won a hard fought 2008 presidential election and became the first non-white President of USA. Obama inherited an economy struggling deep into recession and under him recovery for the US was better than the European economies. However, still he was blamed for high unemployment, large debt and a weak US economy. Despite the economy, in 2012, Obama was able to win re-election. Among his biggest policy initiative was in health care 'Affordable Health Care Act – often termed 'Obama Care'. A year into his presidency, he was awarded the Nobel Peace Prize for promoting world peace. Obama hasn't been able to close down Guantanamo Bay due in part to Congress' refusal to give required funds. In 2011, he ordered the assassination of Osama Bin Laden – the person blamed for 9/11. Obama pledged to end American troops involvement in Iraq and reduce it in Afghanistan.

P

Packer, Kerry (1937 to 2005)   At the time of his death Kerry Packer was Australia's richest man who controlled Publishing and Broadcasting Ltd. (BPL), one of the major media group. He changed the face of international cricket when he organized World Series Cricket in 1977.

Paes, Leander (1974)   Outstanding Indian Tennis player who partnered with Mahesh Bhupati to win first grand slam. He won India's first Olympic bronze medal in any individual sport in Atlanta Olympics in 1996.

Pal, Bachendri (1954)   First Indian woman and fifth woman in the world to scale Mt Everest. She scaled the summit on 23 May 1984 along with two male members— Lhatoo Dorjee and Sherpa Sardar Ang Dorjee.

Pandit, Vijayalakshmi (1900 to 1990)   Sister of Jawaharlal Nehru, Vijayalakshmi Pandit was the first woman minister of an Indian state (UP). She holds the distinction of being the first woman to become President of the UN General Assembly and the first Indian woman Ambassador to Moscow.

Panini (Fourth century BC) Well known Hindu sage and Sanskrit grammarian, he belonged to the Vedic era and authored Ashtadhyayi.

Pant, Govind Ballabh (1887 to 1961)   Veteran Congress leader, he was Chief Minister of UP and later Union Home Minister. He was awarded Bharat Ratna in 1958.

Parks, Rosa (1913 to 2005)   was an African American civil rights activist and seamstress whom the U.S. Congress dubbed the "Mother of the Modern-Day Civil Rights Movement".

Pasteur, Louis (1822 to 1895)   Pasteur was the French scientist who discovered that germs exist and are the cause of infection. The technique of pasteurizing milk is named after him. He also conducted research in areas of hydrophobia, bacteriology, cholera, etc.

Patkar, Medha (1956)   Noted environmentalist and social worker who won the Right Livelihood award, has been very active in *Narmada Bachao Andolan*.

Paul McCartney (1942 –)   British musician, member of Beatles.

Paul, Lord Swaraj (1931)   Noted Indian industrialist based in London (UK). He is member of House of Lords.

Paul II, Pope John (1920 to 2005)   He became the first Polish and first non-Italian Pope of the Roman Catholic Church. His original name was Karol Wojtyla.

Pele (1940)   Pele is the nickname of **Edison Arantes Do Nascimento,** a living legend of world football. Pele is one of the most exciting footballer in history of the game. The Brazilian star has scored 1281 goals in his sparkling career.

Picasso, Pablo (1881 to 1973)   Spanish modern artist, painter, sculptor, ceramacist and poet. By 1907, Picasso had developed a new form of painting known as 'cubism'. One of the Picasso's most famous paintings was his mural of the Guernica bombing (1937). Another key painting of Picasso was his simple bird drawing a symbol of peace. Picasso donated it the Soviet backed World Peace Congress of 1949. It added a new phase in Picasso's art – the power of simplicity.

Pitman, Sir Isaac (1813 to 1897)   Noted educationist and inventor who developed 'shorthand' a system of writing English based on phonographic.

Plato (427 to 347 BC)   Greek philosopher, thinker and tutor and of Aristotle. He completed his education under Socrates.

Polo, Marco (1254 to 1323)   The Italian traveller, who was the first European to visit China. He also journeyed to India and other countries of the Far East and published records of his travels.

Porus   A Hindu king of Punjab, who fought against the Greek invader Alexander when the latter invaded India and nearly defeated him. Alexander admired his gallantry and returned his kingdom to him.

Pot, Pol (1928 to 1998)   Cambodian (Khmer Rouge) infamous leader also known as Saloth Sar. He is charged with atrocious crimes such as genocide and massacres during his regime.

Premchand (1880 to 1937)   Noted author of Hindi novels and short stories that brought him international fame.

Premji, Azim Hasham (1945)   Chairman of Wipro, the leader in Information Technology industry in India.

Presley, Elvis (1935 to 1977)   American singer, entertainer and actor, whose style of music is credited with the creating basis of the modern pop-music.

Priestley, John Boynton (1894 to 1984)   British writer, author of *The Good Companions* (1929), he enjoyed great popularity. His other works include *Angel Pavement*, *Dangerous Corner*, *An Inspector's Call*, etc.

Pritam, Amrita (1919 to 2005)   Noted Punjabi-language writer and poetess known for unconventional writings.

Pulakesin II (AD 608 to 642)   The most powerful ruler of the Chalukyan Dynasty that ruled the Deccan.

Pythagoras (582 to 500 BC)   A Greek philosopher, theologian and mathematician (especially geometry). Although his famous theorem was previously known, he was the first to prove its universal validity.

R

Rai Bacchan, Aishwarya (1974)   Winner of Miss World crown in 1994, she is now a noted film actor.

Raman, Dr Chandrasekhara Venkata (1888 to 1970)   Indian Nobel Prize (1930) winner, who discovered 'Raman effect—a phenomenon of scattered light rays' in 1930.

Rao, Narasimha (1921 to 2004)   Full name, Pamulaparti Venkata Narasimha Rao. He was the Prime Minister of India during 1991 to 1996. He wrote a novel called *The Insider*.

Ray, Satyajit (1921 to 1992)   Noted Indian film-maker and director who won special Oscar award. He was also a writer and enjoyed drawing.

Reagan, Ronald (1911 to 2004)   Former president of United States of America (1981 to 1988) and an noted TV and film personality before he became the president.

Reddy, Neelam Sanjiva (1913 to 1996)   Freedom fighter and president of India from 1977 to 1982.

Reuter, Paul Julius (1816 to 1899)   Pioneer of telegraphic news services from Germany. He established Reuter's international news agency.

Richard Branson (1950 –)   Richard Branson is an entrepreneur and businessman, who founded the Virgin group of more than 400 companies. The Virgin group grew from a small record shop he founded in 1972, to a major multinational company including interests in transport, media, and entertainment.

Roberts, Julia (1970)   Famous American actress who won Oscar awards in her illustrious career.

Ronaldo (1977)   His full name is Ronaldo Luiz Nazario Dlima. Football sensation from Brazil, who holds the record of most goals in World Cups.

Roosevelt, Franklin Delano (1882 to 1945)   Legendary American president who won four presidential elections in history of American democracy.

Roosevelt, Theodore (1858 to 1919)   The president of United States of America who won Nobel Prize for his tole played in during the Spanish–American war.

Rowling, Joanne Kathleen (1965)   Prolific English author who wrote the popular *Harry Potter* series of children's fantasy stories.

Roy, Raja Ram Mohan (1774 to 1833)   The social reformer who tried to eradicate *sati, purdah* and *child marriage*; he also advocated widow remarriage and women's education. He was the founder of the Brahmo Samaj.

Roy, Arundhati (1960)   Noted Indian writer, environmentalist and social activist. She became the first Indian to win Booker Prize for her book, *The God of Small Things.* She was awarded the Sydney Peace Prize in 2004.

Roy, Prannoy (1946)   Noted journalist, media-icon and TV commentator, established NDTV–India.

Rushdie, Salman (1946)   An eminent, controversial and prolific Indian born English writer. Iran's spiritual leader Ayatollah Khomeini issued *fatwa* against him for his book *Satanic Verses*.

S

Samudragupta, (AD 330 to 375)   Son and successor of Chandragupta I and a powerful and able Hindu king, he was also known as 'India's Napoleon'.

Sarabhai, Vikram (1919 to 1971)   Noted nuclear scientist and researcher from India who is credited with establishing Thumba rocket station.

Saraswati, Swami Dayanand (1824 to 1883)   Founder of the Arya Samaj and author of *Satyartha Prakash* he is well known for his opposition of various social taboos.

Schumacher, Michael (1967)   Ace F-1 (Formula One) driver who holds the world record for most Grand Prix victories in his illustrious career.

Schwarzenegger, Arnold (1947)   Noted Hollywood actor and entertainer who gave blockbusters like *Terminator* and *Total Recall.* The Austrian-born American citizen turned republican politician and won election to become governor of California (USA).

Sen, Mihir (1930 to 1997)   Noted Indian swimmer who hold the world record in long distance swimming. He was first Indian to successfully swim across the English channel.

Sen, Mrinal (1923)   Noted film-maker who directed some wonderful films like *Bhuvan Shome* and *Khariz.*

Sen, Sun Yat (1866 to 1925)   The founder and the first president of the Chinese Republic in 1912. In 1905 Sun Yat Sen founded the China Revolutionary League in Europe and Japan and played a prominent part in the revolution of 1911.

Seshan, Tirunellai Narayana Iyer (1932)   Noted administrator and winner of Magsay-say Award. He was appointed as Chief Election Commissioner of India in 1990 and he retired in 1996.

Sethi, Geet (1962)   He became the youngest player to win the World Billiards Championship on his debut in 1985.

Shahjahan (1592 to 1666)   Mughal emperor of India, brought the Mughal empire to its golden age. A great patron of art, architecture and literature, he built the Taj Mahal in

memory of his beloved Mumtaz Mahal. He was deposed by his son Aurangzeb and imprisoned in Agra.

Shakespeare, William (1564 to 1616)   English dramatist and poet, considered the greatest literary figure in English literature. He was born at Stratford-on-Avon and was the son of a tradesman. He married Anne Hathaway in 1582. His first play was Henry VI and his first major poem was *Venus and Adonis.*

Ravi Shankar (1920 to 2012)   Noted *sitar* maestro. He was a sitar virtuoso and composer. He played all around the world and helped to popularise Indian classical music in the west.

Shankaracharya (AD 788)   One of the greatest Hindu philosophers who revived the Hindu religion and successfully threw back the tide of Buddhism and Jainism, he was the founder of the Advaitic philosophy.

Shastri, Lal Bahadur (1904 to 1966)   Indian statesman, who succeeded Pandit Nehru as the second prime minister of India (1964 to 1966). He signed the Tashkent Agreement with Ayub Khan for a ceasefire between India and Pakistan. Also known as 'Man of Peace', he died in Tashkent on 1 January 1966, few hours after he had signed the Indo–Pak accord.

Shaw, George Bernard (1856 to 1950)   Noted writer, dramatist and Nobel prize winner from Ireland.

Shikoh, Dara (1615 to 1659)   Eldest son of Mughal emperor Shahjahan, he was killed by his brother Aurangzeb who usurped their father's throne.

Shivaji, Chhatrapati (1627 to 1680)   Born in 1627, a military genius, Shivaji was the last Hindu king who partly succeeded in establishing 'Hindu Swaraj'. He fought many battles against Aurangzeb and was successful in shattering the Mughal empire in India.

Shourie, Arun (1943)   Noted journalist, author, politician and Magsaysay award winner.

Shyamalan, Manoj Night (1970)   Outstanding young Indian-born Hollywood film-maker who directed famous movies like *The Sixth Sense*, *Unbreakable* and *The Lady in Water*.

Singh, Bhagat (1907 to 1931)   A patriot and revolutionary, known as Shahid-e-azam, who along with Sukh Dev and Raj Guru became a martyr on 23 March 1931.

Singh, Charan (1902 to 1987)   The Lok Dal leader, Charan Singh was Prime Minister of India in 1979.

Singh, Guru Gobind (1666 to 1708)   The 10th and the last Guru of the Sikhs who spent a major part of his life fighting the Muslims. He founded the Khalsa, the inner council of the Sikhs in 1699. He is said to be the author of *Dasam Granth.*

Singh, Maharaja Ranjit (1780 to 1839)   A Sikh ruler of Punjab, he captured Lahore in 1799 and proclaimed himself Maharaja. He wrested control of Punjab from the Afghans and Pathans and earned the title *Lion of Punjab.*

Singh, Dr Manmohan (1932)   First Sikh Prime Minister of India of UPA government. He was former RBI governor and credited for introducing economic reforms and policy of liberalization during his tenure as Finance Minister (1991 to 1996) of Congress government.

Singh, Khushwant (1932 to 2014)   Eminent journalist, prolific writer and former Member of Parliament. He was the 7th Prime Minister of India and the 7th Raja Bahadur of Manda (a princely state of India located near Allahabad, Uttar Pradesh).

Singh, Visawnath Pratap (1931 to 2008)   Former Prime Minister of India during 1989 to 1990.

Singh, Zail (1916 to 1994)   First Sikh President of India (1982 to 1987) during Indira Gandhi government.

Sobers, Gary (1936)   His full name is Sir Garfield St Auburn Sobers. He is the legendary West Indian cricketer, an excellent all-rounder. He held many records which included the highest score of 365 and first to hit six sixes in an over in a first class match.

Spears, Britney (1981)   Noted pop singer and entertainer in USA who sang some of the chartbusters of recent times.

Spencer, Diana (Princess Diana) (1961 to 1997)   She was married to Prince Charles of Britain in 1981. Her fairy tale marriage with Prince Charles ended with divorce in 1996. She died in a car crash in Paris, France in 1997.

Spielberg, Steven (1947)   Oscar wining film director who gave some of the blockbusters to Hollywood. List of some of his most successful films include—*Jurassic Park, Minority Report* and *Schindler's List.*

Stalin, Joseph (1879 to 1953)   Soviet Statesman and architect of the former USSR, he became premier in 1941 and triumphed as a leader during World War II. An active revolutionary leader from the age of 17, he took part in the civil war and rose to become an outstanding figure in Soviet Russia.

Stallone, Sylvester (1946)   Noted actor and film producer who acted in some very successful films in Hollywood.

Subbulakshmi, Madurai Shanmugavadivu (1916 to 2004)   She was the first musician ever to be awarded the Bharat Ratna, India's highest civilian honour. She is the first Indian musician to receive the Ramon Magsaysay award, often considered Asia's Nobel Prize. Her recital of devotional songs were included in the silver jubilee ceremony of United Nations.

Sultan, Tipu (1750 to 1799)   Sultan of Mysore who battled hard against British supremacy in India.

Sunga, Pushyamitra (185–149 BC)   Brahmin Commander-in-chief of the last Mauryan king Brihadratha. He killed his master and founded the Sunga Dynasty.

Suri, Sher Shah (1472/1486 to 1545)   He ruled India between 1540 and 1545 and was the first Muslim king who paid special attention to administrative reforms. The Grand Trunk highway was constructed during his rule. He also introduced currency in India.

T

Tansen (c. 1492 to 1589)   A great exponent of Indian classical music. He was one of the nine gems in the court of Akbar.

Tata, Jamshedji (1813 to 1904)   Founder of the Tata Iron and Steel Company, one of the largest integrated steelworks in the world. He also founded the Indian Institute of Science in Bangalore and built the Taj Hotel in Mumbai.

Tata, J. R. D. (1904 to 1993)   Full name Jahagirji Ratanji Dadabhi Tata, an eminent Indian industrialist and noted entrepreneur who established Tata Group.

Tata, Ratan (1937)   He is great grandson of Jamshedji Tata. In 2007 Ratan Tata acquired Corus group. He is also the main force behind ₹ 100,000 car Nano. He received Padma Bhushan in 2000 and Padma Vibhushan in 2008. Since 2012, he has stepped down as the chairman and He received Bhar Bharat Ratna for the year 2013. Now holds the position of Chairman Emeritus of the group which is an honorary and advisory position.

Tegh Bahadur, Guru (1621 to 1675)   Son of Guru Hargobind and ninth Guru of the Sikhs, he was executed by Aurangzeb when he refused to embrace Islam.

Tendulkar, Sachin Ramesh (1973)   Cricketer and former captain of Indian cricket team, who holds the record of scoring most runs in international cricket (more than

15,000 runs in both forms of the game). He is the first batsman to hit 51 Test-centuries and 40 ODI-centuries. He was conferred with Sir Garfield Sobers Trophy for the ICC Cricketers of the year (2010), the member of the order of Australia (2012), Rajiv Gandhi Khel Ratna Award and Padma Vibhusan. In 2012, he was nominated to Rajya Sabha in the Parliament of India. On December 2012 he retired from one day International (ODI) matches and in May 2013 for the Indian Premier League. He has played 198 Tests (15837 runs/ 51 hundreds), 463 ODI (18,426 runs/49 hundreds. He has 45 Test wicket & 154 ODI wickets.

Tendulkar, Vijay (1928 to 2008)   Noted Marathi play-writer and writer, political journalist and social commentator.

Tennyson, Lord Alfred (1802 to 1892)   England's poet Laureate from 1850 till his death in 1892. Author of *In Memoriam*, a poem of great beauty and depth of thought.

Teresa, Mother (1910 to 1997)   Nobel Prize winner, a noted Roman Catholic nun. She was born Agnes Gonxhe Bojaxhiu on 27 August 1910 in Skopje in today's Republic of Macedonia, was an Albanian Catholic nun who founded the Missionaries of Charity in India.

Thackeray, Balasaheb (1926 to 2012)   Veteran leader of Shiv Sena, a cartoonist-turned-politician, who became the most influential leader of Maharashtra. His followers called him 'Emperor of Hindu Hearts'.

Thatcher, Margaret Hilda (1925 to 2013)   Also known as 'The Iron lady', she became the first woman prime minister of Britain in 1979 and won three consecutive election to remain in power till 1990.

Timur (1336 to 1405)   Head of the Chaghta Turks. He was a powerful warrior and a plunderer infamous for the sacking of Delhi (indiscriminate massacre and plunder) during his invasion of India in 1398.

Tito, Marshal Josip Broz (1892 to 1980)   Ex-president of Yugoslavia, he was leader of the partisan forces that fought successfully against German occupation in 1941. He was made President of Yugoslavia for life in 1963. He was also one of the chief architects of the Non-Aligned Movement along with Jawaharlal Nehru of India, Gamal Abdul Nasser of Egypt, Sukarno of Indonesia and Kwame Nkrumah of Ghana.

Tolstoy, Leo (1828 to 1910)   Tolstoy is among the greatest Russian literary figures. Mahatma Gandhi was greatly influenced by his works which include *Anna Karenina* and *War and Peace*.

Tope, Tantiya (1814 to 1859)   One of the heroes of the War of Indian Independence in 1857, he was the brave Commander of Nana Sahib's forces.

Trotsky, Leon (1879 to 1940)   Russian revolutionary and one of the leaders of the Bolshevist revolution, he was assassinated in 1940 when in exile in Mexico.

Truman, Harry S. (1884 to 1972)   Former president of United States (1945–53) responsible for taking the infamous the decision to drop the first atom bomb on Japan.

Tughlaq, Muhammad-bin (1325 to 1351)   A learned Sultan of Delhi who was well-known for his profound ideas and poor administrative capabilities. He tried to shift his capital from Delhi to Devangiri in Deccan. When he found that his subjects did not approve of the idea, he re-shifted to Delhi.

Tulsidas (1532 to 1623)   A great Hindi poet, religious preacher and known for his work Ramacharitamanas, which depicts the life of Lord Rama.

Tunku, Abdul Rehman (1903 to 1973)   The Malaysian statesman and the first Prime Minister, who negotiated with the British for the independence of Malaysia.

Tutu, Desmond (1931)   Nobel Prize winner became the first black Anglican bishop of Johannesburg (South Africa). He is a noted exponent of non-violent resistance to apartheid.

Twain, Mark (1835 to 1910)   His real name was Samuel Langhorne Clemens. Noted writer and author of famous characters/books like *Tom Sawyer, Huckleberry Finn.*

U

Usain Bolt (1986 –)   became one of world's the most celebrated sportsman after his record breaking runs in the Olympic Games of 2008, where he won three gold medals and set records at 100m and 200m. He went on to win three more gold medals at the London 2012 Olympics.

Usha, Pilavullakandi Thekkeparambil (1964)   Track-queen of India, remembered for her 1/100 of a second finish at the Olympics where she missed the bronze by a whisker. She is the first Indian woman to reach the final of an Olympic event.

V

Vajpayee, Atal Bihari (1924)   Eminent parliamentarian, noted poet, journalist and former Prime Minister of India.

Valmiki   A celebrated Sanskrit poet of ancient India and author of the *Ramayana.*

Varahmihira (505–587 CE)   A distinguished astronomer, mathematician and philosopher of early times. He was one of the nine gems in the court of king Vikramaditya (Chandragupta II).

Veerappan (1933 to 2005) Sandal wood smuggler and poacher of elephant tusks who was killed in 2005.

Victoria, Queen (1819 to1901)   British Queen during the Nineteenth century.

Vidyasagar, Ishwar Chandra (1820 to 1891)   Eminent scholar, educationist and social reformer. He was a tireless champion of widow remarriage. He also modernized the Bangla prose.

Vivekanand, Swami (1863 to 1902)   A disciple of Ramakrishna Paramhansa, he championed the greatness of the Vedantic philosophy. His famous talk at the Chicago Conference of World Religions in 1893 made the Westerners realize the greatness of India for the first time. He established the Ramakrishna Mission, in memory of his guru.

Voltaire, Frances Marie Arovet de (1697 to 1778)   French writer and philosopher. His philosophy made a significant impact on prevailing ideas which led to the outbreak of the French Revolution in 1789.

Vyas, Ved   A great Sanskrit scholar; he wrote the *Mahabharata,* one of the most revered texts of the Hindus.

W

Washington, George (1732 to 1799)   The American general who led the revolt against the British and declared American independence. He became the first president of USA.

Watt, James (1736 to 1819)   The Scottish instrument maker who turned to making high pressure steam engines.

Wilde, Oscar (1854 to 1900)   is one of the most iconic figures from late Victorian society. Enjoying a meteoric rise to the top of society, his wit, humour and intelligence shine through his plays and writings. For his sexuality he suffered the indignity and shame of imprisonment.

Wilson, Woodrow (1856 to 1924)   He was president of America during World War I. He became famous for his '14 points' and played a notable part in the setting-up of the League of Nations.

Woods, Tiger (1975)   Ace American golfer who made world record by winning all four major gold tournament (Grand slam) at age of 24 years. He was also the highest earning sports

person of the world. From 2009–2010 he was inactive from the professional circuit due to troubled marriage because of his infidelity. His ranking blow to below 50 after he resumed playing in 2011. But in March 2013, he ascended to number one position in the world again.

Wordsworth, William (1770 to 1850)   The English romantic poet whose famous works include *The Prelude, Intimations on Immorality, The Recluse, The Solitary Reaper,* etc.

X

Xavier, Francis (1506 to 1552)   The Spanish missionary who preached in Spanish and Portuguese colonies in the East and converted thousands to Christianity. He lived in Goa between 1540 and 1552.

Y

Yunus, Muhammad (1940 –)   Won Nobel Peace Prize 2006 for his work on Micro lending and helping people, especially women to escape poverty by creating small business.

Yousafzai, Malala (1997 –)   is a Pakistani student and spokesperson for women's right to education. In retaliation of her high profile campaign for education and criticism of the Taliban, she was shot in the head at close range by a Taliban gunman. She survived the gunshot wound and has become a leading spokesperson for human rights, education and women's rights. She has received numerous peace awards, and received the Nobel Peace Prize in 2014 along with Kailash Satyarthi, an Indian children's rights activist.

Z

Zafar, Bahadurshah (1807 to 1862)   The last ruler of the Mughal Dynasty. He fought against the British in the first war of Indian independence in 1857. After his defeat, the British exiled him to Rangoon.

Zedong, Mao (1893 to 1976)   Noted Chinese Revolutionist and think, credited as the founder of the People's Republic of China.

Zidane, Zinedine Yazid (1972)   Former French football player of Algerian Kabyle ethnicity. He captained France to 1998 World Cup victory. He was elected FIFA World Player of the Year a record-equalling three times (1998, 2000 and 2003), Best European football player of the past 50 years, At the 2006 FIFA World Cup, he was named Most Outstanding Player of the tournament, thus receiving the Golden Ball. Zidane retired from football after the 2006 World Cup Final on 9 July 2006.

Zoroaster (Sixth century BC)   A celebrated Persian prophet and religious leader who lived in the seventh century BC. He is the founder of Zoroastrianism, whose followers comprise the Parsees settled in India.

Table 11.2   Abbreviated Titles of Some Well Known Figures

Original name	Also called
Abdul Ghaffar Khan	Badshah Khan, Frontier Gandhi
Adolf Hitler	Führer or Fuehrer
Bal Gangadhar Tilak	Lokmanya
Benito Mussolini	II Duce
C. F. Andrews	Deenabandhu
C. N. Annadurai	Anna
C. Rajagopalachari	Rajaji or 'CR'

(*Continued*)

Original name	Also called
C. R. Das	Deshbandhu
Dadabhai Naoroji	Grand Old Man of India
Duke of Wellington	Iron Duke
Dwight David Eisenhower	Ike
Earl of Warwick	King Maker
Gen. Erwin Rommel	Desert Fox
Florence Nightingale	Lady with the Lamp
Francisco Franco	EI Caudillo
Geoffery Chaucer	Father of English Poetry
George Bernard Shaw	G. B. S.
Jawaharlal Nehru	Chacha, panditji
Jayaprakash Narayan	J. P. Loknayak
Joan of Arc	Maid of Orleans
Lal Bahadur Shastri	Man of Peace
Lala Lajpat Rai	Sher-e-Punjab, Punjab Kesari
M. K. Gandhi	Bapu, Mahatma, Father of the Nation
M. S. Golwalkar	Guruji
Madan Mohan Malaviya	Mahamana
Napoleon Bonaparte	Little Corporal, Man of Destiny
Narindra Datta	Swami Vivekanad
Field Marshal K. M. Cariappa	Kipper
Otto von Bismarck	Man of Blood and Iron, Iron Chancellor
Queen Elizabeth I	Maiden Queen
Rabindranath Tagore	Gurudev
Rajinder Singh (Maj. Gen)	Sparrow
Samuel Longhorn Clemens	Mark Twain
Sardar Vallabhbhai Patel	Man of Iron, Strong Man of India
Sarojini Naidu	Nightingale of India
Sheikh Mohammad Abdullah	Sher-e-Kashmir
Sheikh Mujibur Rehman	Bangabandhu
Subhash Chandra Bose	Netaji
Tenzing Norgay	Tiger of Snows
T. Prakasam	Andhra Kesari
Sir Walter Scott	Wizard of the North
William Ewart Gladstone	Grand Old Man of Britain
William Shakespeare	Bard of Avon

PROMINENT FIGURES OF THE INDIAN FREEDOM MOVEMENT

Allan Octavian Hume (1829–1912)   A retired English member of the Indian Civil Services who sympathized with the Indian cause and propagated the ideals of the Congress in Britain. He founded the Indian National Congress in 1885 and was its first General Secretary.

Bal Gangadhar Tilak (1856–1920) An aggressive freedom fighter popularly known as 'The Father of Indian Unrest'. His political career began in 1896 during the famine in the Deccan. His followers along with him preached the relevant sections of the Famine Relief Code and motivated the people to be bold and fearless in demanding their rights. He was first Indian leader to give the slogan 'Swaraj is my birthright and I shall have it'. He is the author of 'Gita-Rahasaya' through which he taught the people to fight against oppression and unrighteousness. He started two well-known newspapers: *Kesari* (Marathi) and *Maratha* (English) to rouse national sentiments. The three leaders: Lala Lajpat Rai, Bal Gangadhar Tilak and Bipin Chandra Pal are known in the history of Indian freedom movement as 'Lal, Bal, Pal'.

Bipin Chandra Pal (1858–1932) One of the extremist leaders of the freedom struggle and an ardent supporter of the boycott of foreign goods, the Swadeshi movement and national education. He did not believe in Dominion Status and wanted full-fledged independence. Achieved national stature after partition of Bengal. In the 1907 Surat Congress session, he fought for Tilak's candidature for presidentship.

Dadabhai Naoroji (1824–1917) Also known as the 'Grand Old Man of India', he was a prominent Congress leader and worked for Swaraj in England which was the centre of his political activities. He was the first Indian to be elected member of the House of Commons from a London county. He authored *Poverty* and *Un-British Rule in India*.

Surendranath Bannerji (1848–1925) He entered the Indian Civil Services in 1869 but was dismissed for a minor irregularity. He then established the Rippon College of which he remained the Principal for several years. Surendranath Bannerji started a daily newspaper 'Bengal' which was published in English. He was the president of Indian National Congress twice (1895 and 1902).

Gopal Krishna Gokhale (1866–1915) Started as a maths teacher and rose to the position of Principal of the well-known Ferguson College, Pune. He played a commendable role in the Imperial Legislative Council of which he was a member in 1902. He founded The Servants of India Society and served as President of the Indian National Congress in 1907.

Ms Annie Besant (1847–1933) Also known as the 'Grand Old Lady of Indian Nationalism'. She became member of the Theosophical Society in 1889 and became its President in 1907. She settled in India and worked for the social upliftment of the people. Ms Annie Besant joined the Congress and in 1916 inaugurated the All India 'Home Rule League' in Madras. She played a prominent role in uniting militant and moderate leaders at the Congress session in Lucknow in 1920. Later she left the Congress but *Continued* to serve India. She translated the Bhagawad Gita into English.

Lala Lajpat Rai (1865–1928) A dedicated social worker edcuationist, he joined the Indian National Congress in 1888. He supported the extremist leaders in the 1907 Congress split-along with Tilak. Lala Lajpat Rai started and edited a newspaper *Young India*, presided over the 1920 Congress Session and became member of the Indian Legislative Assembly in 1923. In 1920 he led the non-cooperation movement in Punjab and was sent to jail. On a visit to Lahore on 30 October 1928, he suffered severe lathi blows in a police attack and later died of injuries. He is also called '*Sher-e-Punjab*' and '*Punjab Kesri*'.

C. R. Das (1870–1925) Also known as '*Deshbandhu*', a lawyer in the Calcutta Bar, he entered politics in 1920. He presided over the Gaya Congress session and along with Motilal Nehru and Hakim Ajmal Khan launched the 'Swaraj Party' in 1923.

Pandit Madan Mohan Malaviya (1861–1946)   He joined the Congress in 1886 and was twice elected President of the Indian National Congress. He represented the Hindu community at the Round Table Conference and founded the Nationalist Party to protect rights of the Hindu community.

Mahatma Gandhi (1869–1948)   Known as 'Father of the Nation' and 'Bapu', he was a true believer of non-violence. He led the Indian National Movement from 1920 to 1947. He worked for Hindu–Muslim unity but was assassinated in 1948. (further details in 'India's Freedom Struggle' section).

Subhash Chandra Bose (1897–1945)   Also known as '*Netaji*', he resigned from the Indian Civil Service in 1921 and supported the non-cooperation movement led by Gandhi. He was elected president of the Congress in 1938 but left the Congress in 1939 and formed the 'Forward Block' party. Subhash Chandra Bose was arrested during World War II but escaped from India and went to Japan where he formed the Indian National Army (INA) to fight the British but was unsuccessful due to Japan's surrender after the war. It was Netaji's wish to unfurl the national-flag at the Red Fort in Delhi. It is thus in his remembrance that the National Flag is unfurled every year at Red Fort on 15 August. He also gave the slogan '*Jai Hind*' to the nation. He is believed to have died in an air-crash in 1945.

Motilal Nehru (1861–1931)   A national leader of the Gandhian era; a noted lawyer of the Allahabad High Court, Motilal Nehru joined the Home Rule League in 1917 and was elected president of the Indian National Congress in 1930. He founded the Swaraj Party and donated his palatial house 'Anand Bhawan' (later known as Swaraj Bhawan) to the Congress.

Sardar Vallabhbhai Patel (1875–1950)   Also known as the 'Iron Man of India' Sardar Patel was Home Minister in independent India's cabinet during which time he worked tirelessly for the integration of the Indian princely states.

Maulana Abul Kalam Azad (1888–1958)   A great national leader who believed in communal harmony, he was elected President of the Indian National Congress in 1923 and was a close associate of Gandhi. He remained Union Minister of Education from January 1947 till his death on 22 February 1958.

Dr Rajendra Prasad (1884–1963)   Joined the Congress in 1911. He also edited a Hindi weekly called *Desh*. He is said to have changed the whole base of Indian politics after the 1920 Nagpur session of the Congress by deciding to involve the masses in the freedom movement. He remained Food and Agriculture Minister in the interim ministry and was elected President of the Constituent Assembly in 1947. He later took over as President of India between 1952 and 1962.

Pandit Jawaharlal Nehru (1889–1964)   A leading member of the Indian National Congress. As Congress President at the 1929 Lahore Session he declared that complete independence was the aim of the Congress. Jawaharlal Nehru remained PM of India from 1947 till his death. He pronounced the doctrine of Panchsheel which is based on the ideology of peaceful co-existence and non-alignment. He authored *Discovery of India* and *Glimpses of World History*, among other books.

Table 11.3   'Firsts' in the World

Field	Name	Year
1. Man to reach South Pole	Roald Amundsen (Norway)	1911
2. Man to reach North Pole	Robert E. Peary (USA)	1909
3. Woman to reach North Pole	Karoline Mikkelsen (Norway)	1935
4. Woman to reach South Pole	Fran Phipps (Canada)	1971
5. Man to go to Space	Yuri Gagarin (former USSR)	1961
6. Man to set foot on the Moon	Neil Alden Armstrong (US)	1969
7. Man to walk in Space	Alexei Leonov (former USSR)	1965
8. Woman Cosmonaut in Space	Valentina Tereshkova (former USSR)	1963
9. Man to climb Mt Everest	Tenzing Norgay (Nepal)	1953
10. Woman to climb Mt Everest	Junko Tabei (Japan)	1975
11. President of USA	George Washington	1789
12. Foreign invader of India	Alexander the Great (Greece)	326 BC
13. Woman to cross the Strait of Gibraltar	Arti Pradhan (India)	1988
14. Handicapped man to cross Strait of Gibraltar (deaf and dumb)	Taranath Shenoy (India)	1988
15. President of Chinese Republic	Dr Sun Yat-Sen	1921–1925
16. Chairman of People's Republic of China	Mao Tse Tung	1949–1976
17. Man to sail around the world	Ferdinand Magellan (Portugal)	1519–1521
18. First Prime Minister of a country	Sir Robert Walpole (Britain)	1721–1742
19. Lady Prime Minister of a country	Srimavo Bhandarnaike (Sri Lanka)	1970–1977
20. Lady Prime Minister of England	Margaret Thatcher	1979–1990
21. Polar circumnavigation	Sir Ranulph Fiennes and Charles Burton (Britain)	1979–1982
22. Chinese traveller to India	Fa hien, Sung yun, Hsüan-tsang and tsino	405–411
23. Woman Bishop	Rev. Barbara C. Harris (USA)	1988
24. Lady President of a Country	Maria Estela Peron (Argentina)	
25. First to have skied to both North and South Poles and climbed Mount Everest	Erling Kagge (Norway)	1994

Table 11.4   Indian Nobel Laureates

Years	Discipline	Details
1915	Literature	**Rabindranath Tagore** (1861–1941)
		Gurudev Rabindranath Tagore is one of India's most distinguished and respected men of letters. He was the first Indian to have won the Nobel Prize for *Gitanjali*. He was a great author and educationist who founded the 'Shantiniketan' (1901) at Bolepur, West Bengal, which later became the Vishvabharti University.
		Works
		Poems: *Sonar Tari, Puravi, The Cycle of the Spring, The Evening Songs, The Morning Songs*, etc.
		Novels: *Gora, Raja our Rani, Muktdahara, Raj Rishi, Ghare Baire, Nauka Dubi, Kabuliwallah, Kshudit Pashan*, etc.

(*Continued*)

Years	Discipline	Details
		The British Government knighted him but he returned the title in 1919 in protest against the Jallianwala Bagh tragedy.
1930	Physics	**C. V. Raman** (1888–1970)
		The first Indian scientist to have won the Nobel Prize for his study of the scattering of light known as the 'Raman Effect'.
		The theory describes change in the frequency of light passing through a transparent medium. He was the first Indian and Asian to receive the Nobel Prize in Physics.
1968	Medicine	**Hargobind Khorana** (b 1922–2011)
		An Indian-born American citizen. He was awarded the Nobel Prize for the laboratory synthesis of a yeast gene for the first time.
1979	Peace	**Mother Teresa** (1910–1998)
		Born in Albania (Yugoslavia), she came to India in 1929 at the age of 19 years and became an Indian citizen. She established 'Missionaries of Charity' and won the Nobel Prize for her missionary services.
		She was also awarded: Bharat Ratna (1980), Jawaharlal Nehru Award for International Understanding (1969), Ramon Magsaysay Award (1962) and Templeton Foundation Award (1973), to name a few. For her, life was a mission to serve the suffering humanity.
1983	Physics	**Subramanyan Chandrasekhar** (1910–1995)
		Born in Lahore (now in Pakistan), he later became an American citizen. He was awarded the Nobel Prize for his work known as '*Chandrasekhar's Limit*' which determines the minimum mass of a dying star which enables it to survive.
1998	Economics	**Amartya Sen** (b 1933)
		Recipient of the Nobel Prize for Economics in 1998, becoming the first Asian to have been honoured with the award. He is credited with finding a mathematical solution of 'Impossibility Theorem' suggested by Kenneth Arrow which states that it is not possible to aggregate individual choices into a satisfactory choice for society as a whole. Prof. Sen showed that societies could find ways to such a poor outcome.
2009	Chemistry	**Venkatraman Ramakrishnan** (b 1952)
		He is credited with his study on structures and functioning of ribosomes.
2014	Peace	**Kailash Satyarthi** (b 1954)
		For his struggle against the suppression of children and young people and for the right of all children to education

RELIGIONS OF THE WORLD

1. Buddhism

Founder	●	Gautam Siddhartha Buddha (563–483 BC) born in Nepal (Lumbini)
Founded in	●	525 BC
Followed in	●	India, China, Tibet, Korea, Mongolia, Nepal, Bhutan, Thailand, Japan, Laos, Myanmar (Burma), Sri Lanka, Cambodia, Taiwan, Indonesia, Bhutan and Vietnam
Sacred Text	●	The 'Tripitaka' (Collection of Buddha's teachings) also called 'Sutras'

Sacred Places	●	Lumbini (Nepal) where Buddha was born, Bodh Gaya (Bihar), where he received enlightenment and Kusinagar (UP) where he attained 'Nirvana'
Place of Worship	●	Vihar (temple) and Monastery (where monks reside)
Sects	●	Mahayana and Hinayana

2. Confucianism

Founder	●	King Fu Tsu, better known as *Confucius* (551–479 BC) born in the state of Lu in China.
Founded in	●	500 BC
Followed in	●	China, Taiwan, South Korea, Nauru and Vietnam
Sacred Text	●	'The Analects'
Sacred Place	●	Peking (Beijing) in China.
Place of worship	●	No church or temple

3. Christianity

Founder	●	Jesus Christ (5 BC to AD 30) born in Judea, also called *Jesus of Nazareth*
Founded in	●	2000 years ago
Followed in	●	Spread all over the world
Sacred Text	●	Holy Bible consisting of 'Old Testament' (before Christ) and the 'New Testament' (during and after Christ)
Sacred Places	●	Holds no specific place as sacred
Place of worship	●	Church
Important sects	●	Catholics and Protestants

4. Hinduism

Founder	●	Ancient Sages.
Founded in	●	Around 1500 BC
Followed in	●	Concentrated in India and Nepal and also found in Bhutan, Fiji, Guyana, Indonesia, Mauritius, Sri Lanka, South Africa, Surinam, Trinidad and Tobago
Sacred Texts	●	'The Vedas', 'the Upanishads', 'the Bhagavad Gita' and the epics of the 'Mahabharata' and the 'Ramayana'
Place of worship	●	Temple

5. Islam

Founder	●	Prophet Mohammed (AD 570–632) born in Mecca (Saudi Arabia)
Founded in	●	AD 622
Followed in	●	From west coast of Africa to the Phillippines which includes Tanzania, Southern part of Russia, China, India, Pakistan, Bangladesh, Malaysia and Indonesia. Also parts of North Africa.
Sacred Texts	●	'Quran' (words of God), 'Hadis' (Collection of Prophet's sayings)
Sacred places	●	Makkah (Mecca) in Saudi Arabia
Place of worship	●	Masjid (mosque)
Important sects	●	Sunnis and Shias

6. Judaism (Religion of the Hebrews)

Founder	●	Moses, born in Egypt
Founded in	●	1300 BC
Followed in	●	Worldwide with concentration in Israel and United States

Sacred Texts	● Talmads, found particularly in the five books of the Bible; commentary on 'Torah' known as 'Talmud and Midrash'
Sacred places	● Jerusalem
Place of worship	● Synagogue

7. Shintoism

Founder	● Began with Japanese culture and developed out of tradition and ancestor worship
Followed in	● Japan
Sacred Texts	● No specific text
Sacred Place	● Central Shrine of Ise (central Japan) and the Yasukuni Shrine in Tokyo

8. Sikhism

Founder	● Guru Nanak (1469–1539)
Founded in	● AD 1500
Followed in	● India
Sacred Texts	● 'Guru Granth Saheb'
Sacred Place	● The Golden Temple of Amritsar
Place of Worship	● Gurudwara

9. Taoism

Founder	● Lao-tse, a Chinese philosopher
Founded in	● 6th century BC
Followed in	● China, Taiwan, Nauru, Brunei, Singapore and Vietnam
Sacred Text	● 'Tao-te-Ching'

10. Zoroastrianism (Parsi Religion)

Founder	● Zoroaster, born in Medea (modern Iran) in about 660 BC
Founded in	● Around 500 BC
Followed in	● Iran and north-west India. The Zoroastrians who fled to India during the eighth century are the ancestors of the present Parsi Community in India
Sacred Text	● 'Zend Avesta'
Place of Worship	● Fire temple

11. Jainism

Founder	● Rishabha
Founded in	● 6th century BC
Followed in	● India, United Stated, Kenya, UK, Canada
Sacred Text	● 'Kalpa Sutra', Agama, Tattvartha sutra' naladiyar

12. Baha'i

Founder	● Bahá'u'lláh (Mírzá Husayn, Alí Núrí)
Founded in	● 19th century
Followed in	● South and South east Asia, Europe and north America Importantly in Iran, Panama, Belize, Bolivia, Zambia, Papua new guinea etc. Kitabui Aqdas ; kitab-i-iqan; The middem The soram words: village.
Sacred Text	● The Ba'b, bahaullah ; Abdul-Baka; Shoghi Effendi ; universal house of justice

ABBREVIATIONS

A

AAFI	Amateur Athletics Federation of India
AAGSP	All Assam Gana Sangram Parishad
AARRO	Afro-Asian Rural Reconstruction Organization
AASU	All Assam Students Union
ABC	Audit Bureau of Circulation; American (or Australian) Broadcasting Co.
ABM	Anti-Ballistic Missiles
ABU	Asian Broadcasting Union
AC	Ante Christum (Before Christ)
ACC	Auxiliary Cadet Corps
AD	Anno Domini (After Christ)
ADB	Asian Development Bank
ADC	Aide-de-Camp
ADF	African Development Fund
ADMK	Anna Dravida Munnetra Kazhagam
ADR	American Depository Receipt
AEC	Atomic Energy Commission
AF	Audio Frequency
AFC	Asian Football Confederation
AFP	Agence France-Presse
AFPRO	Action for Food Programme
AGM	Annual General Meeting
AGP	Asom Gana Parishad
AGSOC	Asian Games Special Organizing Committee
AH	Anno Hegirae
AI	Air India
AIADMK	All India Anna Dravida Munnetra Kazhagam
AICC	All India Congress Committee
AICS	All India Council of Sports
AICTE	All India Council of Technical Education
AID	Agency for International Development
AIDS	Acquired Immune Deficiency Syndrome
AIFACS	All India Fine Arts and Crafts Society
AIIMS	All India Institute of Medical Sciences
AILTA	All India Lawn Tennis Association
AIML	All India Muslim League
AIMO	All India Manufacturers Organization
AINEC	All India Newspaper Editors Conference
AIR	All India Radio
AIREC	All India Railway Employees Confederation
AIRF	All India Railwaymen's Federation
AISSF	All India Sikh Students Federation
AITUC	All India Trade Union Congress
AIWC	All India Women's Conference
AJT	Advanced Jet Trainer
AM	Ante Meridian (before noon)

AMC	Army Medical Corps, Asset Management Company, Annual Maintenance Contract
AMIE	Associate Member of Institution of Engineers
ANZUS	Australia, New Zealand, US (Pacific Pact Nations)
AOC	Air Officer Commanding
AP	Associate Press
APC	Armoured Personnel Carrier
APEC	Asia Pacific Economic Corporation
APL	Above Poverty Line
APM	Administered Pricing Mechanism
APPLE	Ariane Passenger Payload Experiment
ARC	Administrative Reforms Commission
ARDC	Agricultural Refinance and Development Corporation
ARF	Asean Regional Forum
ASAT	Anti-Satellite
ASC	Army Service Corps
ASEAN	Association of South East Asian Nations
ASI	Archaeological Survey of India
ASLV	Augmented Satellite Launch Vehicle
ASPAC	Asian and Pacific Council
ASSOCHAM	Associated Chambers of Commerce and Industry
ATM	Automated Teller Machine
ATR	Action Taken Report
ATS	Anti-Tetanus Serum
AU	Astronomical Unit
AVC	Army Veterinary Corps
AVSM	Ati Vishist Seva Medal
AWACS	Airborne Warning and Control System
B	
B2B	Business to Business
B2C	Business to Customer
BA	Baccalaureus Artium (Bachelor of Arts)
BAFTA	British Academy of Film and Television Arts
BAI	Badminton Association of India
BALCO	Bharat Aluminium Company Limited
BARC	Bhabha Atomic Research Centre
BBC	British Broadcasting Corporation
BC	Before Christ
BCCI	Board of Control for Cricket in India
BCG	Bacillus Calmette Guerin (Tuberculosis vaccine)
BEL	Bharat Electronics Limited
BENELUX	Belgium, The Netherland and Luxembourg
BHEL	Bharat Heavy Electrical Ltd.
BIFR	The Board of Industrial and Financial Reconstruction
BIMSTEC	Bangladesh, India, Myanmar, Sri Lanka, Thailand Economic Co-operation
BIS	Bureau of Indian Standards

BIT	Binary Digit
BJP	Bharatiya Janata Party
BKD	Bharatiya Kranti Dal
BKU	Bharatiya Kisan Union
BLD	Bharatiya Lok Dal
BOAC	British Overseas Airways Corporation (now British Airways)
BOLT	Build, Own, Lease and Transfer
BOOT	Build, Own, Operate and Transfer
BOST	Build, Own, Share and Transfer
BPCL	Bharat Petroleum Corporation Limited
BPE	Bureau of Public Enterprises
BPL	Below Poverty Line
BPO	Business Process Outsourcing
BRO	Border Roads Organization
BSE	Bombay Stock Exchange
BSF	Border Security Force
BSNL	Bharat Sanchar Nigam Limited
BSP	Bahujan Samaj Party
BSS	Bharat Sewa Samaj
BT	Bacillus Thuringiensis

C

C2C	Customer to Consumer
CABE	Central Advisory Board for Education
CAD	Computer Aided Design
CAG	Comptroller and Auditor-General
CAM	Computer Aided Manufacturing
CAPES	Computer Aided Paperless Examination System
CAR	Capital Adequacy Ratio
CARE	Cooperative for American Relief Everywhere
CAS	Conditional Access System
CASE	Commission on Alternative Sources of Energy
CASTAP	Conference on Application of Science and Technology in Asia and the Pacific
CBDT	Central Board of Direct Taxes
CBFC	Central Board of Film Certification
CBI	Central Bureau of Investigation
CBM	Confidence Building Measures
CBR	Central Board of Revenue, Crude Birth Rate
CBSE	Central Board of Secondary Education
CBT	Children's Book Trust
CCI	Cricket Club of India
CD	Compact Disc/Certificate of Deposit/Corpa Diplomatique
CDMA	Code Division Multiple Access
C-DOT	Centre for Development of Telematics
CDR	Crude Death Rate
CDRI	Central Drug Research Institute
CDS	Compulsory Deposit Scheme

CDSL	Central Depository Services (India) Ltd.
CEC	Chief Election Commissioner
CENTO	Central Treaty Organization
CEO	Chief Executive Officer
CFC	Chlorofluoro Carbons
CFD	Congress for Democracy
CFO	Chief Financial Officer
CFSI	Children's Film Society of India
CFTRI	Central Food Technological Research Institute
CGHS	Central Government Health Scheme
CHEC	Commonwealth Human Economic Council
CHOGM	Commonwealth Heads of Government Meeting
CHOGRM	Commonwealth Heads of Government Regional Meeting
CIA	Central Intelligence Agency (USA)
CID	Criminal Investigation Department
CIET	Central Institute of Educational Technology
CIF	Cost, Insurance and Freight
CII	Confederation of Indian Industry
CIL	Coal India Limited
C-in-C	Commander-in-Chief
CIS	Commonwealth of Independent States
CISF	Central Industrial Security Force
CITES	Convention of International Trade in Endangered Species
CITU	Centre of Indian Trade Unions
CIWTC	Central Inland Water Transport Corporation
CLRC	Central Land Reforms Committee
CMD	Chairman and Managing Director
CMIE	Centre for Monitoring Indian Economy
CMN	Common Market Nations
CMO	Chief Medical Officer
CNG	Compressed Natural Gas
CNN	Cable News Network
COAI	Cellular Operators Association of India
COAS	Chief of Army Staff
COBOL	Common Business Oriented Language
COD	Cash on Delivery
COFEPOSA	Conservation of Foreign Exchange and Prevention of Smuggling Act
COMEX	Commonwealth Expedition
CORDET	Cooperative Rural Development Trust
CPC	Civil Procedure Code
CPF	Contributory Provident Fund
CPI	Communist Party of India
CPI(M)/CPM	Communist Party of India (Marxist)
CPO	Central Para Military Organization
CRIS	Central Railway Information Systems
CRISIL	Credit Rating Information Services of India Ltd.
CRM	Customer Relationship Management

CrPC	Criminal Procedure Code
CRPF	Central Reserve Police Force
CRR	Cash Reserve Ratio
CRRI	Central Road Research Institute
CRY	Child Relief and You
CSE	Centre for Science and Environment
CSI	Computer Society of India
CSIO	Central Scientific Instruments Organization
CSIR	Council of Scientific and Industrial Research
CSIRO	Commonwealth Scientific and Industrial Research Organization
CSO	Central Statistical Organization
CTBT	Comprehensive Test Ban Treaty
CVC	Chief Vigilance Commissioner
CVR	Cockpit Voice Recorder

D

D. Litt	Doctor of Literature
DA	Dearness Allowance
DAE	Department of Atomic Energy
DANICS	Delhi–Andaman Nicobar Island Civil Services
DC	Direct Current, Deputy Commissioner
DCC	District Congress Committee
DDT	Dichloro-Diphenyl Trichloro-Ethane
DGC	Director-General of Civil Aviation
DGS and D	Directorate-General of Supply and Disposals
DGTD	Director-General of Technical Development
DLF	Development Loans Fund
DLO	Dead Letter Office
DMK	Dravida Munnetra Kazhagam
DMKF	Dalit Mazdoor Kisan Party
DMRC	Delhi Metro Rail Corporation
DNA	Deoxy Ribonucleic Acid
DO	Demi Official
DOD	Department of Ocean Development
DOT	Dichloro Diphenyl Trichloro-ethane (insecticide)
DPI	Director of Public Instruction
DPT	Diphtheria, Pertussis and Tetanus (Vaccine)
DRDL	Defence Research and Development Laboratory
DRDO	Defence Research and Development Organization
DRI	Differential Rate of Interest
DSIDC	Defence Scientific Information and Documentation Centre
DTH	Direct to Home Service
DV	Deo Volente (God willing)
DVDR	Digital Versatile Disc Recordable

E

EARC	Economic Administrative Reforms Commission
ECA	Economic Commission for Asia

ECAFE	Economic Commission for Asia and Far East
ECG	Electrocardiogram
ECGC	Export Credit and Guarantee Cooperation
ECHR	European Commission on Human Rights
ECM	European Common Market
ECOSOC	Economic and Social Council (of UN)
ECS	Electronic Clearance Services
EEC	European Economic Community
EEG	Electro Encephalogram
EFTA	European Free Trade Association
EG	Exampli Gratia (for example)
ELSS	Equity Linked Saying Scheme
E-MAIL	Electronic Mailing
EMF	Electro-Motive Force
ENLF	Eelam National Liberation Front
EOU	Export Oriented Unit
EPABX	Electronic Private Automatic Branch Exchange
EPS	Earning Per Share
EPZ	Export Processing Zone
ESCAP	Economic and Social Commission for Asia and Pacific
ESI	Employees State Insurance
ESMA	Essential Services Maintenance Act
ESP	Extra Sensory Perception
ESPN	Entertainment and Sports Programming Network

F

FAO	Food and Agriculture Organization (of UN)
FBI	Federal Bureau of Investigation
FBTR	Fast Breeder Test Reactor
FCD	Fully Convertible Debenture
FCI	Food Corporation of India/Fertilizer Corporation of India
FDI	Foreign Direct Investment
FEMA	Foreign Exchange Management Act
FERA	Foreign Exchange Regulation Act
FF	Film Finance Corporation
FFI	Foreign Financial Institutions
FI	Financial Institution
FIA	Federation International de Automobile
FICCI	Federation of Indian Chambers of Commerce and Industry
FIFA	International Football Federation
FII	Foreign Institutional Investor
FIPB	Foreign Investment Promotion Board
FIR	First Information Report
FLAG	Fibre Optic Link Around the Globe
FM	Frequency Modulation
FMCG	First Moving Consumer Goods
FMCT	Fissile Material Cut-off Treaty

FOB	Freight on Board
FOR	Freight on Rail
FRCP	Fellow of the Royal College of Physicians
FRCS	Fellow of the Royal College of Surgeons
FRS	Fellow of the Royal Society
FTZ	Free Trade Zone

G

G-7	Group of Seven Nations (US, UK, Germany, France, Italy, Japan and Canada)
G-8	Group of Eight Nations (G-7 Countries plus Russia)
G-15	Group of Fifteen Nations
GAIL	Gas Authority of India Limited
GARP	Global Atmospheric Research Project
GATS	General Agreement on Trade and Services
GATT	General Agreement on Tariffs and Trade
GBS	George Bernard Shaw
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GDR	Global Depository Receipt
GEC	General Electric Company
GHQ	General Headquarters
GIC	General Insurance Corporation
GLOBE	Global Learning and Observation to Benefit the Environment
GmbH	Gesellsheft Mit Beshrankter Haftung Liability company (German Limited Companies)
GMO	Genetically Modified Organisms
GMT	Greenwich Mean Time
GNLF	Gorkhaland National Liberation Front
GNP	Gross National Product
GOC	General Officer Commanding
GOI	Government of India
GPF	General Provident Fund/Gandhi Peace Foundation
GPO	General Post Office
GSLV	Geo-Synchronous Satellite Launch Vehicle
GSTP	Global System of Trade Practices

H

HAL	Hindustan Aeronautics Ltd.
HBV	Hepatitis-B Virus
HDFC	Housing Development and Finance Corporation
HE	His/Her Excellency
HEC	Heavy Engineering Company
HEH	His/Her Highness
HLC	Humanitarian Law Commission (Red Cross Body)
HLL	Hindustan Lever Limited
HMI	Himalayan Mountaineering Institute

HMT	Hindustan Machine Tools
HMV	His Master's Voice
HP	Harmonic Progression, Horse Power
HSD	High Speed Diesel
HSL	Hindustan Steel Ltd.
HUDCO	Housing and Urban Development Corporation
HZL	Hindustan Zinc Limited

I

IAA	International Airport Authority
IAAS	Indian Audit and Accounts Service
IAC	Indian Airlines Corporation
IAEA	International Atomic Energy Agency
IAFC	Indian Agricultural Finance Corporation
IAMC	Indian Army Medical Corps
IARI	Indian Agricultural Research Institute
IASRI	Indian Agricultural Statistical Research Institute
IATA	International Air Transport Association
IBEC	International Bank for Economic Cooperation
IBM	International Business Machines
IBRD	International Bank for Reconstruction and Development
ICAO	International Civil Aviation Organization
ICAR	Indian Council of Agricultural Research
ICBM	Inter-Continental Ballistic Missile
ICC	International Cricket Council/International Crime Court/International Control Commission
ICCR	Indian Council of Cultural Relations
ICE	Infotech Communications and Entertainment
ICHR	Indian Council of Historical Research
ICICI	Industrial Credit and Investment Corporation of India
ICJ	International Court of Justice
ICRA	Investment and Credit Rating Agency of India
ICRC	International Committee of Red Cross
ICRIER	Indian Council for Research on International Economic Relations
ICSI	Institute of Company Secretaries of India
ICSSR	Indian Council of Social Science Research
ICSW	Indian Council of Social Welfare
ICWA	Indian Council of World Affairs
ICWAI	Institute of Cost and Works Accountants of India
IDA	International Development Agency
IDBI	Industrial Development Bank of India
IDC	Industrial Development Corporation
IDPL	Indian Drugs and Pharmaceuticals Ltd.
IDRC	International Development Research Centre
IDSA	Institute of Defence Studies and Analysis
IETE	Institution of Electronics and Telecommunication Engineers

IFAD	International Fund for Agricultural Development
IFCI	Industrial Finance Corporation of India
IFFI	International Film Festival of India
IGIA	Indira Gandhi International Airport
IGNOU	Indira Gandhi National Open University
IHF	Indian Hockey Federation
IIFT	Indian Institute of Foreign Trade
IIP	Index of Industrial Production
IIUTF	International Union of Trade Fairs
ILO	International Labour Organization
IMA	Indian Military Academy
IMF	International Monetary Fund
INS	Indian Naval Ship
INSAT	Indian National Satellite
INTELSAT	International Telecommunication Satellite
INTERPOL	International Police
INTUC	Indian National Trade Union Congress
IOA	Indian Olympic Association
IOC	International Olympic Committee
IOCOM	Indian Ocean Commonwealth
IOJ	International Organization of Journalists
IOU	I Owe You
IPC	Indian Penal Code
IPO	Initial Public Offering
IPU	International Parliamentary Union
IQ	Intelligence Quotient
IRA	Irish Republic Army
IRBM	Intermediate Range Ballastic Missile
IRDA	Insurance Regulatory and Development Authority
IRDP	Integrated Rural Development Programme
IREDA	Indian Renewable Energy Development Agency
IRSS	Indian Remote Sensing Satellite
ISAF	International Security Assistance Force (in Afghanistan)
ISBA	International Sea-Bed Authority
ISBN	International Standard Book Number
ISI	Inter Services Intelligence (of Pakistan)
ISO	International Standards Organization
ISP	Internet Service Provider
ISRO	Indian Space Research Organization
IST	Indian Standard Time
ITBP	Indo-Tibetan Border Police
ITDC	Indian Tourism Development Corporation
ITF	International Tennis Federation
ITO	Income Tax Office/International Trade Organization
ITU	International Telecommunication Union
IVF	In-Vitro Fertilization
IYC	Indian Youth Congress

J

JCO	Junior Commissioned Officer
JKLF	Jammu and Kashmir Liberation Front
JLP	Janata Legislature Party
JP	Janata Party, Jayaprakash Narayan
JPC	Joint Parliamentary Committee
JPP	Janata Parliamentary Party
JRY	Jawahar Rozgar Yojna
JVM	Janata Vidhyarthi Morcha

K

KAL	Korean Airlines
KANU	Kenya African National Union
KBE	Knight of British Empire
KG	Kindergarten
KRIBHCO	Krishak Bharti Corporation Ltd.
KVIC	Khadi and Village Industries Commission

L

LASER	Light Amplification by Stimulated Emission of Radiation
LASIK	Laser in Situ Kerato Mileusis
LCA	Light Combat Aircraft
LDC	Lower Division Clerk
LES	Lunar Escape System
LIBOR	London Interbank Offer Rate
LLB	Legum Baccalaureus (Bachelor of Law)
LIC	Life Insurance Corporation
LNG	Liquified Natural Gas
LOAC	Line of Actual Control
LOC	Line of Control
LPG	Liquified Petroleum Gas
LSD	Lysergic Diethylamide
LSE	London School of Economics
LTTE	Liberation Tigers of Tamil Eelam

M

M&A	Merger and Acquisition
MA	Master of Arts (Magisites Artium)
MAD	Mutual Assured Destruction
MBA	Master of Business Administration
MBBS	Bachelor of Medicine and Bachelor of Surgery
MBE	Member of the British Empire
MBT	Main Battle Tank
MCC	Marylebone Cricket Club
MCI	Medical Council of India
MENA	Middle East News Agency
MFN	Most Favoured Nation
MI	Military Intelligence

MICR	Magnetic Ink Character Recognition
MISA	Maintenance of Internal Security Act
MLA	Member of Legislative Assembly
MLC	Member of Legislative Council
MMAMC	Mining and Allied Machinery Corporation
MMS	Multimedia Messaging Service
MNC	Multinational Corporation
MNF	Mizo National Front
MODEM	Modulator Demodulator
MODVAT	Modified Value Added Tax
MOU	Memorandum of Understanding
MP	Member of Parliament
MRD	Movement for Restoration of Democracy (Pakistan)
MRTPC	Monopolies and Restrictive Trade Practices Commission
MRTS	Mass Rapid Transport System
MTCR	Missile Technology Control Regime
MUL	Maruti Udyog Limited
MVC	Maha Vir Chakra

N

NAAI	National Airport Authority of India
NABARD	National Bank for Agricultural and Rural Development
NAFED	National Agricultural Co-operation Marketing Federation
NAFTA	North American Free Trade Agreement
NAG	National Air Guard
NAM	Non-Aligned Movement
NASA	National Aeronautics and Space Administration (USA)
NASDAQ	National Association of Securities Dealers Automated Quotation
NASSCOM	The National Association of Software and Service Companies
NATO	North Atlantic Treaty Organization
NAV	Net Asset Value
NB	Nota Bene (note well/note below)
NBFC	Non-Banking Finance Company
NBT	National Book Trust
NCA	National Commission of Agriculture
NCAER	National Council of Applied Economic Research
NCD	Non-Convertible Debenture
NCEPC	National Committee of Environmental Planning and Coordination
NCERT	National Council of Educational Research and Training
NCM	National Commission for Minorities
NCR	National Capital Territory
NCST	National Committee of Science and Technology, National Conference on Science and Technology
NDA	National Defence Academy/National Democratic Alliance
NDC	National Development Corporation/National Development Council
NDDB	National Dairy Development Board

NEERI	National Environmental Engineering Research Institute
NEFA	North-East Frontier Agency
NEPA	National Environment Protection Act
NFDC	National Film Development Corporation
NGO	Non-Governmental Organization
NGRI	National Geographical Research Institute
NHAI	National Highway Authority of India
NHDP	National Highways Development Project
NHPC	National Hydro-electric Power Corporation
NHRC	National Human Rights Commission
NIC	National Integration Council
NID	National Institute of Design
NIEO	National Economic Order
NIIT	National Institute of Information Technology
NIO	National Institute of Oceanography
NITIE	National Institute for Training in Industrial Engineering
NMDC	National Mineral Development Corporation
NOC	No Objection Certificate
NPA	Non-Performing Assets
NPC	National Productivity Council
NPL	National Physical Laboratory
NPT	Nuclear Non-Proliferation Treaty
NRC	Nuclear Regulatory Commission
NRE	Non-Resident External (account)
NRI	Non-Resident Indian
NRSA	National Remote Sensing Agency
NSC	National Service Corps
NSE	National Stock Exchange
NTPC	National Thermal Power Corporation

O

OAPEC	Organization of Arab Petroleum Exporting Countries
OAS	Organization of American States
OAU	Organization of African Unity
OIGS	On Indian Government Service
ONGC	Oil and Natural Gas Corporation
OPEC	Organization of Petroleum Exporting Countries

P

PAC	Provincial Armed Constabulary, Public Accounts Committee, Political Affairs Committee
PAN	Permanent Account Number (Income Tax)
PBX	Private Branch Exchange (for Telephone)
PCC	Pradesh Congress Committee
PDA	Preventive Detention Act
PDS	Public Distribution System
PEC	Projects and Equipment Corporation of India

PEN	Poets, Editors and Novelists Association
PER	Price Earning Ratio
PERT	Programme Evaluation and Review Technique
PET	Polyethylene Tereph Thalate
PFA	Press Foundation of Asia, Prevention of Food Adulteration
PHC	Primary Health Centre
PIB	Public Investment Board, Press Information Bureau
PII	Press Institute of India
PIL	Public Interest Litigation
PIN	Postal Index Number
PIO	Person of Indian Origin
PLO	Palestine Liberation Organization
PLOTE	People's Liberation Organization of Tamil Eelam
PLR	Prime Lending Rate
PM	Post Meridien/Prime Minister
PNR	Passenger Name Recorder
POK	Pakistan Occupied Kashmir
POTA	Prevention of Terrorist Activities Act
POW	Prisoner of War
PPP	Pakistan People's Party/Purchasing Power Parity
PREPAK	People's Revolutionary Party of Kangleipak (Imphal)
PRO	Public Relations Officer
PS	Post Script
PSC	Public Service Commission
PSLV	Polar Satellite Launch Vehicle
PSP	Praja Socialist Party
PTA	Parent-Teacher Association
PTI	Press Trust of India
PVC	Param Vir Chakra
PVSM	Param Vishisht Seva Medal
PWD	Public Works Department

Q

QED	Quod Erat Demonstrandum (That which was to be demonstrated)
QMG	Quarter Master General
QMT	Quantitative Management Technique
QR	Quarterly Report/Quantitative Restrictions

R

R&D/RND	Research and Development
RADAR	Radio Detecting and Ranging
RAF	Rapid Action Force
RAM	Random Access Memory
RAW	Research and Analysis Wing
RBI	Reserve Bank of India
RCD	Regional Cooperation for Development
RDX	Research Developed Explosive

REC	Rural Electrification Corporation/Regional Engineering College
RITES	Rail India Technical and Economic Services
RLEGS	Rural Landless Employment Guarantee Scheme
RPM	Revolutions Per Minute (r.p.m.)
RSM	Rashtriya Sanjay Manch
RSS	Rashtriya Swayam Sewak Sangh
RSVP	Repondez Sil Vous Plait (Reply if you please)
RTC	Round Table Conference

S

SAARC	South Asian Association for Regional Cooperation
SAFTA	South Asian Free Trade Agreement
SAIL	Steel Authority of India Ltd.
SALT	Strategic Arms Limitation Talks
SAPTA	SAARC Preferential Trading Agreement
SARS	Severe Acute Respiratory Syndrome
SC	Scheduled Caste, Supreme Court
SCI	Shipping Corporation of India
SCOPE	Standing Conference on Public Enterprises
SCUBA	Self-Contained Underwater Breathing Apparatus
SDR	Special Drawing Rights
SEATO	South-East Asia Treaty Organization
SEBI	Securities and Exchange Board of India
SENSEX	Sensitivity Index (of Bombay Stock Exchange)
SERC	Structural Engineering Research Centre
SEZ	Special Economic Zone
SFF	Special Frontier Force
SFI	Students Federation of India
SGPC	Shiromani Gurudwara Prabandhak Committee
SHCIL	Stock Holding Corporation of India Ltd.
SIDBI	Small Industries Development Bank of India
SIDC	State Industrial Development Corporation
SIPRI	Stockholm International Peace Research Institute
SITA	Suppression of Immoral Traffic in Women and Girls Act
SITE	Satellite Instructional Television Experiment
SLFP	Sri Lanka Freedom Party
SLR	Self Loading Rifle, Statutory Liquidity Ratio
SLV	Satellite Launch Vehicle
SMS	Short Messaging Services
SNIPES	Society of National Institutes for Physical Education and Sports
SOS	Save Our Souls
SPCA	Society for Prevention of Cruelty to Animals
SPDC	State Peace and Development Council (Myanmar)
SSC	Staff Selection Commission
SSI	Small Scale Industries
STARS	Satellite Tracking and Ranging Station

START	Strategic Arms Reduction Treaty
STAR-TV	Satellite Television Asian Region Ltd.
STC	State Trading Corporation
STD	Subscriber Trunk Dialling
SUNFED	Special United Nations Fund for Economic Development
SVD	Samyukta Vidhayak Dal
SWAPO	South-West African People's Organization

T

TA	Travelling Allowance, Territorial Army
TADA	Terrorist and Disruptive Activities (Prevention) Act
TAX	Trunk Automatic Exchange
TDA	Trade Development Authority
TDP	Telugu Desam Party
TDS	Tax Deducted at Source
TELCO	Tata Engineering and Locomotive Company
TELEX	Teleprinter Exchange
TELO	Tamil Eelam Liberation Organization
TERLS	Thumba Equatorial Rocket Launching Station
THI	Temperature Humidity Index
TIFR	Tata Institute of Fundamental Research
TISCO	Tata Iron and Steel Company
TMO	Telegraph Money Order
TMT	Technology Media Telecom
TNC	Trans National Corporation
TNT	Tri-nitro toluene (highly explosive material)
TQM	Total Quality Management
TRAI	Telecom Regulatory Authority of India
TRIMS	Trade Related Investment Measures
TRIPS	Trade Related Intellectual Property Rights
TRP	Television Rating Points
TRYSEM	(National Scheme) Training of Rural Youth for Self-Employment
TSP	Total Suspended Particles
TUC	Trade Union Congress
TULF	Tamil United Liberation Front
TWA	Trans World Airlines

U

UAE	United Arab Emirates
UANC	United African National Council
UAR	United Arab Republic
UCTA	United Chamber of Trade Association
UDC	Upper Division Clerk
UDF	United Democratic Front
UFO	Unidentified Flying Object
UGC	University Grants Commission
ULFA	United Liberation Front of Assam

UNCIP	United Nations Commission for India and Pakistan
UNCITRAL	United Nations Conference on International Trade Law
UNCLOS	United Nations Conference on the Law of the Sea
UNCNRSE	United Nations Conference for New and Renewable Sources of Energy
UNCOD	United Nations Conference on Desertification
UNCST	United Nations Conference on Science and Technology
UNCSW	United Nations Commission on the Status of Women
UNCTAD	United Nations Conference on Trade and Development
UNDC	United Nations Disarmament Commission
UNDOF	United Nations Disengagement Observer Force
UNDP	United Nations Development Programme
UNEF	United Nations Emergency Force
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational Scientific and Cultural Organization
UNFPA	United Nations Fund for Population Activities
UNHCR	United Nations High Commissioner for Refugees
UNI	United News of India
UNIC	United Nations Information Centre
UNICEF	United Nations International Children's Education Fund
UNIDO	United Nations Industrial Development Organization
UNIFIL	United Nations Interim Force in Lebanon
UNISPACE	United Nations Conference on Peaceful Uses of Space
UNITAR	United Nations Institute for Training and Research
UNITC	United Nations International Trade Centre
UNLA	Uganda National Liberation Army
UNMOGIP	United Nations Military Observer Group in India and Pakistan
UNRRA	United Nations Relief and Rehabilitation Administration
UPI	United Press International
UPS	Uninterrupted Power Supply
UPSC	Union Public Service Commission
USAID	United States Agency for International Development
USIS	United States Information Service
USP	Unique Selling Proposition

V

VABAL	Value Based Advanced Licence
VAT	Value Added Tax
VIP	Very Important Person
VPP	Value Payable Post
VRDE	Vehicle Research and Development Establishment
VSAT	Very Small Aperture Terminal
VSNL	Videsh Sanchar Nigam Ltd.
VSSC	Vikram Sarabhai Space Centre

W

WAPCOS	Water and Power Development Consultancy Services (I) Ltd.

WASME	World Assembly of Small and Medium Enterprises
WEF	World Economic Forum
WFC	World Food Council
WFP	World Food Programme
WFTU	World Federation of Trade Unions
WHO	World Health Organization
WLL	Wireless in Local Loop
WMD	Weapons of Mass Destruction
WMO	World Meteorological Organization
WPI	Wholesale Price Index
WTO	World Trade Organization
WWF	World Wildlife Fund
WWW	World Wide Web

Y

Y2K	Year 2000
YMCA	Young Men's Christian Association
YMIA	Young Men's Indian Association
Y-O-Y	Year on Year
YWCA	Young Women's Christian Association

AWARDS AND HONOURS

International Awards

Nobel Prize

Year of Institution: 1901

Founder: Alfred Bernhard Nobel

Date on which awarded: 10 December (death anniversary of the founder)

No. of Disciplines Awarded: Total Six:

1. Physics
2. Chemistry
3. Physiology or Medicine
4. Literature
5. Peace
6. Economics (established in 1967)

The most prestigious award in the world, supported by The Nobel Foundation (USD 58,960,000) was set-up in 1900 under the will of Alfred Bernhard Nobel (1833–96). Alfred Nobel was a Swedish scientist and chemical engineer who discovered Nitroglycerin ($C_3H_5N_3O_9$) and its use in the manufacture of dynamite in 1866. These awards are presented annually on 10 December, the death anniversary of the founder and is presented by the Sewdish King.

Originally, awards were for work in five disciplines. The prize for Economics was instituted in 1967 by Sveriges Riksbank (Swedish Bank) in celebration of its 300th anniversary and was awarded for the first time in 1969. It is called the *Nobel Memorial Prize in Economics*.

Table 11.5 Other Important International Awards

Name of Award	Year Instituted	Awarded for
Pulitzer Prize	1917	Named after the US publisher, Joseph Pulitzer. It is annually conferred in the US for accomplishment in journalism, literature and music
Magsaysay Award	1957	Named after Ramon Magsaysay, President of the Philippines; it is annually conferred for outstanding contribution to Public Service, Community Leadership, Journalism, Literature, Creative Arts and International Understanding
Templeton Award	1972	Conferred by the Templeton Foundation for progress in religion—inaugurated by John M. Templeton, a presbyterian of Nassau, Bahamas
Booker Prize	1968	Highest literary award, set-up by the Booker Company and the British Publishers Association
Right Livelihood	1980	Instituted by Jakob Von Vexkull, a Swedish-German writer and philatelic expert, after selling his stamp collection; also known as the *Alternative Nobel Prize* and conferred annually for practical and exemplary solutions to real problems of today
Jawaharlal Nehru	1965	Instituted by Government of India, it is conferred annually to persons for outstanding contribution in promotion of international understanding, goodwill and friendship among the people of the world.
Oscar Awards	1929	Conferred annually by the Academy of Motion Pictures, Arts and Sciences in the US in recognition of contribution and performance in the field of cinema.
Jesse Owens	1992	Instituted by the International Amateur Athletic Federation Global Award to honour individuals with sports background who have made significant and lasting contribution to society.

NATIONAL AWARDS

Republic Day Awards (Civilian Awards)

Bharat Ratna

This is the highest national award in the country for exceptional work in the advancement of art, literature and science, or in recognition of public service of the highest order. It has been awarded by the President of India on January 26 every year since 1954. The foremost recipients of Bharat Ratna were:

- C. Rajagopalachari
- S. Radhakrishnan
- C. V. Raman

These awards were disContinued in 1977 by the Janata Government but were revived by the Congress government in 1980. After revival of these awards, Mother Teresa was the first recipient.

Note: No Civilian Awards in 1993 and 1994.

Satya Pal Anand challenged before the MP High Court, the process of 'Conferment of the Bharat Ratna to Rajiv Gandhi posthumously'. Anand succeeded in gaining an *ex-parte* stay against the government in August 1992. The government announced that no Bharat Ratna or Padma awards would be given till the constitutionality of these awards was decided by the courts. Therefore, these awards were not conferred in 1993 and 1994.

Padma Awards

Padma Awards fall next in line after the Bharat Ratna. They were also dis*Continued* in 1977 along with the Bharat Ratna and revived again in 1980. There are three Padma awards:

1. *Padma Vibhushan* is the second highest national award given for exceptional and distinguished service in any field including services rendered by government employees.

2. *Padma Bhushan* is the third highest national award given for distinguished service in any field.

3. *Padma Shri* is the fourth highest award given for distinguished service in any field.

Gallantry Awards

Param Vir Chakra is the highest decoration of valour awarded, for most conspicuous bravery, or some act of valour or self-sacrifice in the presence of the enemy, whether on land, at sea or in the air. The medal is made of bronze.

Mahavir Chakra is the second highest gallantry award for acts of conspicuous gallantry in the presence of the enemy whether on land, at sea or in the air. The medal is made of standard silver.

Vir Chakra is awarded for acts of gallantry in the presence of enemy, whether on land, at sea or in the air. The medal is made of standard silver.

Winners of Param Vir Chakra

- Major Somnath Sharma, 4 Kumaon Regiment: Posthumous—November 1947 (Kashmir Operations 1947–48)
- 2nd Lt R. R. Rane, Corps of Engineers: April 1948 (Kashmir Operations 1947–48)
- Company Havildar Major Piru Singh, 6 Rajputana Rifles: Posthumous—July 1948 (Kashmir Operations 1947–48)
- L/NK Karam Singh, 1 Sikh Regiment: October 1948 (Kashmir Operations 1947–48)
- Naik Jadunath Singh, 1 Rajput Regiment: Posthumous—December 1948 (Kashmir Operations 1947–48)
- Captain Gurbachan Singh Salaria, 3/1 Gorkha Rifles: Posthumous—December 1961 (Congo)
- Major Dhan Singh Thappa, 1/8 Gorkha Rifles: October 1962 (Ladakh)
- Subedar Joginder Singh, 1 Sikh Regiment, Posthumous—October 1962 (NEFA)
- Major Shaitan Singh, 13 Kumaon Regiment: Posthumous—November 1962 (Ladakh)
- Abdul Hamid, 4 Grenadiers: Posthumous—September 1965 (Operations against Pakistan)
- Lt Col A. B. Tarapore, 17 Poona Horse: Posthumous—September 1965 (Operation against Pakistan)

- Flying Officer Nirmal Jit Singh Sekhon, No. 8 Squadron: Posthumous—December 1971 (Indo-Pak Conflict)
- Major Hoshiar Singh, 3 Grenadiers: December 1971 (Indo-Pak conflict)
- 2nd Lt Arun Khetarpal, 17 Poona Horse: Posthumous—December 1971 (Indo-Pak Conflict)
- L/NK Albert Ekka, 14 Brigade of Guards: Posthumous—December 1971 (Indo-Pak Conflict)
- Naib Subedar Bana Singh, 8 JAK Light Infantry: June 1987 (Operations in Siachen Glacier)
- Major Ramaswamy Parameswaran, 8 Mahar Regiment: Posthumous—November 1997 (IPKF Operations in Sri Lanka)
- Capt. Vikram Batra, 13 JAK Rifles: Posthumous—June 1999 (OP Vijay in Kargil)
- Lt Manoj Kumar Pandey, 1/11 GR: Posthumous—June 1999 (OP Vijay in Kargil)
- Rifleman Sanjay Kumar, 13 JAK Rifles—June 1999 (OP Vijay in Kargil)
- Gdr Yogender Singh Yadav, 18 GDRS—June 1999 (OP Vijay in Kargil)

Other Gallantry Awards (Civilian Gallantry Awards)

Ashok Chakra is awarded for most conspicuous bravery or some act of courage or pre-eminent valour or self-sacrifice other than in the face of enemy.

Kirti Chakra is awarded for conspicous gallantry, other than in the face of the enemy.

Shaurya Chakra is awarded for bravery other than in the presence of enemy.

Table 11.6 Other National Awards

Name of Award	Date Instituted	Awarded for
Dada Saheb Phalke	1969	Awarded for outstanding contribution to the cause of film/cinema—first recipient was Devika Rani in 1969
Bharatiya Jnanpith	1962	The most prestigious literary award, given to outstanding authors of creative literature in any of the Indian languages recognised by the Constitution of India
Arjuna Award	1961	Awarded to outstanding sports persons in various disciplines
Dronacharya Award	1985	Named after Dronacharya, the legendary guru of the epic age of the 'Mahabharata' who taught archery to Kauravas and Pandavas—it is awarded to sports coaches for outstanding work on constant basis in the last three consecutive years
Rajiv Gandhi Khel Ratna Award	1991–92	The highest honour given to a sports person across sporting disciplines

SPORTS

Olympics

This is an international sports festival which originated in the city of Olympia, an ancient city of Greece.

Ancient Olympics

These games were held at Mount Olympia in Greece in honour of Zeus from 776 BC to AD 394. From AD 394 these games started degenerating and by AD 580 they altogether vanished and were banned by the Roman emperor, Theodosius.

Modern Olympics

It was the French nobleman, Baron Pierre de Coubertin, who revived Olympic games (almost 1500 years after the last ancient Olympics) in 1894. The modern series of the Olympic games started in 1896 in Athens and since then are held every four years.

Separate winter Olympic games began in 1924. Women have been competing in the Olympics since 1912. India officially participated in the Olympics for the first time in 1920 when four athletes and two wrestlers were sent to participate in the sixth Olympic games at Antwerp, Belgium.

The Olympic Flag is made-up of white silk and contains fine intertwined rings as the Olympics Emblem. From right to left the rings are Blue (for Europe), Yellow (for Asia), Black (for Africa), Red (for America) and Green (for Australia).

In 1897, Father Didon composed the games motto 'Citius, Altius, Fortius' in Latin, which means 'Swifter, Higher and Stronger'. However, it was introduced as Olympic motto only in 1920 games.

Table 11. 7   Olympics—Where and When

Olympiad	Year	Olympics	
		Venue	**Country**
I	1896	Athens	Greece
II	1900	Paris	France
III	1904	St Louis	US
IV	1908	London	Great Britain
V	1912	Stockholm	Sweden
VI*	1916	Berlin	Germany
VII	1920	Antwerp	Belgium
VIII	1924	Paris	France
IX	1928	Amsterdam	Netherlands
X	1932	Los Angeles	US
XI	1936	Berlin	Germany
XII**	1940	Tokyo (then Helsinki)	Japan (then Finland)
XIII**	1944	London	Great Britain
XIV	1948	London	Great Britain
XV	1952	Helsinki	Finland
XVI	1956	Melbourne	Australia
XVII	1960	Rome	Italy
XVIII	1964	Tokyo	Japan
XIX	1968	Mexico City	Mexico
XX	1972	Munich	W. Germany
XXI	1976	Montreal	Canada
XXII	1980	Moscow	USSR
XXIII	1984	Los Angeles	US
XXIV	1988	Seoul	S. Korea
XXV	1992	Barcelona	Spain
XXVI	1996	Atlanta	US
XXVII	2000	Sydney	Australia

(*Continued*)

		Olympics	
Olympiad	Year	Venue	Country
XXVIII	2004	Athens	Greece
XXIX	2008	Beijing	China
XXX	2012	London	UK
XXXI	2016	Rio de Janerio	Brazil
XXXII	2018	Tokyo	Japan

*Games were not held due to World War I.
**Games were not celebrated due to World War II. In 1940 the Games were retracted from Tokyo and were awarded to Helsinki by the IOC.

Asian Games

These games were organized at the initiative of the late Prime Minister, Pt Jawaharlal Nehru, in 1951 and are held once in four years mid-way between the Olympics.

The first Asian Games were held in 1951 at the National Stadium, New Delhi and were inaugurated by Dr Rajendra Prasad (first President of India). About 489 participants from 11 nations participated in the Games.

Asian Games Federation adopted the motto 'Ever Onward', given by Pt Jawahar Lal Nehru and the emblem of Asian games is 'a bright full rising sun with interlocking rings'. The 'Torch and Flag' was presented by Maharaja of Patiala at the First Asian Games held at New Delhi, India.

Table 11.8 Asiads–Where and When

	Venue		Participation			
Year	City	Country	No. of Athletes	No. of Nations	No. of Sports	Ranking (First three)
1951	New Delhi	India	489	11	6	1. Japan 2. India 3. Iran
1954	Manila	Philippines	967	18	8	1. Japan 2. Philippines 3. S. Korea
1958	Tokyo	Japan	1422	20	13	1. Japan 2. Philippines 3. S. Korea
1962	Jakarta	Indonesia	1545	17	13	1. Japan 2. Indonesia 3. India
1966	Bangkok	Thailand	1945	18	14	1. Japan 2. S. Korea 3. Thailand
1970	Bangkok	Thailand	1752	18	13	1. Japan 2. S. Korea 3. Thailand
1974	Tehran	Iran	2357	25	16	1. Japan 2. Iran 3. China
1978	Bangkok	Thailand	2879	25	19	1. Japan 2. China 3. S. Korea

Year	Venue		Participation		No. of Sports	Ranking (First three)
	City	Country	No. of Athletes	No. of Nations		
1982	New Delhi	India	3411	33	21	1. China 2. Japan 3. S. Korea
1986	Seoul	S. Korea	3345	27	25	1. China 2. S. Korea 3. Japan
1990	Beijing	China	4684	37	27	1. China 2. S. Korea 3. Japan
1994	Hiroshima	Japan	5300	42	34	1. China 2. S. Korea 3. Japan
1998	Bangkok	Thailand	8100	41	36	1. China 2. S.Korea 3. Japan
2002	Busan	South Korea	9919	42	38	1. China 2. S. Korea 3. Japan
2006	Doha	Qatar	10500	45	39	1. China 2. S. Korea 3. Japan
2010	Guangzhou	China	14000	45	42	1. China 2. S. Korea 3. Japan
2014	Incheon	S. Korea	9501	45	51	1. China 2. S.Korea 3. Japan
2018	Jakarta	Indonesia (Scheduled)				

Commonwealth Games

The first Commonwealth Games were held in 1930 at Hamilton, Canada. They are conducted, like Olympics, once in four years. All commonwealth countries (erstwhile British Colonies) participate in the sports events which is next to Olympics in terms of participating countries.

Table 11. 9 Commonwealth Games–Where and When

Year	Venue	Countries Participated	No. of Participants	No. of Disciplines
1930	Hamilton, Canada	11	400	6
1934	London, Great Britain	16	500	6
1938	Sydney, Australia	15	467	7
1950	Auckland, New Zealand	12	590	9
1954	Vancouver, Canada	24	662	9
1958	Cardiff, UK	35	1130	9
1962	Perth, Australia	35	863	9
1966	Kingston, Jamaica	34	1050	9

Year	Venue	Countries Participated	No. of Participants	No. of Disciplines
1970	Edinburgh, UK	42	1383	9
1974	Christchurch, New Zealand	39	1276	9
1978	Edmonton, Canada	46	1473	10
1982	Brisbane, Australia	46	1583	10
1986	Edinburgh, UK	26	1662	10
1990	Auckland, New Zealand	29	2826	10
1994	Victoria, Canada	34	2557	13
1998	Kuala Lumpur, Malaysia	70	3679	16
2002	Manchester, UK	70	5766	16
2006	Melbourne, Australia	71	5766	16
2010	Delhi, India	71	6800	17
2014	Glasgow, Scotland	71	4947	17
2018	Gold Coast, Australia (Scheduled)			

World Cup Cricket

1. 1975 (Lord's, England) : West Indies beat Australia
2. 1979 (Lord's, England) : West Indies beat England
3. 1983 (Lord's, England) : India beat West Indies
4. 1987 (Kolkata, India) : Australia beat England
5. 1992 (Melbourne, Australia) : Pakistan beat England
6. 1996 (Lahore, Pakistan) : Sri Lanka beat Australia
7. 1999 (Lord's, England) : Australia beat Pakistan
8. 2003 (Johannesburg, South Africa) : Australia beat India
9. 2007 (Bridgetown, West Indies) : Australia beat Sri Lanka
10. 2011 (Mumbai, India) : India beat Sri Lanka
11. 2015 (New Zealand, Australia) : Australia beats New Zealand
12. 2019 (Lord's, England) : Scheduled
13. 2023 (India) : Scheduled

T-20 Cricket World Cup

1. 2007 (Johannesburg, South Africa) : India beat Pakistan
2. 2009 (England) : Pakistan beat Sri Lanka
3. 2010 (West Indies) : England beat Australia
4. 2012 (Sri Lanka) : West Indies beat Sri Lanka
5. 2014 (Bangladesh) : Sri Lanka beat India
6. 2016 (India) : West Indies beat England

Indian Permier League

1. 2008 (Mumbai) : Rajasthan Royals beat Chennai Super Kings
2. 2009 (Johannesburg, South Africa) : Deccan Chargers beat Royal Challengers
3. 2010 (Mumbai) : Chennai Super Kings beat Mumbai Indians
4. 2011 (Chennai) : Chennai Super Kings beat Royal Challengers, Bangalore
5. 2012 (Chennai) : Kolkata Knight Riders beat Chennai Super Kings

6. 2013 (Kolkata)	: Mumbai Indian beat Chennai Super Kings
7. 2014 (Benguluru)	: Kolkata Knight Riders beat Kings XI Punjab
8. 2015 (Kolkata)	: Mumbai Indians beat Chennai Super Kings
9. 2016 (Bengaluru)	: Sunrisers Hyderabad beat Royal Challangers Bangalore

World Cup Hockey
1. 1971—Pakistan beat Spain in Barcelona
2. 1973—Holland beat India in Amsterdam
3. 1975—India beat Pakistan in Kuala Lampur
4. 1978—Pakistan beat Holland in Buenos Aires
5. 1982—Pakistan beat Germany in Mumbai
6. 1986—Australia beat England in London
7. 1990—Holland beat Pakistan in Lahore
8. 1994—Pakistan beat Holland in Sydney
9. 1998—Holland beat Spain in Utrecht
10. 2002—Germany beat Australia in Kuala Lampur (Malaysia)
11. 2006—Germany beat Australia in Monchengladbach, Germany
12. 2010—Australia beat Germany in India
13. 2014—Australia beat Netherlands in Netherland.

World Cup Soccer (Football) Tournament
1. 1930—Uruguay beat Argentina in Uruguay
2. 1934—Italy beat Czechoslovakia in Italy
3. 1938—Italy beat Hungary in Brazil
4. 1950—Uruguay beat Brazil in Brazil
5. 1954—West Germany beat Hungary in Switzerland
6. 1958—Brazil beat Sweden in Sweden
7. 1962—Brazil beat Czechoslovakia in Chile
8. 1966—England beat West Germany in England
9. 1970—Brazil beat Italy in Mexico
10. 1974—West Germany beat Holland in West Germany
11. 1978—Argentina beat Holland in Argentina
12. 1982—Italy beat West Germany in Spain
13. 1986—Argentina beat West Germany in Mexico
14. 1990—West Germany beat Argentina in Italy
15. 1994—Brazil beat Italy in USA
16. 1998—France beat Brazil in France
17. 2002—Brazil beat Germany in Japan
18. 2006—Italy beat France in Germany
19. 2010—Spain beat Netherlands in South Africa
20. 2014—Germany beat Argentina in Brazil
   - The Football World Cup is organized by FIFA (Federation of International Football Association)
   - The World Cup is called 'Jules Rimet Cup' named after the name of FIFA president from 1921–1953
   - In 1942 and 1946, the World Cup Soccer was not played.

SAF (South Asian Federation) Games

The SAF games, as a part of SAARC programme, was first held in 1984 at Kathmandu, Nepal. The seven participating countries are India, Pakistan, Sri Lanka, Bangladesh, Nepal, Bhutan and Maldives. The motto of SAF games is 'Peace, Prosperity and Progress'. The games in year 1986 edition was not staged as it was a year of Commonwealth and Asian Games.

Table 11.10 SAF Games–Where and When

Year	Games	Venue	Ranking (Ist/IInd/IIIrd)
1984	I	Kathmandu, Nepal	India/Sri Lanka/Pakistan
1985	II	Dhaka, Bangladesh	India/Pakistan/Bangladesh
1987	III	Calcutta, India	India/Pakistan/Sri Lanka
1989	IV	Islamabad, Pakistan	India/Pakistan/Sri Lanka
1991	V	Colombo, Sri Lanka	India/Sri Lanka/Pakistan
1993	VI	Dhaka, Bangladesh	India/Pakistan/Sri Lanka
1995	VII	Chennai, India	India/Sri Lanka/Pakistan
1999	VIII	Kathmandu, Nepal	India/Nepal/Sri Lanka
2004	IX	Islamabad, Pakistan	India/Pakistan/Sri Lanka
2006	X	Colombo, Sri Lanka	India/Pakistan/Sri Lanka
2010	XI	Dhaka, Bangladesh	Event scheduled to take place in November 2009 took place in January 2010 (India/Pakistan/Bangladesh)
2016	XII	Guwahati, Shillong (India)	(India/Sri Lanka/Pakistan)
2018	XIII	Kathmandu (Nepal)	Scheduled

Important Trophies and Cups

Table 11.11 International

Name	Associated Sport
American Cup	Yacht Racing
Ashes	Cricket (Australia-England)
Canada Cup	Golf (World Championship)
Colombo Cup	Football (India, Pakistan, Sri Lanka and Myanmar)
Corbillion Cup	World Table Tennis (women)
Davis Cup	Tennis
Derby	Horse Racing
Holker	Bridge
Jules Rimet Trophy	World Football (soccer)
Merdeka	Football (Asian Cup)
Ryder Cup	Golf
Reliance Cup	Cricket
Swaythling Cup	World Table Tennis (men)
Todd Memorial Trophy	Basketball
Thomas Cup	World Badminton (men)
Tunku Abdul Rahman Cup	Asian Badminton
U. Thant Cup	Lawn Tennis

Name	Associated Sport
Uber Cup	World Badminton (women)
Yonex Cup	Badminton
Walker Cup	Golf
William Cup	Basketball
Wimbledon Trophy	Tennis
World Cup	Cricket (Prudential/Reliance Cup)

Table 11.12 National

Name	Associated Sport
Aga Khan Cup	Hockey
Barna-Bellack Cup	Table Tennis (men)
Beighton Cup	Hockey
Ezar Cup	Polo
Dhyan Chand Tropny	Hockey
Dr B. C. Roy Trophy	Football (National junior)
Duleep Trophy	Cricket
Durand Cup	Football
Guru Nanak Championship	Hockey (all India women)
Irani Cup	Cricket
Lady Ratan Tata Trophy	Hockey (women)
Maharaja Ranjit Singh Gold Cup	Hockey
Murugappa Gold Cup	Hockey
Nehru Trophy	Hockey
Nizam Gold Cup	Football
Rangaswami Cup	Hockey (National championship)
Ranji Trophy	Cricket (National championship)
Rovers Cup	Football
Sanjay Gold Cup	Football
Santosh Trophy	Football
Sheesh Mahal Trophy	Cricket
Subroto Mukherjee Cup	Football
Todd Memorial Trophy	Football
Vittal Trophy	Football
Vizzy Trophy	Cricket
Yadavindra Cup	Hockey

Table 11.13 Special Names of Playgrounds

Sport	Name of Playing Area	Sport	Name of Playing Area
Badminton	Court	Golf	Link, Green**
Baseball	Diamond	Lawn Tennis	Court
Boxing	Ring	Skating	Rink
Cricket	Pitch*	Wrestling	Ring, Arena

*Pitch in fact is the space between the wickets and not the entire cricket field.

**It is the area around the hole only.

Table II. 14   Important National Sports

Country	National Sport
Australia	Tennis and Cricket
Canada	Lacrosse
China	Table Tennis (Ping Pong)
England	Cricket, Football
India	Hockey, Kabaddi
Japan	Judo, Sumo
Malaysia	Badminton
Scotland	Rugby, Football
Spain	Bull Fighting
US	Baseball

Table II.15   Sports Stadiums of India

Name	Location
Netaji Indoor Stadium	Kolkata
Wankhede Stadium	Mumbai
Nehru (Chepauk) Stadium	Chennai
National Stadium	New Delhi
Vallabhbhai Patel Stadium	Ahmedabad
Keenan Stadium	Jamshedpur
Brabourne Stadium	Mumbai
Yadvindra Stadium	Patiala
Ranjit Stadium	Kolkata
Barabati Stadium	Cuttack
Eden Gardens	Kolkata
Green Park Stadium	Kanpur
Sawai Mansingh Stadium	Jaipur
Shivaji Stadium	New Delhi
Jawaharlal Nehru Stadium	New Delhi
Yuva Bharati Stadium* (Salt Lake Stadium)	Kolkata
Indira Gandhi Indoor Stadium	New Delhi

*It is India's largest stadium and can accommodate 1,20,000 people; it is spread over an area of 30.75 hectares. It is also one of the largest stadiums in the world.

TERMS ASSOCIATED WITH SPORTS

Table II.16

Sport	Associated terms
Badminton	drop, deuce, smash, double touch, clash service, love, service line
Base Ball	bunting, home, pitcher, put out, strike
Basketball	block, dribble, held ball, pivot, basket
Billiards	cue, cannon, baulk, pot scratch, long jenny, short jenny, frame, spider, short and long rest, in-off

(*Continued*)

Sport	Associated terms
Boxing	rounds, knock-outs, countdown, flyweight, featherweight, middleweight, light heavy-weight, welterweight, lightweight, super heavy-weight, jab, uppercut, hook, punch
Bridge	contract bridge, duplicate bridge, tricks, suite, rubber, trump, grand slam, little slam
Chess	gambit, stalemate, move, resign, checkmate, king, queen, rook, bishop, knight, pawn, double check, Sicilian Defence, Caro Kann Defence
Cricket	innings, runs, wickets, overs, hat-trick, maiden, follow-on, declare, bowled, caught, run-out, leg-before wicket (LBW), stumped, boundary, six, four, single, batsman, bowler, wicket-keeper, non-striker, slips, gully, forward short-leg, silly mid-on, mid-on, point, cover, mid-off, long off, mid-wicket, short-leg, long-leg, fine-leg, yorker, bouncer, beamer, googly, full toss, drive, cut, pull, hook, flick
Football	kick off, goal, corner-kick, free-kick, throw-in, penalty, offside, red card, yellow card, foul, hat trick, dribble, pass, forward, defender, half, goalkeeper, tie-breaker, trapping, heading
Golf	course, links, tee, hole, caddie, threesome, four-some, niblic, club, putt, iron, birdie, eagle
Hockey	centre, defender, forward, half, penalty-stroke, penalty corner, push-in, free-hit, striking circle goal, goal-line, touch-line, goal keeper, off-side, foul, stick, carry, dribble, tiebreaker, trapping
Horse Racing	race course, steeplechase, bets, bookies, jockey, punter
Polo	mallet, bunker, chukker, handicap, goal, sixty yarder
Shooting	bag, bullseye, marksmanship, plug, skeet
Table Tennis	smash, drop, deuce, spin, let, service
Tennis	smash, cross-court, passing shot, backhand, forehand, slice, top-spin, serve, dropshot, lob, down-the-line, deuce, tie-breaker, set, game, grand slam, ace, volley
Volleyball	blocking, doubling, heave, smash, point, serve, volley

ALL PURPOSE GLOSSARY

Abdication   The relinquishing of the throne by a reigning sovereign. It may be voluntary, or demanded by the legislature if the constitution has been contravened.

Ad hoc   For a special purpose, e.g., ad hoc committee which is constituted for a special purpose or an ad hoc grant which is financial assistance for a special purpose.

Absolute majority   The section of any group which constitutes more than 50% of the total group membership.

Adult franchise   Franchise refers to the right or privilege of voting. Adult franchise is a voting right of an adult without distinction of gender, caste, colour or religion.

Ad valorem duty   Tax on commodities is calculated in two ways—either according to quantity or according to value. Ad valorem duty refers to tax or duty imposed on a commodity according to, or in proportion of, its value.

Affidavit   A declaration or statement in writing made under oath before a public notary or any other authorized officer.

Affranchise   To free from servitude, liberate from obligation or liabilities.

Alma mater   Alma mater literally means 'benign mother', used by alumni when referring to their university.

Amalgamation   Amalgamation means blending or merging. In commercial parlance it is used when two firms or companies unite into a single business entity, e.g., recent amalgamation of Brooke Bond Company with Lipton India Ltd.

Amortization   Provision for the payment of debt by means of a sinking fund. The sinking fund is a sum set aside from the revenue of a company or a country for the purpose.

Anarchism   Belief which holds that it is possible and desirable to abolish all organized government and that mankind can live socially through voluntary cooperation, without government and law and order agencies.

Annuity   Annuity is a fixed payment (generally of a uniform amount) by an insurance company to a client, falling due in each year during a given term, the capital sum not being returnable. To buy annuity, the client can either pay a lump sum amount or pay periodic premiums over a number of years.

Apartheid   Policy of the erstwhile South African government of segregating people classified as whites from blacks, people of Asian origin and coloureds (people of mixed race) and depriving the blacks of their rights. This policy has now been abolished as a result of multi-racial elections held in April 1994.

Arbitration   Referring of a dispute to an impartial person or a body of persons for settlement with agreement by all parties to accept the decision made by the arbitrator.

Armistice   Temporary cessation or suspension of hostilities by mutual consent in order to start a peace negotiation.

Armistice Day   11 November 1918, the day fighting ended in the First World War—and observed since then as an anniversary—the Remembrance Sunday.

Asylum   Asylum refers to a place for refuge or protection. For example, the Tibetan spiritual leader, Dalai Lama, took asylum in India. Alternatively, it could also be used to refer to an institution for the mentally ill.

Autonomy   Refers to power or the right of self-government, especially partial self-government; based on the doctrine that the human will carry its guiding principles within itself. As an autonomous state, it implies a self-governed or independent state guided by its own principles.

Balance of payments   Figures showing the balance between a nation's earning from abroad and its spending abroad. The term refers to a complete and comprehensive account of a country's entire commercial transactions with rest of the world. If the value of imports exceed that of exports, a deficit balance results; if exports are worth more than imports, there is a surplus balance. BoP is the most important factor in determining the exchange rate of a country's currency.

Balance of trade   It refers to the difference of the visible exports and imports of two countries in trade with each other. If exports are more, it is called 'favourable balance of trade' and if the imports are more than exports, it is called 'unfavourable balance of trade'.

Bank Rate   Bank rate is the rate of interest charged by the Reserve Bank of India for lending money to other commercial banks.

Barter   Barter means to traffic or trade by exchange of commodities. Before introduction of currency system, people used to trade by exchanging commodities. This has now re-emerged in the form of counter-trade.

Bear   Speculator on the stock market (shares) who believes that the prices of certain shares that he owns will soon fall. He sells them in the hope of buying them back cheap when their prices have fallen further.

Bicameral   Legislature functioning with two chambers (Houses)—lower and upper houses, e.g., the Lok Sabha and the Rajya Sabha or Legislative Assembly and Legislative Council.

Bilateral   Bilateral means involving two parties, e.g., the Kashmir dispute is to be settled between India and Pakistan through bilateral negotiations/agreement. When more than two parties are involved, it is called *multilateral*. For example, the recently concluded General Agreement on Tarrifs and Trade (GATT) is based on multilateral trade negotiations.

Bill of exchange   An unconditional order in writing addressed by one person (drawer) to another person (drawee) requesting the person to whom it is addressed to pay on demand after a fixed or a determinable time, a definite sum of money to the account of a third person called 'payee'.

Black economy   It refers to an economic activity which is officially non-existent but involves circulation of black money and as such, does not attract revenue taxes. As a result of black economy, loss of public revenue takes place.

Black market   Unofficial and usually illegal system of providing people with more than their share of goods and services, where these are rationed or their prices are controlled. It generally takes form of profiteering (usually illegal) by hoarding a commodity to create artificial scarcity and then selling it at higher prices without proper accounting to evade taxes.

Black money   Income not reported for tax purposes. It is unaccounted money accumulated by concealing income and evading taxes. It is generated by black marketing or by bribes.

Blue chip   The term applies to the most reliable industrial shares of reputed companies which have a stable growth and least risk involved in investment in such companies by the public.

Book value   Refers to the cash value of the assets of the company calculated at the value at which they were acquired minus the liabilities payable to those having a prior claim. Also refers to the cash value of machinery or capital goods after deducting depreciation.

Boom   Stage in the trade cycle when production, employment and spending are all high.

Bounce   A colloquial term applied to a dishonoured cheque when the bank refuses to pay to the payee or drawer because of insufficient funds in the drawer's account.

Brain drain   Refers to continuing loss of citizens of 'high intelligence' and creativity through emigration, especially when the best talent of a country is attracted to another country because of better monetary benefits and working conditions.

Broker   Term generally used for a person or a firm acting as the link between the buyer and the seller in the market calling for specialised knowledge.

Buffer stock   The stock built-up of some commodity to meet requirements in emergencies, i.e., when scarcity occurs.

Bull   Speculator on the stock market who believes that the prices of certain securities/shares will soon rise. He buys them in the hope of selling them at a profit when the prices have risen. This term has been widely used for Harshad Mehta, the prime accused in the securities scam.

Bureaucracy   A system of government by officials responsible only to their departmental chief or an administrative policy-making group of civil servants which leads to an unwieldy and laborious process and produces red tape (unnecessary delay of processing).

Buyers' market   A market where goods and services are available in plenty and their supply exceeds demand. In a buyer's market a buyer can get things at the price he chooses to pay.

By-election   The election to a seat rendered vacant during the running term of an elected person. This might occur on resignation, death, or any other subsequent disqualification of the member originally elected.

Capital   Refers to that part of wealth other than land which is used for production. In common parlance, the term is generally used for money that is saved. 'Working Capital' is the term often applied to money not invested in building or plant and machinery, but in stocks, work-in-progress and generally in the everyday conduct of a business.

Capital gain   Profit made when an asset is sold for more than the price at which it was bought. When an asset fetches less money than that spent on acquisition, it is termed as capital loss.

Capitalism   A system of government under which private entrepreneurs have complete control over ownership of land and natural resources, as well as means of production and distribution of goods for their own profits, competition being the only limiting factor.

Cartels   A combination of firms or manufacturers to control output, investment, marketing and prices. It is a sort of monopoly under which the firms having common interest combine together with the aim of maximising their profit, but at the same time retaining their individual identity.

Coalition   Temporary combination of different political groups for a specific purpose. The term now usually refers to a combination of political parties—none of which has an absolute majority in the legislature—which put aside their political differences to form a government with a programme acceptable to all of them.

Cold war   Sometimes two countries or power blocs suspect each other. They do not fight openly against each other but do every thing to strengthen themselves and weaken the opponent. The term was used to describe the relations prevailing between the US and the former USSR.

Colonial rule   When an independent country rules over a territory or an area of land which is not its integral part and the people of the territory are subjected to the rule of that independent country, it is referred to as colonial rule. For example, before independence, India was under the British rule.

Communism   Communism means collective ownership of property or means of production. It is a theory or condition according to which private property should be

abolished and all thing should be held in common. The system of communism believes in a classless society in which there will be no private property and people will share all resources collectively, according to their needs.

Collateral Security for a loan usually taken from a bank. If the borrower fails to repay, the lender is empowered to dispose off the collateral securities—which might be the deeds of a house, stocks or shares with sufficiently high surrender value—in order to recoup the money.

Conglomerate Conglomerate literally means gathered into a mass. It refers to a company which has acquired interest in different industries by taking over or merging with other companies.

Convertibility A currency is convertible when it can be exchanged for another foreign currency, or for gold, without restrictions imposed by the issuing authority, the central bank of the country.

Corporate tax Tax levied on the profits of limited companies.

Core sector According to the changes made in the industrial licensing policy in 1970, industries were categorized into three sectors: core, joint and middle sectors. Important industries like ship building, tractors and heavy machinery were put under the core sector.

Cost of living index It is a statistical device used to register changes of levels in prices of essential commodities needed for normal living. To arrive at a figure showing the prevailing cost of living, the data is compared with a 'base year' taken as 100. The 'base year' is a particular period selected for comparison.

Coup d'etat Coup means a blow or a stroke. The term is used to describe a sudden fall of a government brought about by illegal forces.

Credit Squeeze Restriction on the availability of credit from banks imposed during periods of inflation to reduce the demand for goods and services. This is done by raising interest rates and placing other controls on bank lending.

Current account Bank account from which withdrawals are allowed without any restriction on frequency or amount so long as there is a credit balance. Even overdrafts are allowed when a limit has been fixed by a bank on the amount that can be overdrawn.

Customs duty The tax imposed on import or export of goods.

Debenture A written acknowledgement of debt issued as security by a company on its property. It is issued in the form of a bond by a company undertaking to repay the amount raised from the debenture holder with specified interest after a specified period. Debenture holders are only creditors and not shareholders and have the first right on the company's assets in the case of winding up.

Deficit financing Deficit means deficiency of revenue compared to the expenditure. Deficit financing is a process in which money is created (either by printing currency or from borrowings or utilization of reservers) without productive resources being augmented to bridge the gap between revenue and expenditure. If there is no adequate increase in productivity it results in inflation and adversely affects the real wages. The system is based on John Maynard Keynes theory which states 'that full employment might require the government to spend more in order to stimulate demand' (called 'pump priming').

Deflation A financing condition in which there is an undue decrease in the amount of money available relative to its buying power to reduce the level of demand and supply. The decrease in money circulation results in low prices and unemployment. It is implemented by credit squeeze and higher taxation.

Democracy   A form of government in which the supreme power is vested in the people collectively and is administered by them or by officers appointed by them. According to Abraham Lincoln, democracy means 'Government of the people, by the people and for the people'.

Demonetization   Means to divest value of money. When lots of unaccounted money (black money) circulates and threatens to wreck the economy, government sometimes withdraws currency notes of particular denomination (usually a higher denomination) to unearth black money.

Depreciation   Fall in the value of an asset. In accounting, this is a percentage reduced from the value of plant and machinery for wear and tear every year. In economics, it means a fall in money value indicating an inflationary trend and high prices. It also refers to a fall in the value of a currency in terms of other foreign currencies.

Depression   The term is used to describe a period of persistent high unemployment, stable or falling prices, very low investment and stagnation of business activity.

Devaluation   Deliberate reduction in the value of home currency in relation to foreign currency to reduce imports and promote exports. It is the reduction of the official rate at which one currency is exchanged for that of other nations. Devaluation makes foreign currency and goods more expensive and domestically produced goods cheaper abroad. Devaluation results in an improved trade balance only if the demand for exports as well as imports is relatively elastic.

Developing countries   Term used collectively for those countries in Africa, Asia and Latin America which are undergoing the complex process of modernization.

Differential rate of interest   The concessional rate of interest which is lower than the normal bank rate of interest. In 1972, government introduced the Differential Rate of Interest scheme (DRI) under which bank credit is provided to weaker sections of the society at a concessional rate of interest of 4% per annum.

Diminishing returns   It is a law of economics which states that beyond a certain point, increasing input of labour and capital does not increase the output in the same proportion but at progressively diminishing rates.

Dividend   Share of profit payable to the shareholders in a joint stock company. The company allots a certain portion of its profit to its shareholders at a uniform percentage, based on the number of shares held by the shareholder.

Dumping   Selling of goods abroad at a price well below the production cost at home. By this process, the supply of a manufacturer's product remains low in domestic market which fetches him better price. Dumping is prohibited by GATT regulations.

Ecological balance   The term refers to the balance of natural elements essential for survival of life, like oxygen, water, etc., maintained in nature by the interaction of living organisms and inanimate matter. Industrialized countries are charged with disturbing the ecological balance through excessive generation of effluents (like carbon dioxide).

Economic goods   All commodities which are limited in quantity compared to their demand are called *economic goods*. These are both man-made or natural, such as land. Land is a free gift of nature but one has to pay a price for its purchase or use.

Economic sanctions   Sanctions mean a penalty or reward expressly attached to non-observance or observance of a law or treaty. Economic sanctions is a measure taken by a

country or a group of countries collectively, in order to persuade another country to follow a certain course of action. These are effected through import and export control, shipping control, blacklisting, preclusive purchases, etc.

Elasticity of demand   Measurement of the extent to which the quantity demanded of goods or services varies when another factor, normally price, is altered. The change in demand is not always proportionate to the change in price. A small change in price may lead to a considerable change in demand.

Embargo   Embargo literally means a prohibition or ban on something. The government may place an embargo on particular goods, or on the goods from a particular nation.

Equity capital   Equity capital or equity value of a company to its shareholders is the value of the assets, after all liabilities, other than those to holders of ordinary shares, have been paid. In other words, it is the ordinary share value.

Equity shares   These are ordinary shares, the holders of which take the maximum risk with no guarantee of dividend but also earn maximum returns when there is profit in a company. Equity shares are different from debentures and preference shares which have first or second claim, respectively, on company's assets.

Estate duty   It is a tax payable by the inheritor on a property over a specified value when the real owner dies.

Exchange rate   The rate at which one currency can be exchanged for another foreign currency.

Excise duty   It is a tax levied on certain commodities produced and consumed in the country and on licences for certain trades.

Extradition   Demand made by a country for the return of political and criminal characters living in a foreign land.

Federal state   A system of state government, in which several states while remaining independent in home affairs, combine themselves for national or general purposes, or common interests in respect of matters like defence, customs, etc.

Fifth column   Refers to traitors or people who secretly indulge in anti-national or anti-government activities and help the enemy.

Floating currency   The exchange rate of one currency in terms of another is subject to the forces of supply and demand, unless monetary authorities intervene to influence those forces. If there is no such intervention, the exchange rate is said to float, or find its own level. If there is then an increase in demand for the currency, the rate rises and if there is a decrease in demand it falls.

Floor crossing   Also called 'defection', the term which is used when a member of the legislature leaves his party on whose ticket he was elected to join the ruling party or the opposition.

Fourth estate   The term used for the daily press or newspapers, because of their power to change public opinion for or against the existing government.

Forward market   The term is referred to a market where buying or selling of a commodity is guaranteed at a given price at some future date.

Forward exchange   In the forward exchange market, an importer can secure supplies of foreign currency at a current rate of exchange, ahead of the time when he actually needs it to pay for imports.

Fourth world The term refers to economically weak countries which have further slipped down economically and are experiencing difficulty in repaying foreign debts invariably due to energy crisis. This resulted following the abnormal increases in oil prices by the Organization of Petroleum Exporting Countries (OPEC).

Fixed costs The component of cost of production of a commodity which does not change with the change in volume of its production, such as rent of factory premises, managerial costs, etc. However, over the long term, all costs are variable.

Free ports The ports which are exempted from payment of customs duty on articles of commerce, primarily to encourage tourism.

Free market The market where the price of a commodity is determined by free play of the forces of supply and demand.

Free trade A condition of international market where the nations do not impose customs duty or other taxes on imports of goods.

Fundamental rights The basic rights of a citizen in a civilized country. In our country, these are listed in the Constitution.

Genocide Refers to deliberate killing or extermination of a race or a group of people by another race or group.

GATT General Agreement on Tariffs and Trade (GATT) is an international agreement reached in 1948 between non-communist nations with the object of encouraging international trade unobstructed by tariff barriers or import quotas. It seeks to achieve its aim by arranging and encouraging bargaining with trade concessions between members.

Green revolution The term applied to the introduction of new, more productive agricultural techniques in the developing countries. The process concentrated mainly on the development of new strains of seeds and new fertiliser to obtain greater yield. As a result of the green revolution, the output of wheat and rice has almost doubled in India.

Gresham's law The principle that 'bad money drives out good'—i.e., drives it out of circulation. If two coins have same face value but contain different amount of precious metal, consumers will spend the inferior coins, hoarding the more valuable coins for speculation, or for melting them down.

Gross National Product (GNP) Total value of the goods and services produced within a country during a year, plus the net income from the country's investment abroad. This is the figure arrived at after deduction of the income derived by foreigners from their investment in the host country. The figures show trends in savings, investments and consumption between public sector and private sector, enabling policy decisions to be made accordingly.

Gross Domestic Product (GDP) The total value of all goods and services produced in a nation's economy during one year, not including the income from the investment made abroad by the nation's citizens and businesses.

Guerilla war Guerilla is a Spanish word meaning 'small war'. It is an irregular war waged by an independent group. When independent small forces strike against superior forces from the rear, or from the flanks and quickly disappear, it is referred to as guerilla warfare. Shivaji utilized this method of warfare against the Mughal forces.

Habeas Corpus Act The Act provides that no one is to be imprisoned without a writ or a warrant stating charges. Under this Act a writ is made for direction of the Supreme Court

or a high court to a person who is detaining another, asking him to bring the person in his custody at a specified time to a specified place for a specified purpose. Its aim is to liberate the confined person detained without legal jurisdiction.

Hard currency   A currency which consistently retains high value in relation to other currencies and is consequently in demand and difficult to get, such as US dollars in India. Such currencies normally belong to countries with strong economies and balance of payment surpluses. Hard currencies make up a large proportion of the foreign exchange reserves of countries.

Hot money   Term used to describe money that flows into a country to take advantage of high rates of interest there.

Household sector   The sector which contributes factor services to the production sector and in turn, gets the factors payments in the form of interest, rent, wages and profit. The income generated by the household sector is spent on the goods and services produced by the production sector. Thus, it is both a supplier of factor services and a consumer of goods and services.

Hyperinflation   Term used to describe a very rapid rate of inflation, also called 'galloping inflation'.

Impeachment   Procedure by which the legislature prosecutes and judges a person, usually a high officer of State (such as the President or Chief Justice) for alleged offences that would otherwise be beyond the reach of the normal process of law.

Indirect taxation   Taxes that are not paid directly to the government but through intermediaries such as producers or retailers. They are not levied on income or wealth, but on expenditure. For example, Value Added Tax (VAT) and Excise Duty and various taxes added to the prices of consumer goods. Here impact and incidence is at different points.

Inflation   General and continuing rise in prices or fall in the value of money, leading to rising wages and loss of savings. This is due to an undue increase in the quantity of money available.

Injunction   Judicial restraint or order to prevent a wrongful act.

Inventory control   It refers to the control exercized by a manufacturing concern over the maintenance of adequate stocks of raw materials and finished goods. As stocks involve blocking of working capital, it is better to have as little inventory as possible and to achieve this, various controls are exercised by the firms.

Laissez-faire   French term meaning 'leave alone'. The leading advocate of laissez-faire was the English economist, Adam Smith, who held that if the state allowed the economic forces a free play, the 'invisible hand' of supply and demand would guide individual economic behaviour towards the collective interests of all.

Letter of Credit (L/C)   Guarantee to an exporter that the importer of his goods will pay immediately for the goods ordered by him. A letter of credit takes the form of an authorization of payment sent by the importer's bank to the exporter's bank and is cashed like a cheque.

Liquid asset   It refers to a type of asset which is either in cash or in the form of a deposit in the current account of the commercial bank.

Mandamus   An order of the Supreme Court or a High Court commanding a person or a body of persons to do that which is his or its duty to do. This is issued to secure the right to the aggrieved party.

Mandate   Command from a superior officer or a judge to a subordinate; right given to a person to act in the name of another.

Manifesto   A written public declaration of the intentions, notions or motives of a sovereign, or of a leader or a political party.

Mid-term poll   Elections held due to the dissolution of legislature before the end of its term.

Mixed economy   Economies which have some of the characteristics of both free-enterprise, capitalist economies (private sector) and of state controlled, centralized economies (public sector). There is a co-existence of market and state control as well as direct participation of the government in economic activity. To a large extent, most of the real world economies are mixed.

MODVAT   Modified Value Added Tax, a term used in excise. It is a new scheme of indirect taxes, which allows a manufacturer to claim instant reimbursement of the excise duty paid on the raw materials used for production of the final goods. It helps avoid repeated payment of tax on some commodities and thus reduces the total burden of taxation on the final product.

Monarchy   Rule of a sole hereditary head of state, or a king, whose authority is not circumscribed or inhibited in any way.

National debt   Borrowings by a country from foreign countries to meet the expenditure when domestic resources fall short.

Nationalization   The term refers to the acquiring of privately owned service or industry by the government. For example, nationalization of commercial banks which were previously private banks.

National income   The value of all goods and services in monetary terms produced by a nation during any one year. A country's national income is calculated by adding together all incomes received in return for goods and services. Wages, rent and interest are included, as also the investment income from abroad. Depreciation and payment made to foreigners is deducted. In other words, the national income is the income generated through production in a country (i.e., domestic income) plus net income from abroad.

Naxalites   The term originated from Naxalbari in West Bengal in 1967, when radical communists attempted a revolt. Naxalites are radical communists (now belonging to CPIM) who advocate the preaching of Mao Tse-Tung to create revolt by exploiting feelings of discontent among peasants and tribes. The government banned the organization in 1975.

Nazism   Nazi party was a political party led by Adolf Hitler in Germany in the 1930s. The word Nazi is an abbreviated form of national socialism.

Negotiable instrument   The term is applied to the promissory note or the bill of exchange payable either on demand or on the expiry of a specified period mentioned on it.

Net National Product (NNP)   The gross national product minus allowance for depreciation of capital goods used in production.

Net National Product at Factor Cost It is the sum total of factor incomes generated by the factors of production during one year, which include wages, interest, rent and profits as well as mixed income of the self-employed.

Octroi It is a tax levied by a municipal committee or a local body on the goods brought in within the municipal limits of a town.

Oligopoly It is a form of market in which there are few sellers of a commodity who control its pricing and marketing. It is different from monopoly in which only one seller operates. In oligopoly, the sellers being small in number are dependent on each other for pricing and marketing because each seller is affected by the other. The cola market in India is one such example.

Ordinary shares A security giving its holders part-ownership of a company and a share of profits generated by company's operations after the debenture holders and preference shareholders have received their claims. Holders of the ordinary shares, therefore, take maximum risk because in a bad year, dividend is not guaranteed. But since each share carries one vote at the company's meetings and most shares are ordinary shares, their holders control the company.

Overdraft Amount agreed by a clearing bank and one of its clients by which the client's withdrawals from his current account are allowed to exceed the sum deposited. The bank charges interest on the amount overdrafted. The overdraft is repayable either by a specified date or on demand.

Overheads Costs of running a business, which cannot be attributed directly to any single unit of the firm's production such as rent and wages. Since these costs have to be met irrespective of the level of production output, they are also referred to as 'fixed costs'.

Per capita income (or expenditure) It is the average income or average expenditure per head of population which is arrived at by dividing the income or expenditure by the size of population.

Prime costs Expenses which can be attributed to any single unit of a particular product. These costs vary with the volume of output of production and are, therefore, direct costs. They include cost of inputs like raw materials and wages.

Poverty line Poverty line is drawn at the level of income at which a person or a family (usually consisting of five members) can barely subsist. It is based on the money value of minimum calorific intakes required.

Preference shares Shares with a fixed rate of dividend that entitle their holders to priority payment over those who hold ordinary shares of a company.

Privy purse Before independence, the Government of India granted certain privileges and annual payments to princes or rulers of various states. The rulers had agreed to surrender their states to the Indian Union in return for privy purses.

Promoter The person who starts a new business venture. It may also refer to a body corporate when it starts a new company or firm.

Recession Slowing down of economic activity over a limited period. During recession, unemployment will probably rise and demand and output may fall, leading to slump in trade. This usually results due to accumulation of unsold goods owing to a fall in demand.

Referendum A means of putting a controversial issue directly to the public for decision by popular vote. For example, the Russian Referendum of 1992 which approved the new democratic constitution.

Reserves   National reserve refers to the gold or foreign currencies held by a country's Central Bank (in our case Reserve Bank of India) to finance international trade and to pay-off balance of payment deficits. Most of the reserves are held in the form of the currencies of major trading countries.

In company accounting, it refers to capital reserve which is a sum of money set aside (out of profits) by a company for a particular purpose such as expansion of production capacity at a later date. It is not meant for distribution to the shareholders.

Repatriation   To restore or return people to their native land. The term is mostly used in the case of prisoners of war or refugees. For example, repatriation of Chakma refugees to Bangladesh, from where they had fled to take refugee in India.

Rights issue   The private offer of new shares to existing shareholders in a company in proportion to their existing shareholding. The shares are normally offered at a small discount, but have the advantage to the company of avoiding the heavy costs of a public offer on the stock market.

Seller's market   Opposite of the buyer's market, it is a market condition when goods and services are not freely available and thus the prices are relatively high. Such market conditions are favourable to the seller because if the shortage continues, he can increase prices and make a profit.

Sinking fund   The funds set aside periodically on which interest accrues, which is then used to discharge an obligation.

Snap poll   When a sudden election to a legislature is held before the expiry of its full term, it is called a *snap poll* or a *mid-term poll*.

Stock exchange   Place of trade where firms, individuals and institutions buy or sell stocks or shares.

Scrip issue   The issue of new shares of shareholders in a company in proportion to their existing shareholdings. Unlike a rights issue, a scrip issue is made free of charge to the shareholders. Its purpose is not to raise new capital or funds, but to convert the company's capital reserves into shares which belong to the shareholders but cannot be distributed to them as dividend.

Third world   The term is used for the developing countries. From the point of view of international economy, the world is grouped into three blocks, *viz*. (i) the industrialized western block led by US, UK, Germany, Japan, etc., is referred to as the first world, (ii) the communist block led (formerly) by the erstwhile USSR and east European countries was referred to as the second world and (iii) the developing countries, including India, are called the *Third World*.

Trade discount   The discount given by a manufacturer to a dealer or by a higher grade dealer to a lower grade dealer.

Turnover   Refers to the total amount of sales made by a firm in one year or the total amount of money changing hands in business.

Trade gap   Difference between the value of visible or tangible exports and visible imports. The term normally refers to a situation in which imports are greater than exports.

Value Added Tax (VAT)   Indirect tax levied at each stage of production and distribution, from the primary producer to the retailer. At each stage the tax is calculated on the selling price, but in declaring his liability to the government, the seller is allowed to deduct any tax paid by him when he bought the goods.

MISCELLANEOUS

Table 11.17 Presidents of India

Name	Tenure	
1. Dr Rajendra Prasad (1884–1963)	26 Jan. 1950 to 13 May 1962	First President; longest tenure
2. Dr Sarvepalli Radhakrishnan (1888–1975)	13 May 1962 to 13 May 1967	
3. Dr Zakir Hussain (1897–1969)	13 May 1967 to 3 May 1969	President with shortest tenure; first Muslim President of India and first to die in harness
4. Varahagiri Venkatagiri (1884–1980)	3 May 1969 to 20 July 1969	First to become Acting President
5. Justice Muhammad Hidayatullah (1905–1992)	20 July1969 to 24 Aug. 1969	
6. Varahagiri Venkatagiri (V. V. Giri, 1884–1980)	24 Aug. 1969 to 24 Aug. 1974	Only person to become President of India twice
7. Fakhruddin Ali Ahmed (1905–1977)	24 Aug. 1974 to 11 Feb. 1977	Died in harness
8. Basappa Danappa Jatti (1913–2002)	11 Feb. 1977 to 15 July 1977	Acting President
9. Neelam Sanjeeva Reddy (1913–1996)	25 July 1997 to 25 July 1982	Youngest to become President (64 yrs)
10. Giani Zail Singh (1916–1994)	25 July 1982 to 25 July 1987	First Sikh President of India
11. Ramaswamy Venkataraman (1910)	25 July 1987 to 25 July 1992	Oldest to become President (76 yrs)
12. Dr Shankar Dayal Sharma (1918–1999)	25 July 1992 to 25 July 1997	
13. Kocheril Raman Narayanan (1920–2005)	25 July 1997 to 25 July 2002	
14. Dr A. P. J. Kalam (1931)	25 July 2002 to 25 July 2007	
15. Pratibha Devi Patil (1934)	25 July 2007 to 25 July 2012	
16. Pranab Mukherjee (1935)	25 July 2007–till date	

Table 11.18 Vice-Presidents of India

Name	Tenure
1. Dr S. Radhakrishnan (1888–1975)	1952–1962
2. Dr Zakir Hussain (1897–1969)	1962–1967
3. Varahagiri Venkata Giri (1884–1980)	1967–1969
4. Gopal Swaroop Pathak (1896–1982)	1969–1974
5. B. D. Jatti (1913–2002)	1974–1979
6. Justice M. Hidayatullah (1905–1992)	1979–1984
7. R. Venkataraman (1910–2009)	1984–1987
8. Dr Shankar Dayal Sharma (1918–1999)	1987–1992

9.	K. R. Narayanan (1920–2005)	1992–1997
10.	Krishan Kant (1927–2002)	1997–2002
11.	Bhairon Singh Shekhawat (1923–2010)	2002–2007
12.	Mohammad Hamid Ansari (b. 1937)	2007–till date

Table 11.19 Prime Ministers of India

Name	Tenure	
1. Pt Jawaharlal Nehru (1889–1964)	15 Aug. 1947 to 27 May 1964	First Prime Minister; also the longest tenure (17 years)
2. Gulzari Lal Nanda (1898–1997)	27 May 1964 to 9 June 1964	First Acting Prime Minister
3. Lal Bahadur Shastri (1904–1966)	9 June 1964 to 11 Jan. 1966	First Prime Minister to die abroad during an official visit
4. Gulzari Lal Nanda (1898–1997)	11 Jan. 1966 to 24 Jan. 1966	First to become Acting Prime Minister twice
5. Indira Gandhi (1917–1984)	24 Jan. 1966 to 24 March 1977	First lady Prime Minister; First to lose elections
6. Morarji Desai (1869–1995)	24 March 1977 to 28 June 1979	Oldest to become Prime Minister and the first to resign from office
7. Charan Singh (1902–1987)	28 July 1979 to 14 Jan 1980	The only Prime Minister who did not face the Parliament
8. Indira Gandhi (1917–1984)	14 Jan. 1980 to 31 Oct. 1984	First Prime Minister to be assassinated
9. Rajiv Gandhi (1944–1991)	31 Oct. 1984 to Nov. 1989	Youngest to become Prime Minister (40 years)
10. V. P. Singh (b. 1931)	Dec. 1989 to 7 Nov. 1990	First Prime Minister to step down after vote of no-confidence
11. Chandra Shekhar (b. 1927)	10 Nov. 1990 to June 1992	
12. P. V. Narasimha Rao (b. 1921)	20 June 1992 to 16 May 1996	First Prime Minister from South India
13. A. B. Vajpayee (b. 1926)	16 May 1996 to to 1 June 1996	Shortest tenure–13 days
14. H. D. Deve Gowda (b. 1933)	1 June 1996 to 21 April 1997	Leader of United Front Parliamentary Group
15. Inder Kumar Gujral (b. 1933)	21 April 1999 to 18 March 1998	
16. A. B. Vajpayee (b. 1926)	19 March 1998 to 13 Oct. 1999	
17. A. B. Vajpayee (b. 1926)	13 Oct. 1999 to 22 May 2004	Only one to become PM of India thrice
18. Dr Manmohan Singh (b. 1932)	22 May 2004 to 18 May 2009	First Non-Hindu Prime Minister of India
19. Dr Manmohan Singh (b. 1932)	22 May 2009 to 26 May 2014	Second term as Prime Minister of India
20. Narendra Damodardas Modi (b. 1950)	26 May 2014–till date	

Table 11.20 Speakers of the Lok Sabha

Name	Tenure
G. V. Mavalankar	1952–1956
M. Ananthasayanam Ayyangar	1956–1962
Sardar Hukam Singh	1962–1967
Neelam Sanjeeva Reddy	1967–1969
Gurdayal Singh Dhillon	1969–1975
Bali Ram Bhagat	1976–1977
Neelam Sanjeeva Reddy	1977 (March–July)
K. S. Hegde	1977–1979
Balram Jakhar	1980–1989
Rabi Ray	1989–1991
Shivraj Patil	1991–1996
P. A. Sangma	1996–1998 (March)
G. M. C. Balayogi	24 March 1998–2002
Manohar Joshi	10 May 2002–2004
Somnath Chatterjee	2 June 2004–2009
Meira Kumar	30 May 2009–2014
Sumitra Mahajan	6 June 2014–present

Table 11.21 Chief Justices of India

Name	Tenure
H. J. Kania	August 1947—November 1951
M. Patanjali Sastri	November 1951—January 1954
Mehar Chand Mahajan	January 1954—December 1954
B. K. Mukherjee	December 1954—January 1956
S. R. Das	February 1956—September 1959
B. P. Sinha	October 1959—January 1964
P. B. Gajendragadkar	February 1964—March 1966
A. K. Sarkar	March 1966—June 1966
K. Subba Rao	June 1966—April 1967
K. N. Wanchoo	April 1967—February 1968
M. Hidayatullah	February 1968—December 1970
J. C. Shah	December 1970—January 1971
S. M. Sikri	January 1971—April 1973
A. N. Ray	April 1973—January 1977
M. H. Beg	January 1977—February 1978
Y. V. Chandrachud	February 1978—July 1985
P. N. Bhagwati	July 1985—December 1986
R. S. Pathak	December 1986—June 1989
E. S. Venkataramiah	June 1989—December 1989
Sabyasachi Mukherjee	December 1989—September 1990
Ranganath Mishra	September 1990—November 1991
K. N. Singh	November 1991—December 1991
M. H. Kania	December 1991—November 1992
I. M. Sharma	November 1992—February 1993
M. N. Venkatachaliah	February 1993—October 1994
Aziz Mushabbar Ahmadi	October 1994—March 1997

(Continued)

Name	Tenure
J. S. Verma	March 1997—January 1998
M. M. Punchi	January 1998—October 1998
A. S. Anand	October 1998—November 2001
S. P. Bharucha	November 2001—May 2002
Bhupinder Nath Kirpal	May 2002—November 2002
G. B. Patnaik	November 2002—December 2002
V. N. Khare	December 2002—May 2004
S. Rajendra Babu	May 2004—June 2004
R. C. Lahoti	June 2004—31 October 2005
Y. K.Sabharwal	2 Nov 2005—14 January 2007
K. G. Balakrishnan	15 January 2007—11 May 2010
S. H. Kapadia	12 May 2010—28 September 2012
Altamas Kabir	29 September 2012—18 July 2013
P. Sathasivam	19 July 2013—26 April 2014
Rajendra Mal Lodha	April 2014—September 2014
H. L. Dattu	September 2014—December 2015
T.S.Thakur	December 2015—till date

Table 11.22 Chief Election Commissioners

Name	Tenure
Sukumar Sen	March 1950—December 1958
K. V. K. Sundaram	December 1958—September 1967
S. P. Sen Verma	October1967—September 1972
Dr Nagendra Singh	October 1972—February 1973
T. Swaminathan	February 1973—June 1977
S. L. Shakdhar	June 1977—June 1982
R. K. Trivedi	June 1982—December 1985
R. V. S. Peri Sastri	January 1986—November 1990
Smt V. S. Rama Devi	November 1990—December 1990
T. N. Seshan	December 1990—December 1996
M. S. Gill	December 1996—June 2001
J. M. Lyngdoh	June 2001—Febrary 2004
T. S. Krishnamurthy	February 2004—May 2005
B. B. Tandon	May 2005—June 2006
N. Gopalaswami	June 2006—April 2009
Navin Chawla	April 2009—July 2010
Sahabuddin Yaqoob Quraishi	July 2010—June 2012
V. S. Sampath	June 2012—January 2015
H.S. Brahma	January 2015—April 2015
Nasim Zaidi	April 2015—till date

Table 11.23 Commanders-in-Chief

Name	Tenure
Gen. Sir Roy Bucher	1 January 1948—14 January 1949
Gen. K. M. Cariappa	15 January 1949—14 January 1953
Gen Maharaj Rajendra Singhji	15 January 1953—31 March 1955

(*Continued*)

Table 11.24 Chiefs of Army Staff

Name	Tenure
Gen. Maharaj Rajendra Singhji	April 1955—May 1955
Gen. S. M. Srinagesh	May 1955—May 1957
Gen. K. S. Thimayya	May 1957—May 1961
Gen. P. N. Thapar	May 1961—November 1962
Gen. J. N. Chaudhuri	November 1962—June 1966
Gen P. K. Kumaramangalam	June 1966—June 1969
Gen. S. H. F. J. Manekshaw	June 1969—December 1972
Field Marshal S. H. F. J. Manekshaw	January 1972—January 1973
Gen. G. G. Bewoor	January 1973—May 1975
Gen. T. N. Raina	June 1975—May 1978
Gen. O. P. Malhotra	June 1978—May 1981
Gen. K. V. Krishna Rao	June 1981—July 1983
Gen. A. S. Vaidya	August 1983—January 1986
Gen. K. Sundarjee	February 1986—April 1988
Gen. V. N. Sharma	May 1988—June 1990
Gen. S. F. Rodrigues	July 1990—June 1993
Gen. B. C. Joshi	July 1993—November 1994
Gen. Shankar Roy Choudhury	November 1994—September 1997
Gen. V. P. Malik	October 1997—September 2000
Gen. S. Padmanashan	October 2000—December 2002
Gen. N. C. Vij	January 2003—January 2005
Gen. J. J. Singh	February 2005—September 2007
Gen. Deepak Kapoor	September 2007—March 2010
Gen. V. K. Singh	March 2010—May 2012
Gen. Bikram Singh	May 2012—August 2014
Gen. Dalbeer Singh Suhag	August 2014—till date

Note: Gen. (later, Field Marshal) K. M. Cariappa took over from the British C-in-C, Gen. Sir Roy Bucher on 15 January 1949 and held the office till 14 January 1953. The armed forces had only one more C-in-C, Gen. M. Rajendra Singh. In April 1955, when the post of C-in-C was abolished, Gen. Rajendra Singh became the first Chief of Army Staff. Gen. S. H. F. J. Manekshaw became the first Field Marshal in 1971.

Table 11.25 Chiefs of Naval Staff

Name	Tenure
Rear Admiral J. T. S. Hall	15 August 1947—August 1948
Admiral Sir Edward Parry	August 1948—October 1951
Admiral Sir Mark Pizey	October 1951—July 1955
Vice-Admiral Sir Stephen Carlill	July 1955—April 1958
Vice-Admiral R. D. Katari	April 1958—June 1962
Vice-Admiral B. S. Soman	June 1962—March 1966
Admiral A. K. Chatterjee	March 1966—February 1970
Admiral S. M. Nanda	February 1970—February 1973
Admiral S. N. Kohli	March 1973—February 1976
Admiral J. L. Cursetji	March 1976—February 1979
Admiral R. L. Pereira	March 1979—February 1982
Admiral O. S. Dawson	March 1982—November 1984

(*Continued*)

Name	Tenure
Admiral R. H. Tahiliani	December 1984—November 1987
Admiral J. G. Nadkarni	December 1987—November 1990
Admiral L. Ramdas	December 1990—September 1993
Admiral V. S. Shekhawat	October 1993—September 1996
Admiral Vishnu Bhagwat	October 1996—December 1998
Admiral Sushil Kumar	December 1998—December 2001
Admiral Madhvendra Singh	December 2001—July 2004
Admiral Arun Prakash	August 2004—October 2006
Admiral Sureesh Mehta	October 2006—August 2009
Admiral Nirmal Verma	August 2009—August 2012
Admiral Devendra Kumar Joshi	August 2012—April 2014
Admiral R. K. Dhowan	April 2014—May 2016
Admiral Sunil Lamba	May 2016—till date

Table 11.26 Chiefs of Air Staff

Name	Tenure
Air Marshal Sir Thomas Emhirst	15 August 1947—February 1950
Air Marshal Sir R. L. Chapman	February 1950—December 1951
Air Marshal Sir Gerald Gibbs	December 1951—March 1954
Air Marshal S. Mukherjee	April 1954—November 1960
Air Marshal A. M. Engineer	December 1960—July 1964
Air Chief Marshal Arjan Singh	August 1964—July 1969
Air Chief Marshal P. C. Lal	July 1969—January 1973
Air Chief Marshal O. P. Mehra	January 1973—January 1976
Air Chief Marshal H. Moolgaonkar	February 1976—August 1978
Air Chief Marshal I. H. Latif	September 1978—August 1981
Air Chief Marshal Dilbagh Singh	September 1981—September 1984
Air Chief Marshal L. K. Katre	September 1984—July 1985
Air Chief Marshal D. A. La Fontaine	July 1985—July 1988
Air Chief Marshal S. K. Mehra	August 1988—July 1991
Air Chief Marshal N. C. Suri	August 1991—July 1993
Air Chief Marshal S. K. Kaul	August 1993—December 1998
Air Chief Marshal Satish Kr. Sareen	January 1996—December 1998
Air Chief Marshal A. Y. Tipnis	January 1999—December 2001
Air Chief Marshal S. Krishnaswamy	December 2001—December 2004
Air Chief Marshal S. P. Tyagi	December 2004—March 2007
Air Chief Marshal Fali Homi Major	March 2007—May 2009
Air Chief Marshal Pradeep Vasant Naik	June 2009—July 2011
Air Chief Marshal NAK Browne	July 2011—December 2013
Air Chief Marshall Arup Raha	December 2013—till date

Table 11.27 World's Superlatives—Largest, Biggest, Highest, Smallest Structures

Structure	Name	Location
Largest Airport	King Khaled International Airport (223 km^2)	Riyadh, Saudi Arabia
Largest Airport (roofed)	King Abdul Aziz International Airport (103 km^2)	Jeddah, Saudi Arabia

(*Continued*)

Structure	Name	Location
Highest Airport	Lhasa Airport at 4363 m	Tibet, China
Busiest Airport	Hartsfield-Jackson Atlanta International Airport	Atlanta, USA
Lowest Airport	Schipol lnternational Airport	Amsterdam
Longest Steel Arch Bridge	Chaotianmen Bridge, built in 2009 (552 m long)	China
Longest Bridge (i.e. stretch of bridging of any kind)	The bridged stretch carrying Interstate 55 and Interstate 10 highways on twin concrete trestles (over 52.21 km)	Manchac, Louisiana, USA
Longest Floating Bridge	'Evergreen Point' is 3839 m long, of which 2310 m floats.	Seattle, Washington USA
Longest Bridge-by Suspension Spans	Akashi-Kaikyo, (1,991 m long)	Japan
Longest Bridge-by Cantilever Spans	Pont de Quebec (rail-road), built in 1917 is 548.6 m long	St. Lawrence, Canada
Tallest Bridge Towers	Millau Bridge, built in 2004 (336 m high).	France
Longest Railway Bridge	Huey P. Long Bridge (7009 m)	Metairie, Louisiana, US
Highest Bridge	A Bailey bridge built by the Indian army (30 m long at an altitude of 5600 m)	Khardungla, Ladakh
Highest Road Bridge	Royal Gorge (321 m abovesea level)	River Arkansas, Colorado
Highest Railway Bridge	Fades Bridge (144 m long 132.5 m above sea level)	River Sioule, France
Longest Rail Line	Trans-Siberian line from Moscow to Nakhodka (9438 km)	Russia
Tallest Office Building	Sear Towers (110 storeys, 443 m high)	Chicago, Ilinois
Tallest Building	Burj Khalifa (built in 2010)—828 meters	Dubai, UAE
Tallest Building (inhabitated)	Burj Khalifa (built in 2010)—828 meters	Dubai, UAE
Tallest Tower	Tokyp Skytree, (634 m high), [KVLY (formely KTHI)-TV Mast, North Dakota (guyed), USA built in 1963 (height 629 m)].	Metro Centre, Toronto
Twin Towers	Petronas Towers (452 m and 96 storeys) built in 1997	Kuala lumpur, malaysia
Largest Church	Basilica of St Peter built in 1492–1612 (15,142 m^2)	Vatican City, Rome
Tallest Church	Sagrada Familia, 170 m (scheduled completion date is 2026 but open for worship following its consecration by Pope Benedict XVI in 2010). [Ulm Cathedral, Ulm, Germany built in 1890 is the highest church at 162 m]	Barcelona, Spain
Largest Cathedral	Diocese of New York, area 11,240 m^2	New York

Structure	Name	Location
Largest Mosque (in ruins)	at Malwiya Mosque (238.9 m × 156 m)	Smarra, Iraq
Largest Mosque (in use)	Al-Masjid al-Haram (also known as 'The Sacred Mosque' or the 'Grand Mosque'). Area: 88.2 acres. Capacity: 4 million (worshippers during the Hajj). It surrounds the Kabba, the place which Muslims worldwide turn towards while performing daily Namaz.	City of Mecca
Largest Temple	Angkor Vat (162.6 ha)	Cambodia
Largest Railway Station	Grand Central Terminal	Park Avenue, New York
Highest Railway	Condor Station (4786 m height)	Bolivia
Longest Railway Platform	Kharagpur Railway Platform (833 m length)	Kharagpur, West Bengal
Longest Wall	The Great Wall of China	China
Tallest Building	Taipei 101 (509 m 101 storeys)	Taipei, Taiwan
Largest Stadium	Strahov Stadium	Prague, Czech
Largest Seaport	Port of New York and New Jersey	
Largest Library	The Library of Congress	Capital Hill, Washington DC
Oldest University (existing, and continually operating)	University of Karueein (founded AD 859)	Morocco
Largest Open University	Indira Gandhi National Open University	New Delhi
Longest Road	Pan-American Highway 27,387 km	North-west Alaska to Southern-most Chile
Highest Road	13 km stretch between Kangti-suu and Khaleb Hsin-Chi-Fu	Tibet
Longest Vehicular Tunnel (rail)	Seikan, Tsugaru (sub-aqueous) Channel—53.85 kms [Important: St. Gotthard (rail) tunnel in Switzerland will be 57.07 km long when completed in 2018]	Japan
Longest Vehicular Tunnel (non-rail)	Laerdal-Aurland Road Link—24.51 kms	Norway
Longest Non-Vehicular Tunnel	Dalware Aqueduct, constructed in 1937–44 to a length of 168.9 km.	New York, USA
Longest Ship Canal	White Sea-Baltic (formerly Stalin), built in 1933. Total length of canal—235 km of which canalized river 51.5 km. (min. depth of 5 m only) [Important: Suez Canal (built in 1969) links Red Sea and Mediteranean Seas, is 162 km long (min depth 12.9 m only), is the third longest, whereas Rhine-Main-Danube Canal of Germany (built in 1992) is the second longest ship canal, 171 km long (min. depth of 4.0 m only)].	

Structure	Name	Location
Tallest Dam	Jinping-I (it is 305 m high and scheduled for completion by 2014). Nurek Dam in Tajikistan, built in 1980, is presently the completed and functional highest dam (300 m high).	China

Table II.28 Natural World

Structure	Name
Largest Bird	North American Ostrich
Smallest Bird	Bee Hummingbird
Largest Egg	Ostrich egg
Largest Reptile	Estuarine or salt-water crocodile found in South-East Asia, northern Australia and New Guinea
Longest Snake	Reticulated Python, found in South-East Asia, Indonesia and Philippines
Largest Animal (in water)	Blue Whale
Largest Animal (living on land)	African bush elephant
Tallest Animal	Giraffe
Largest Ocean	Pacific
Deepest Part of the Ocean	Mariana Trench in the Pacific Ocean
Largest Sea	South China Sea
Largest Gulf	Gulf of Mexico
Largest Bay	Hudson Bay, Northern Canada
Largest Glacier	Lambert-Fisher Ice Passage, mac Robertson Land, East Antartica (length: 515 km)
Largest Glaciated Area	South Polar Regions (Area: 138,30,000 km^2)
Largest Continent	Asia (Area: 439,98,000 km^2)
Smallest Continent	Australia (Area: 76,18,493 km^2)
Deepest Depression	Dead Sea, Jordan/Israel (max depth below sea level: 408 m) **Important**: —The world's largest exposed depression is the 'Prikaspiyskaya Nizmennost' covering the hinterland of the northern third of the Caspian Sea, which is itself 28 m below sea level. —Western Antartica and central Greenland largely comprise of crypto-depressions under ice burdens. The Antartic Bentley subglacial trench has a bedrock 2538 m below sea level. In the Greenland the bedrock at some locations is 365 m below sea level. —Nearly one quarter of the area of the Netherlands lies marginally below sea level, an area of more than 10,000 km^2. —No part of the Maldives is higher than 2.4 m of sea-level. —No place in Lesotho is lower than 1381 m.
Largest Island	Greenland (renamed Kalaallit Nunaat), Arctic (Area: 21,75,500 km^2).
Highest Mountain Peak	Mount Everest on the Tibet-Nepal border [Height: 8848 m]

(Continued)

Structure	Name
Highest Active Volcano	San Pedro, Andes, Chile (most recent activity was ion 1960) [Height: 6145]
Highest Mountain Range	Himalaya-Karakoram-Hindu Kush in Central Asia (the world's twelve 8000 m mountains are all in this range)
Longest Mountain Range	Cordillera de Los Andes, South America (length 7200 km) [Rocky Mountains, North America is second longest (length 4800 km) and Himalaya-Karakoram-Hindu Kush range of Central Asia is the third longest (length 3850 km)].
Longest Cave System	Mammoth Cave System, Kentucky, USA (total known length is 590.6 km)
Deepest Cave	Krubera (Voronya), Georgia (Depth: 2191 m). [The world's deepest cave was discoved in January 2001 by a team of Ukarinian cave explorers in the Arabikskaya system in the western Caucasus mountains of Georgia. It is a branch of the Voronya or 'Crow's Cave']
Largest River	Amazon in South America (6448 km)
Longest River	Nile in Africa (6725 km)
Smallest River (shortest)	Roe River in Montana
Largest Delta	Sunderbans, created by the Ganga and Brahmaputra in Bangladesh and West Bengal
Largest Lake	Caspian Sea—Iran/Azerbaijan/Russia/Turkmenistan/Kazakhstan (Area: 371,000 km^2)
Largest Man-made Lake	Owen Falls (Uganda/Kenya/Tanzania) made in year 1954. (Volume: 204.80 km^3)
Deepest Lake	Baikal, Russia (Greatest depth: 1637 m)
Greatest Waterfall—by height	Salto Angel, Venezuela (Total drop—979 m; Greatest single leap—807 m)
Greatest Waterfall—by Volume	Khone, Mekong, Laos (Mean annual flow: 11,610 m^3/sec)
Largest Desert	The Sahara, North Africa (Area: 90,00,000 km^2). [Gobi, Mongolia/China is the second largest (area: 13,00,000 km^2) and Arabian (Eastern) Desert, Egypt is the third largest (10,00,000 km^2)].
Largest Glacier (Non-Polar regions)	Siachen, Indo-Pak border
Driest Place	Atacama Desert, Chile
Hottest Place	Aziza, Libya
Rainiest Place	Mawsynram, near Cherrapunji (Meghalaya)

Table 11.29 Top Twenty Indian Peaks

Peak	Height (in m above mean sea level)	Peak	Height (in m above mean sea level)
1. K2	8611	5. Broad Peak	8047
2. Kanchenjunga	8598	6. Disteghil Sar	7885
3. Nanga Parbat	8126	7. Masher Brum-E	7820
4. Gasher Brum	8068	8. Nanda Devi	7817

(*Continued*)

Peak	Height (in m above mean sea level)	Peak	Height (in m above mean sea level)
9. Masher Brum-W	7806	15. Chaukhamba (Badrinath Peak)	7138
10. Rakaposhi	7788	16. Trishul West	7138
11. Kamet	7756	17. Nunkun	7135
12. Saser Kangri	7672	18. Pauhunri	7128
13. Skyang Kangri	7544	19. Kangto	7090
14. Sia Kangri	7422	20. Dunagiri	7066

Indian Political Parties

Political Party	Abbreviation
Aam Aadmi Party	AAP
Akhil Bharatiya Loktantrik Congress	ABLC
All India Anna Dravida Munnetra Kazhagam	AIADMK
All India Forward Bloc	AIFB
All India Majlis-(e)-Ittehadul Muslimeen	AIMEIM
All India Trinamool Congress	AITC
Asom Gana Parishad	AGP
Bahujan Samaj Party	BSP
Bhartiya Janata Party	BJP
Bhartiya Navshakti Party	BNP
Bharipa Bahujan Mahasangh	BBM
Biju Janata Dal	BJD
Communist Party of India	CPI
Communist Party of India (Marxist)	CPI(M)
Communist Party of India (ML) Liberation	CPI(ML) L
Dravida Munnetra Kazhagam	DMK
Haryana Vikas Party	HVP
Himachal Vikas Congress	HVC
Indian Federal Democratic Party	IFDP
Indian National Congress	INC
Indian National Lok Dal	INLD
Jammu and Kashmir National Conference	J&KNC
Janata Dal (JP)	JD(JP)
Janata Dal (Secular)	JD(S)
Janata Dal (United)	JD(U)
Jharkhand Mukti Morcha	JMM
Kerela Congress	KC
Karnataka Janta Party (B5 Yeddyureppa)	KJP
Lok Dal (Secular)	LD(S)
Lok Jan Shakti Party	LJP
Marumalarchi Dravida Munnetra Kazhagam	MDMK
Mizo National Front	MNF

Political Party	Abbreviation
Muslim League	ML
Nagaland eoples Front	NPF
Nationalist Congress Party	NCP
Pattali Makkal Katchi	PMK
Peasants and Workers Party of India	PWP
Peoples Democratic Party	PDP
Rashtriya Janata Dal	RJD
Rashtriya Janata Dal (Democratic)	RJD(D)
Rashtriya Lok Dal	RLD
Republican Party of India (A)	RPI (A)
Revolutionary Socialist Party	RSP
Samajwadi Janata Party (Rashtriya)	SJP(R)
Samajwadi Party	SP
Shiromani Akali Dal	SAD
Shiromani Akali Dal (SS Mann)	SAD(M)
Shiv Sena	SS
Sikkim Democratic Front	SDF
Swatantra Bharat Paksh	SBP
Telangana Rashtra Samiti	TRS
Telugu Desam Party	TDP
Independent	IND
Nominated	NOM
YSR Congress Party	YSRCP
All India Trinamool Congress	TMC
Maharashtrawadi Gomantak Party	MGP
Haryana Janhit Congress (BL)	MJC
Mizoram People's Conference	HPC
Zoram National Party	ZNP
Pattali Makkal Katchi	PMK
Desiya Murpokku Dravida Kazhagam	DMDK
Revolutionary Socialist Party	RSP

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12 Current Events

NATIONAL CURRENT AFFAIRS

THE ASSEMBLY ELECTIONS

ASSAM

The tenure of the legislative assembly of Assam expired on June 5, 2016. The polls for the 2016 assembly were conducted in two phases, on April 4 and 11, 2016 to elect members of the 126 constituencies in Assam. The results were declared on May 19, 2016.

Results For 126 out of 126 Constituencies	
Party	**Won**
Bharatiya Janata Party	60
Indian National Congress	26
All India United Democratic Front	13
Asom Gana Parishad	14
Bodoland Peoples Front	12
Independent	1
Total	**126**

New Chief Minister

On May 24, 2016, Sarbananda Sonowal was sworn in as the 14th chief minister of Assam after the Bharatiya Janata Party (BJP), registered a maiden electoral victory in the North-East. Besides first time chief minister Sonowal and his nine council of ministers drawn from BJP and alliance partner parties; Asom Gana Parishad (AGP) and Bodoland Peoples Front (BPF),former three times congress chief minister Tarun Gogoi also took oath as a legislator.

KERALA

The tenure of the legislative assembly of Kerala expired on May 31, 2016. The polls for the 2016 assembly held on May 16, 2016. The results were declared on May 19, 2016.

Results For 140 out of 140 Constituencies	
Party	**Won**
Bharatiya Janata Party	1
Communist Party of India	19
Communist Party of India (Marxist)	58
Indian National Congress	22
Nationalist Congress Party	2
Indian Union Muslim League	18
Janata Dal (Secular)	3
Kerala Congress (M)	6
Communist Marxist Party Kerala State Committee	1
Congress (Secular)	1
Kerala Congress (Jacob)	1
Kerala Congress (B)	1
National Secular Conference	1
Revolutionary Socialist Party (Leninist)	1
Independent	5
Total	**140**

New Chief Minister

On May 25, 2016, Pinarayi Vijayan was sworn in as the chief minister of Kerala at Thiruvananthapuram. He will be leading a 19 member cabinet of the LDF which includes alliance partners CPI and NCP. The new CM is set to handle critical portfolios of home and vigilance.

PUDUCHERRY

The tenure of the legislative assembly of Puducherry expired on June 2, 2016. The polls for the 2016 assembly held on May 16, 2016, to elect members of the 30 constituencies in the non-contiguous territory. The results were declared on May 19, 2016.

Results For 30 out of 30 Constituencies	
Party	**Won**
Indian National Congress	15
All India Anna Dravida Munnetra Kazhagam	4
All India NR Congress	8
Dravida Munnetra Kazhagam	2
Independent	1
Total	**30**

New Chief Minister

V. Narayanasamy has been named the congress's pick to be the new chief minister of Puducherry. Narayanasamy had served as the minister of state in the prime minister's office in the second UPA government, after serving as MoS parliamentary affairs in the first UPA government. He did not contest the May 16th assembly elections, and will now have to seek elections to the legislature in a by poll.

WEST BENGAL

The tenure of the legislative assembly of West Bengal expired on May 29, 2016. Like in 2011, the polls for the assembly were held in six phases. The first phase, held in naxal-affected areas, had two polling dates, April 4 and April 11, 2016. The other phases held on April 17, 21, 25, 30 and May 5, 2016. The results were declared on May 19, 2016.

Results For 294 out of 294 Constituencies	
Party	**Won**
Bharatiya Janata Party	3
Communist Party of India	1
Communist Party of India (Marxist)	26
Indian National Congress	44
All India Forward Bloc	2
All India Trinamool Congress	211
Revolutionary Socialist Party	3
Gorkha Janmukti Morcha	3
Independent	1
Total	**294**

New Chief Minister

On May 27, 2016, Mamata Banerjee was sworn in as chief minister of West Bengal for a second consecutive term, in a ceremony on Red Road in Kolkata, witnessed by nearly 25,000 people. While no big announcements were made at the ceremony, a special resolution was adopted at the first cabinet meet where the government renewed its pledge to offer good governance to the people, enhance social sector schemes, create job opportunities for the young and provide a flourishing environment for all communities.

TAMIL NADU

The tenure of the legislative assembly of Tamil Nadu expired on May 22, 2016. The polls for the assembly were held on May 16, 2016, for the 234 seats of the legislative assembly in the state of Tamil Nadu, India. In the previous election in 2011, the AIADMK, under the leadership of Jayalalithaa, won a majority and formed the government. The results were declared on May 19, 2016.

Results For 232 out of 234 Constituencies	
Party	**Won**
Indian National Congress	8
All India Anna Dravida Munnetra Kazhagam	134
Dravida Munnetra Kazhagam	89
Indian Union Muslim League	1
Total	**232**

New Chief Minister

On May 23, 2016, J. Jayalalitha took oath as the chief minister of Tamil Nadu at the Madras University Centenary Auditorium. 28 ministers, including her trusted lieutenant and finance minister O. Panneerselvam also took the oath with her. This is Jayalalitha's second consecutive and sixth term as the chief minister of the state. Jayalalitha has the portfolios of home and the All India Services, including the IAS, public and general administration. Panneerselvam, who was earlier chief minister of the state from 2001–2002 and 2014–2015, is the minister for finance, personnel and administrative reforms, while former M.P. Dindigul, C. Srinivasan is to be the minister for forests. Several of the sitting ministers are holding offices again, including K.P. Anbazhagan (higher education), P. Thangamani (electricity), Sellur K. Raju (co-operation and labour), S.P. Velumani (municipal administration and rural development), C.V. Shanmugam (law and courts), Edappadi K. Palaniswami (public works, highways and minor ports), K.T. Rajenthra Bhalaji (rural industries), D. Jayakumar (fisheries), R.B. Udhayakumar (revenue), S.P. Shanmuganathan (milk and dairy development), M.C. Sampath (labour), K.C. Veeramani (commercial taxes), R. Kamaraj (food and civil supplies) and C. Vijayabaskar (Health). Including Jayalalitha, there are four women in the cabinet besides three doctors and 13 new faces.

OTHER BY ELECTIONS in 2016 *(till June 2016)*

- **Gujarat**—Result for one out of 1 constituencies [Bhartiya Janta Party won this seat]
- **Jharkhand**—Result for two out of 2 constituencies [Bhartiya Janta Party and Indian National Congress won one seat each]
- **Telangana**—Result for one out of 1 constituencies [Telangana Rashtra Samithi won this seat]
- **Uttar Pradesh**—Result for two out of 2 constituencies [Samajwadi Party won both the seats]

FORTHCOMING ASSEMBLY ELECTIONS (2017)

- **Goa**—Assembly tenure ends on Mar 18, 2017 [40 seats]
- **Manipur**—Assembly tenure ends on Mar 18, 2017 [60 seats]
- **Punjab**—Assembly tenure ends on Mar 18, 2017 [117 seats]
- **Uttarakhand**—Assembly tenure ends on Mar 26, 2017 [70 seats]
- **Uttar Pradesh**—Assembly tenure ends on May 27, 2017 [403 seats]

GENERAL NATIONAL NEWS AND EVENTS

Rurban-Mission Launched

The Prime Minister, Narendra Modi launched Shyama Prasad Mukherjee National Rurban Mission on Feb 21, 2016. The mission proposed to invest of ₹5,000 crore in three years to transform rural regions into economically, socially and physically sustainable places. The mission was launched from Kurubhat village in Dongargarh block of Rajnandgaon district in Chhattisgarh. The Rurban Mission intends to develop smart villages on the line of smart cities. It would reduce the trend of migration to the cities. The mission would replace the United Progressive Alliance (UPA) government's provision of Urban Amenities in Rural Areas (PURA) initiative. The mission would create village clusters to restrict rural migration to cities through skill development programmes.

Election Laws (Amendment) Bill, 2016 Passed

On Feb 2, 2016, the lok sabha passed election laws (amendment) bill, 2016. The new law guaranties voting rights to people who became Indian citizens as a result of the exchange of enclaves between India and Bangladesh. The bill authorizes the election commission to carry out delimitation of assembly and parliamentary constituencies in Cooch Behar district of West Bengal that suffered due to the enactment of the act. As per the constitution (100th amendment) act 2015, 51 Bangladeshi and 111 Indian enclaves were exchanged between India and Bangladesh on July 31, 2015.

Pradhan Mantri Ujjwala Yojana Launched

Prime Minister, Narendra Modi launched the Pradhan Mantri Ujjwala Yojana on May 1, 2016. The programme aims to provide 5 crore LPG connections to women belonging to Below Poverty Line (BPL) households over the next three financial years. ₹8,000 crore has been set aside to implement the programme. The scheme will be partially funded from the savings of the government emerging from 'Give It Up' programme.

Gram Uday Se Bharat Uday Abhiyan

On April 14, 2016, Prime Minister, Narendra Modi launched `Gram Uday Se Bharat Uday Abhiyan' to strengthen panchayati raj in villages and ensure social harmony. He launched this programme to mark the occasion of 125th birth anniversary of BR Ambedkar. The program aims at rural development through doubling farmer's incomes. It would increase purchasing power of rural people thereby boosting Indian economy.

e-NAM Project Launced

Prime Minister, Narendra Modi launched the pilot of e-NAM, the e-trading platform for the National Agriculture market, for the farmers on April 14, 2016. The initiative will bring transparency benefitting the farmers. Initially, 21 mandis in eight states were linked to e-NAM and by March 2018, 585 more mandis were included in this. Now, the farmers can sell or buy the agricultural products online. This programme operates through an online portal.

'Start-Up India' Launched

On Jan 16, 2016, Prime Minister, Narendra Modi launched the 'Start-Up India' campaign, and government has promised through this initiative to act as a facilitator of start-ups and assured friendly tax regime. Prime Minister of India, Narendra Modi, also released first ever 'Start Up India' action plan subsequently that aims to define 'Make in India' and work as 'Make for India' initiative as well. The government also released a blue-print under which it commits ₹10,000 crore, funding for the startups. Other important aspects of this programme are: easier exit policy for start-ups (included in to be introduced bankruptcy bill, 2015), easier patent registration process, setting up of single-point start-up information source (Startup Hub), simpler patent registration, easier procurement policy of government, and others.

Smart City Mission

This flagship project of the government has announced the approval of 48,000 crore that will be allocated to the smart cities project. The government is committed to provide 100 crore per city per year over the next five years. The total number of 100 smart cities has been distributed among the states and UTs on the basis of an equitable criterion. At the initial stage the government has declared the names of 98 cities selected for the 'Smart City Project'. The first 20 smart cities are: Bhubaneswar (Odisha); Pune (Maharashtra), Jaipur (Rajasthan), Surat (Gujarat), Kochi (Kerala), Ahmedabad (Gujarat), Jabalpur (Madhya Pradesh), Visakhapatnam (Andhra Pradesh), Solapur (Maharashtra), Davangere (Karnataka), Indore (Madhya Pradesh), New Delhi Municipal Council (NDMC), Coimbatore (Tamil Nadu); Kakinada (Andhra Pradesh), Belagavi (Karnataka), Udaipur (Rajasthan), Guwahati (Assam), Chennai (Tamil Nadu), Ludhiana (Punjab) and Bhopal (Madhya Pradesh). On May 24, 2016, announced the second list of smart cities that included the following 13 cities: Lucknow (Uttar Pradesh), New Town in Kolkata (West Bengal), Bhagalpur (Bihar), Dharamasala (Himachal Pradesh), Chandigarh, Faridabad (Haryana), Raipur (Chhattisgarh), Ranchi (Jharkhand), Warangal (Telangana), Agartala (Tripura), Imphal (Nagaland), Port Blair (Andaman & Nicobar) and Panaji (Goa).

Skill India

Launching 'Skill India', on July 15, 2015, Narendra Modi had stated that India should aspire to arise as the 'human resource capital' of the world. Notably, China has become a global 'manufacturing factory' through strategic government initiatives. Skill India Mission is a part of the government's 'war against poverty'. The NDA government announced that it will work towards equipping over 40 crore people with adequate skills by 2022.

Deen Dayal Upadhyaya Gram Jyoti Yojana

This coveted scheme of the NDA government is launched with a focus to provide 24x7 power supply to all homes in rural India.

Digital India Programme

Launched on July 1, 2015, by Narendra Modi the programme focuses on empowering the nation digitally by ensuring that government services are electronically available

to the citizens and people are served with all updated policy decision, governmental notifications and all other latest information through the benefits of technology.

From Jan Dhan to Jan Suraksha

Insurance is the most neglected factors on human life in India with large proportion of population being without insurance of any kind, be it health insurance, accidental insurance or life insurance. Worryingly, as our young population ages, it is also going to be pension less. Encouraged by the success of the Pradhan Mantri Jan Dhan Yojana, the government has proposed to work towards creating a universal social security system for all Indians, especially the poor and the underprivileged. The three social security schemes viz. Atal Pension Yojana (APY), Pradhan Mantri Suraksha Bima Yojana (PMSBY) and Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY), have been formally dedicated to the nation by the prime minister on May 9, 2015. The target under APY is to enroll 2 crore persons under the scheme till December 31, 2015. All the public sector banks have been allocated targets to enroll 30 accounts per branch per month and regional rural banks have also been allotted a target of 150 accounts per branch. Around 18, 99,841 people have joined APY as on January 16, 2016.

'Himmat' App

On January 1, 2015, the ministry of home affairs gave approval to the launch of mobile app 'Himmat' by Delhi Police. The app aims to infuse confidence in women, to assist women in distress and to make sure of their safety in Delhi. This application helps women to send SOS alert and the same gets reported along with her location in real time at police control room and the nearest PCR van and local police can be sent to the location.

Special Task Force on Women's Safety

Since the composition of special task force on women's safety, following 2012 Nirbhaya gang rape case, the union home secretary has been holding regular meetings of Special Task Force (STF) on women safety issues. The union home secretary issues instructions and obtains updates from various implementing agencies in the meetings. So far the STF has met 11 and the last meeting was held on December 2, 2015.

Central Victim Compensation Fund (CVCF)

The union government has sanctioned 'Central Victim Compensation Fund (CVCF)' in order to support the victim compensation scheme launched by States/UTs. Guidelines for operating CVCF have also been circulated along with the fund. It has been decided that to help victims of acid attack by providing them additional sum of up to 5.00 lakh for treatment through the CVCF. The government is working on a cashless treatment scheme for victims of acid attack.

Nationwide Emergency Response System (NERS)

MHA has initiated the process of creating a Nationwide Emergency Response System (NERS) which will have '112' as the emergency number. The number will allow anyone from any part of the country to seek police assistance. People from any part of the country will be able to access this emergency system through various methods such as landline phone, mobile phone, e-mail, SMS, chatting, voice over internet, internet of things, etc. It will offer them a range of options in different situations. DOT has allocated emergency

number '112' for this service. Guidelines for implementing this system by the states/UTs have been issued.

Raising of Mahila Battalions in CRPFs

Keeping in view the rising demand of women police in handling law and order situations and to increase women representation in the force, government has given approval to raise two mahila battalions in place of 2 male battalions in CRPF during 2015–16 and 2016–17.

Operation Muskaan and Operation Smile:

Home Ministry in co-ordination with the state governments initiated two campaigns 'Operation Smile' during January 2015, and 'Operation Muskaan' in July 2015. These campaigns aimed at rescuing missing children and reuniting them with their parents. Under the campaigns more than 28,000 missing children were rescued. A great number of police personnel were provided training and were sensitized about this social problem. The ministry has requested all the states and the UTs to take up Operation Smile-II during January 2016.

Streamlining Foreign Contribution Regulation (FCRA) Registration

On December 14, 2015, a new FCRA portal was launched which offers complete online processing of FCRA requests for registration/ prior permission/ foreign hospitality. The complete process of documentation and interaction with applicant will be undertaken online. Inter departmental consultation will also be done online. It would increase transparency, smooth monitoring of application process and efficient and time-bound mechanism for disposal of various services. The amendments to FCRR 2011 made to facilitate various processes include:

- Number of application forms has been reduced from ten to six.
- The associations not receiving any foreign contribution are not required to obtain certificate from CA for filing annual return self-certification will be acceptable.
- It will not be necessary to send physical returns subsequent to online filing of annual returns.
- No permission is needed for change of name, change of address, change of bank account and change of key executives. Only online intimation will be sufficient.

E-tourist Visa (e-TV)

Union home minister launched this scheme on November 27, 2014. So far this facility had been extended to the citizens of 113 countries at 16 Indian airports. Around 150 countries have been covered under this scheme till May 2016. Since its launch, more than 5,00,000 visas have been issued. Government revised the e-tourist visa fee in four slabs of 0, US $25, US $48, and US $60 which was applicable from November 3, 2015. At present e-tourist visa application fee is US $60 and bank charge is US $2. The revision of visa fee has been done on the principle of reciprocity. There is no bank charge for zero visa fees.

South Asian Disaster Management Exercise (SAADMEx) 2015

The yearly SAARC disaster management exercise was conducted for the first time in India from November 23–26, 2015. All the SAARC countries participated in the exercise. The

SAARC regional workshop on sharing best practices followed the exercise on November 27, 2015. The outcomes of SAADMEx 2015 were also discussed in the workshop.

Tourism

There are 25 cultural world heritage sites in India. These sites lack facilities and require restoration, which includes landscape restoration, signage and interpretation centres, parking, access for the differently abled, visitors' amenities, including securities and toilets, illumination and plans for benefiting communities around them. The ministry of cultural affairs and ministry of tourism intends to provide resources to start work at the following heritage sites: (i) churches & convents of old Goa, (ii) Hampi (Karnataka), (iii) Elephanta Caves, Mumbai (Maharashtra), (iv) Kumbalgarh and other hill forts (Rajasthan), (v) Rani ki Vav, Patan (Gujarat), (vi) Leh Palace, Ladakh (J&K), (vii) Varanasi temple town (UP), (viii) Jalianwala bagh, Amritsar(Punjab), (ix) Qutub Shahi Tombs, Hyderabad (Telengana).

Green India Initiatives

The degradation of environment hurts the poor more than others. Therefore, it is our responsibility to make our development process as green as possible. India has effective 'Carbon Tax' on most petroleum products as per international norms. Regarding coal, it is required to find a balance between taxing pollution, and the cost of power. However, with the start of 2016, the government moved in this direction by starting a scheme for Faster Adoption and Manufacturing of Electric vehicles (FAME). The ministry of new renewable energy has reviewed its target of renewable energy capacity to 1,75,000 MW by 2022, involving 100,000 MW solar, 60,000 MW wind, 10,000 MW biomass and 5000 MW small hydro.

Revision of Targets Solar Power: In a meeting that was held on June 17, 2015, the union cabinet approved revision of cumulative targets under National Solar Mission (NSM) from 20,000 MW to 1,00,000 MW by 2021–22, for grid connected solar power projects.

Wind Power: In order to attain a cumulative capacity of 60,000 MW of wind energy by 2022, tentative year wise targets have been decided.

Biomass and Small Hydro Power: CCEA has already given its approval for programmes during 12th five year plan for the proposed 10,000 MW biomass power programme and 5000 MW SHP. For the 12th plan period the target set under biomass and small hydro power are 2700 MW and 2100 MW respectively. The approval of remaining 7300 MW biomass and 2900 MW of SHP will be discussed while obtaining approval of the schemes during the 13th plan. As on December 31, 2015, cumulative capacity of about 38820 MW off grid-interactive renewable energy capacity has been installed in the country which includes 25088 MW from wind power, 4878 MW from solar power, 4177 MW from small hydro power and 4677 MW from bio-power.

National Agriculture Market (NAM) through Agri-Tech Infrastructure Fund

On July 1, 2015, the government approved the scheme for setting up of national agriculture market through agri-tech infrastructure fund. A budget of 200 crore was set for the scheme that would be implemented during 2015–16 and 2017–18. The scheme intended

to provide a national agriculture market by creating a common e-market platform in selected 585 regulated wholesale markets in the country. Small Farmers Agribusiness Consortium (SFAC) along with its strategic partner, M/s Nagarjuna Fertilizers and Chemicals Limited in consortium with Techno Brain Global FZE, would implement the national e-platform. It would cover 250, 200 and 135 mandis during 2015–16, 2016–17 and 2017–18 respectively. Department of agriculture, co-operation and farmers welfare would meet expenses on software and its customization for the states and provide it free of cost to the states and UTs.

Certain pre-requisites such as (i) a single license to be valid across the state, (ii) single point levy of market fee and (iii) provision for electronic auction at mode price recovery are needed for the integration of state APMC, NAM. States/UTs completing these pre-requisites will only be eligible for assistance under the scheme. 5 crore has been provided to SFAC for the scheme. Many states have shown their intention to join the NAM.

MUDRA Loans

On January 6, 2016, the union cabinet gave its approval to set up a credit guarantee fund for Micro Units Development Refinance Agency (MUDRA) loans and to transform MUDRA Ltd. into MUDRA Small Industries Development Bank of India (SIDBI). It will work as exclusively owned subsidiary of SIDBI. Micro Units Development Refinance Agency (MUDRA) bank, with a corpus of 20,000 crore, and credit guarantee corpus of 3,000 crore has was set up to refinance micro-finance institutions through a Pradhan Mantri Mudra Yojana. Priority will be given to SC/ST enterprises in offering credits. This will greatly enhance the confidence of young, educated or skilled workers. Existing small businesses too will be able to expand their activities with the availability of easy loans.

Sovereign Gold Bond Scheme, 2015

The sovereign gold bond scheme has been launched by the union government with a goal of reducing the demand for physical gold. It will reduce the outflow of foreign exchange spent on import of gold. The scheme is a mode for substitution of physical gold. It will also provide security to the individual investor who invests in gold for meeting their social obligation. Keeping this in view, in order to providing parity in tax treatment between physical gold and sovereign gold bond, a proposal has been made to amend section 47 of the income-tax act, so as to provide that any redemption of sovereign gold bond under the scheme, by an individual shall not be treated as transfer and therefore shall be exempt from tax on capital gains. An amendment to section 48 of the income-tax act has also been proposed, so as to provide indexation benefits to long term capital gain arising on transfer of sovereign gold bond to all cases of assesses.

Rupee Denominated Bond

The Reserve Bank of India has allowed Indian corporates to issue rupee denominated bonds outside the country in order to enable the Indian corporates to raise funds from abroad. Consequently, with an aim to offer relief to non-resident investor risking currency fluctuation, it is suggested to make amendment to section 48 of the act. It states that the capital gains, originating in case of appreciation of rupee between the date of issue and

the date of redemption shall be exempt from tax on capital gains. This amendment will be effective from April 1, 2017.

GENERAL NATIONAL AFFAIRS

Setu Bharatam Launched

The Prime Minister, Narendra Modi launched 'Setu Bharatam'—an ambitious programme on Mar 4, 2016. The programme proposes to invest 50,000 crore to build bridges for safe and smooth travel on national highways. The programme intends to make all national highways railway level crossing free by 2019. It is proposed to construct 208 new roads over bridges/roads under bridges. Around 1500 bridges will be widened, rehabilitated or replaced.

Officials and Employees of Private Banks' Employees Should Be Considered Public Servants

The supreme court ruled on Feb 23, 2016, in its verdict that the top officials and employees of private banks would be considered as public servants for the purposes of the prevention of corruption act, 1988. This would enable the investigating agencies, such as Central Bureau of Investigation (CBI), examine frauds and scams involving private banks operating in the country. The verdict was issued by an SC bench comprising Justice Ranjan Gogoi and Prafulla C. Pant.

Rajya Sabha Passed Mines and Minerals (Development And Regulation) Amendment Bill, 2015

The rajya sabha passed the mines and minerals (development and regulation) amendment bill, 2015 on May 2, 2016. The bill amends the mines and minerals (development and regulation) act, 1957 so that the mining sector in the country can be regulated. It also replaces the mines and minerals (development and regulation) amendment ordinance, 2015 promulgated in January 2015. The lok sabha had passed the bill in March 3, 2016.

Rajiv Gandhi Khel Abhiyan Merged with Khelo India

Rajiv Gandhi Khel Abhiyan (RGKA) was a centrally sponsored scheme launched by the UPA government on February 2014. It had been launched replacing the previous Panchayat Yuva Krida aur Khel Abhoyan (PYKKA) in order to construct support complexes in block of India by the year 2020. In February 2016, the union government merged RGKA with 'Khelo India' programme for development of sports. The Urban Sports Infrastructure Scheme (USIS) and National Sports Talent Search Scheme (NSTSS) have also been merged in the new scheme.

Stand Up India Scheme

On Mar 29, 2016, Haryana assembly passed a bill to provide reservation to Jats and five other communities in government jobs and educational institutions. The bill has been passed ahead of the early April deadline set by the community. The community

demanding a reservation for the Jats had launched a violent agitation in February 2016. The communities other than the Jats who have been provided reservation include Jat Sikhs, Rors, Bishnois, Tyagis and Mulla Jat/Muslim Jat. To facilitate them a new classification block has been constituted in the backward class category.

Amendments in Power Tariff Policy Approved

On January 20, 2016, the union cabinet approved amendments that take a holistic view of the power sector. There are comprehensive amendments in tariff policy 2006 as the new power tariff policy guarantees 24x7 availability of cheaper power for all and endorses clean energy, better guidelines for operations of DISCOM's and quicker rollout of investments. The amendments focus on achieving the objectives of Ujwal DISCOM Assurance Yojana (UDAY) with the emphasis on 4Es:

- *Electricity* for all
- *Efficiency* to ensure affordable tariffs
- *Environment* for a sustainable future
- *Ease* of doing business to attract investments and ensure financial viability.

NEWS FROM THE STATES & UNION TERRITORIES

ANDHRA PRADESH

Andhra Pradesh Reorganization Act Adopted

On March 16, 2016, the Andhra Pradesh assembly adopted a resolution requesting the union government to implement all provisions mentioned in the Andhra Pradesh reorganization act 2014, including grant of special category status to the state in a swift manner. Chief Minister, N. Chandrababu Naidu presented the resolution under rule 77 having 17 main issues that needed immediate resolution. The Telugu Desam Party (TDP) decided to present the resolution as it had been facing mounted pressure from the congress that had raised the issue.

Bill Passed to Raise Salaries of Legislators

On March 31, 2016, the Andhra Pradesh assembly hiked salaries and other emoluments of legislators by passing a bill in this respect. The bill was passed a day after Telangana had hiked the allowances of its legislators. The move of the AP government would put extra annual financial burden of ₹30,62,31,300. It is noteworthy that only one MLA (of the opposition YSRC) in the 175 member opposed the move.

No-Trust Motion against Speaker Defeated

On March 16, 2016, a no-confidence motion by opposition YSR congress against speaker Kodela Sivaprasada was moved in Andhra Pradesh assembly. The motion was defeated by 40 votes. 57 members of the YSRC voted in favour, whereas 97 voted against it. The motion was moved alleging that the speaker was acting in a biased manner and trying to undermine the opposition. The party demanded the resignation of speaker.

ARUNACHAL PRADESH

President's Rule in Arunachal Pradesh

On Jan 27, 2016, President, Pranab Mukherjee placed Arunachal Pradesh under president's rule after the union cabinet had recommended central rule following political instability in the state citing a constitutional breakdown and a growing law and order problem on account of the congress government's poor governance. With this decision, the assembly would cease to function and Arunachal Pradesh would come under centre's. On February 19, 2016 the president's rule was lifted and former congress leader Kaliko Pultook oath as the new chief minister of Arunachal Pradesh. The development is seen as a major setback for the ousted Nabam Tuki led congress government in the state as the supreme court cleared way for the government formation.

BIHAR

Nitish Kumar to resume Janata Darbar

Chief Minister of Bihar, Nitish Kumar, will resume 'janata darbar' from Feb 1, 2016. He would listen to the grievances of the people in these darbars. The chief minister's office informed the media that the 'janata darbar' was the previous year due to the model code of conduct for the state assembly elections.

HARYANA

Jat Reservation Bill Passed after Jat Agitation in Feb 2016

On Mar 29, 2016, Haryana assembly passed a bill to provide reservation to Jats and five other communities in government jobs and educational institutions. The bill has been passed ahead of the early April deadline set by the community. The community demanding a reservation for the Jats had launched a violent agitation in February 2016. The communities other than the Jats who have been provided reservation include Jat Sikhs, Rors, Bishnois, Tyagis and Mulla Jat/Muslim Jat. To facilitate them a new classification Block has been constituted in the backward classes category.

JAMMU AND KASHMIR

J&K High Court's 2-member Division Bench stays State Flag Hoisting Order of Single Bench

In Jan 2016, Justice Hasnain Masoodi's single bench of Jammu & Kashmir high court had endorsed a state government order of hoisting J&K flag along with Indian national flag on all official vehicles and buildings in the state. The state enjoys a special constitutional status. BJP which is also a constituent of the PDP-BJP coalition challenged the verdict and a two member division bench of J&K high court stated the single bench's order. Ex CM Omar Abdullah asked current CM Mufti Mohammed Sayeed to thwart nefarious plans of BJP of doing away with article 370. Mehboob Beg, the chief spokesperson of PDP stated that dual flag hoisting in J&K is permitted by the constitution and there is no need of any court order in this regard.

Mehbooba Mufti Takes Oath as CM

On April 4, 2016, Mehbooba Mufti took oath as the chief minister of Jammu and Kashmir at raj bhawan in Jammu. She is the 1st woman chief minister of J&K. Nirmal Singh from Bharatiya Janata Party (BJP) took oath as deputy chief minister. Besides these two, 22 other ministers also took oath along in the ceremony.

KARNATAKA

Karnataka Urban Water Supply Modernization Project

On May 24, 2016, government of India, government of Karnataka and the World Bank (IBRD) signed an agreement for the sanction of loan of US $100 million for the Karnataka urban water supply modernization project. The aim of the project is to provide city-wide access to a continuous piped water supply in the eligible cities in Karnataka. KUIDFC is supposed to implement the project. The project would have four main elements: (i) Capital Investment Program; (ii) Institution Building; (iii) Technical Assistance for Sector Development; and (iv) Project Management.

Ransomware Attack

India figures among the top five countries in the world that are attacked by ransomware malware. The malware forces its victims to pay a ransom in order to grant access to their systems, or to get their data back. Ransomware attacks are frequent in India and it is among the top five infected countries. India tops the list of countries that were attacked by Teslacrypt ransomware and was placed fourth in the countries that was attacked by Locky ransomware in March-May 2016. Ransomware prevents or limits users from accessing their system. Locky is a Windows ransomware infection, released in the middle of February 2016.

Anti-Superstition Bill

The Karnataka government proposes an anti-superstition bill similar to one in Maharashtra. The bill was initially proposed in 2013 and is has since been drafted twice. Chief Minister, Siddaramaiah, and his government has now decided to introduce the bill. Karnataka follows various superstitious practices such as the made snana ritual, in which people roll over food left over by Brahmins at the Kukke Subramanya temple in Dakshina Kannada district. Some others superstitions include walking on burning coals and even throwing babies from the roof of a temple onto a cloth spread below.

KERALA

Kerala becomes the first state to attain 100% primary education. Owing to continuous efforts made by the Kerala State Literacy Mission (a nodal agency for conducting continuing education programmes), the state has achieved 100% primary education. The Vice President of India, Hamid Ansari, announced this mentioning the significant role played by 'Athulyam' scheme that was launched in October 2014.

Tendulkar's name as Kerala's Campaign against Drugs and Liquor

On June 1, 2016, the cricket star Sachin Tendulkar accepted Kerala government's request to use his name in a campaign against drug and liquor abuse in the state. The Chief

Minister Pinarayi Vijayan informed this to media after his meeting with Sachin Tendulkar and three other co-owners of the Kerala Blasters Football Club (KBFC) at the state secretariat.

MAHARASHTRA

Ammunition Depot Fire

On May 31, 2016, a fire broke out at the central ammunition depot at Pulgaon after an explosion was heard. The cause of the fire is not known yet. The army has ordered a court of inquiry into the fire. Army Chief General, Dalbir Singh visited Pulgaon depot to make first take stock of the situation. The Pulgaon central ammunition depot is the largest in India and the second largest in Asia. A huge quantity of ammunition including Brahmos missiles and AK 47 rifles are stored here.

Bombay High Court on Demolishing Adarsh Housing Society

On April 29, 2016, the Bombay high court ordered the demolition of Adarsh Housing Society, an illegal apartment building in Mumbai. The housing society had become a symbol of political corruption. It is a 31-story building in Colaba, south Mumbai whose flats were constructed for war veterans. However, these flats were grabbed by politicians, defence officers and bureaucrats.

PUNJAB

Operation to Flush out Terrorists from Pathankot Air Force Base at 'Mature Stage'

In Jan 2016, after suspected Pakistan based Jaish-e-Mohammed terrorists attacked strategic Pathankot Air Force Base in Punjab. US called the Pathankot attack 'a heinous' terror strike.

People's Party of Punjab (PPP) merges with INC

Manpreet Singh Badal, the head of People's Party of Punjab (PPP) in Jan 2016 merged his party with the Indian National Congress. Former finance minister Manpreet Singh Badal along with an estranged nephew of Chief Minister Parkash Singh Badal had announced the formation of a new party called PPP in 2011. In line with the Aam Aadmi Party (AAP), the People's Party of Punjab (PPP) intended to shun VIP culture in the state of Punjab.

RAJASTHAN

Brahmos Test Fired

On May 27, 2016, the Indian Air Force successfully test fired an advanced version of Brahmos supersonic cruise missile system in the western region of Rajasthan. This formidable missile system has endowed all three wings of the armed forces with flawless anti-ship and land attack capability.

SIKKIM

First Organic Farming State of India

On Jan 18, 2016, Sikkim was declared as the first organic farming state of India. The declaration was made by, Prime Minister, Narendra Modi while inaugurating the Sikkim organic festival 2016 in Gangtok, Sikkim. The Sikkim organic festival 2016 was held on the sidelines of the two day long national conference on sustainable agriculture and farmer's welfare that began on January 17, 2016.

TAMIL NADU

Pools Cancelled on two TN Assembly Seats

On May 28, 2016, the election commission, in a first instance of its sort, decided to rescind the notification and conduct polls afresh 'in due course of time' to two Tamil Nadu assembly seats after evidence of use of money to influence voters appeared. The election commission had on two occasions postponed elections to Aravakurichi and Thanjavur seats after reports of distribution of money and gifts to voters by the candidates and political parties emerged. The polls were postponed from May 16 to May 23. On May 21, the election commission decided to postpone the polls once again to June 13, 2016.

Mandatory NEET brings Panic to TN Students

The apex court's instructions issued on May 9, 2016, regarding making National Eligibility Entrance Test (NEET) mandatory for admissions has caused panic among medical aspirants in Tamil Nadu. It is noteworthy that the state had abolished medical entrance exams nine years ago to make the admission process stress free. It also provided equal opportunity to high scoring rural students. Prior to the apex court's verdict admissions in MBBS and BDS courses in the state used to take place on the basis of their class 12 marks.

TELANGANA

T-Hub Outpost in Silicon Valley

On June 1, 2016, the Telangana government proposed to set up an outpost of T-Hub as its technological incubator in silicon valley, United States. It intends to get the support and co-operation from TiE (a Global network of entrepreneurs) and investors from Silicon Valley. T-Hub is one of its type public/private partnerships between the Telangana government, three premier academic institutes (IIIT-H, ISB and NALSAR) of the country and important private sector leaders. The state government initiated digital literacy in huge scale and is heading towards m-Governance from e-Governance.

Heatwave kills hundreds in Telangana

Due to the heat conditions prevailing in some parts of Telangana, the number of deaths has risen to more than 250. According to the India Meteorological Department the heatwave conditions may continue in some parts of Adilabad, Nizamabad, Karimnagar and Khammam districts. Telangana had witnessed severe heatwave during the summer seasons in past also. The government has announced ₹50,000 ex-gratia to kin of each of the deceased.

Unnati Kendras Launched by Intel

On April 21, 2016, Intel inaugurated Unnati Kendras in 10 towns in Telangana as part of its country wide plan to create a blueprint for the digitization of non-urban India. Under the 'Ek Kadam Unnati Ki Aur' programme, Intel India will cooperate with 10 Common Service Centres (CSCs) in Warangal, Nalgonda, Medak, Karimnagar, Mahbubnagar, Adilabad, and Ranga Reddy districts, to drive the relevance of PC adoption. Each Unnati Kendra will be installed with Intel-powered devices, local language content, and relevant training modules for non-urban citizens, creating opportunities for skill development and digital empowerment.

UTTARAKHAND

Quashing of President's Rule

On April 22, 2016, High Court division bench quashed the president's rule in the state and reinstated the dismissed congress government. The orders restored the Harish Rawat government, which was dismissed by the centre on March 27, 2016. The court ordered that he should seek a vote of confidence in the assembly on April 29, 2016. It also upheld the disqualification of nine rebel congress legislators, saying they must pay the price of committing the 'constitutional sin' of defection. The congress government won the floor test that concluded On May 10, 2016. Congress sources claimed the support of 33 lawmakers, two more than he needed for majority.

NATIONAL CAPITAL TERRITORY OF DELHI

Delhi Government rolls out Odd-Even Scheme on Roads of National Capital

Delhi Government's odd-even formula pet project to decongest roads of national capital and thereby check the uncontrolled pollution in the capital city has become operational from today. The scheme started on a trial basis for 15 days from 8 AM to 8 PM IST. Anyone found violating the rule will be fined 2,000. Delhi CM, Arvind Kejriwal went to Delhi Secretariat by sharing his vehicle with PWD Minister Satyendar Jain and Delhi Transport Minister Gopal Rai. Kejriwal said that the scheme seems to have become successful as people seem to respond voluntarily. For coping with additional rush and less number of cars on road, Delhi government has hired 3,000 additional private buses.

Sunanda Pushkar's death unnatural, confirms Delhi Police Chief

Delhi Police Commissioner, B.S. Bassi has cleared the air over Sunanda Pushkar's mysterious death by stating that the current observation from the final viscera report of Sunanda gives a clear impression that she died an unnatural death which was not led by radioactive poisoning. Wife of congress M.P. Shashi Tharoor, Sunanda Pushkar was found dead inside her suite at a five-star hotel in January 2014.

BRT Corridor to be dismantled tomorrow

After having experienced strong dislike by the Indian capital Delhi, the 5.8 km long stretch i.e., the BRT (Bus Rapid Transport) corridor would be dismantled tomorrow afternoon. The BRT corridor was created by the government of Sheila Dikshit for a whopping sum

of 150 crores and was intended to allow buses to shuttle travellers through a lane free of traffic lights.

SCIENCE AND TECHNOLOGY

ISRO

Indo-French Joint Exploration of Mars, Venus on Cards

Jean-Yves Le Gall, chief of French space agency (Centre National D'études Spatiales - CNES), proposed that following India's mission Mars, in which it placed Mars Orbiter Mission Mangalyaan on orbit successfully, France intends support to India's next mission for exploring Mars. France has knowledgeable scientists for Mars and Venus. India's MOM mission has demonstrated how smart work can help in producing low cost space missions and went on to term it an appropriate example of Make in India's manufacturing capability at low cost.

Space Technology to Transform India in coming Years

K. Sivan, Director, Vikram Sarabhai Space Centre (VSSC), ISRO (Indian Space Research Organisation), has stated that space technology will play a crucial role in coming years to transform India and advocated application based learning in space technology. VSCC had come up with 1/6th size of actual reusable launch vehicle (showcased in April) that will be useful in space tourism.

ISRO successfully launches IRNSS-1E

ISRO (Indian Space Research Organization) successfully launched Indian Regional Navigation Satellite System (IRNSS-1E), India's 5th navigation satellite on PSLV-C31 from Sriharikota space centre. As the fifth navigation satellite in the IRNSS space system, the IRNSS-1E included seven satellites which are at par with the American Global Positioning System (GPS). The launch has brought India a step closer to a functional 'desi-GPS'.

Robotic Mission to Space

The Vikram Sarabhai Space Centre (VSSC) at Thiruvananthapuram, has announced that human flight mission to space may not generate adequate benefits currently. VSSC advocates sending robotic mission into space and a manned space mission will cost 40,000 crore. A proposal of sending unmanned robotic mission to space has been forwarded to the Government.

Indian Scientists Map Helpful Gut Bacterial Profile in 15 Indian Tribes for Medical Advancement

A team of Indian scientists, led by Mojibur R. Khan, has pioneered in mapping role of healthy micro organisms in human gut in keeping people healthy. It is believed that the research, published in the Nature Scientific Reports in December 2015, will help scientists in making personalized medicines as well as designing diets that suit changing lifestyles of man. Mapping of gut bacteria was done on 193 healthy individuals who belonged to 15 ethnic tribes inhabiting in Telangana, Sikkim, Manipur, and Assam. The report

also mentions similarity of Gut Bacterial Profile (GBP) with that of Mongoloid people of Mongolia.

Maximum 'Brain Drain' of Scientists and Engineers in US from India

According to statistics available with National Center for Science and Engineering of National Science Foundation, majority (32.09%) of scientists and engineers from Asia heading to the US are from India. The reasons cited of such brain drain include lower earnings, lack of research support, and red tapism. The report announced that from 2003 to 2013 a rise of 85% in brain drain from India has been seen.

Government constitutes Technical Group for monitoring Zika Virus Situation after WHO's Warning

WHO has warned that Zika virus is spreading explosively. Zika found its origin in Africa but an outbreak of the disease started last year in Brazil. So far, it has spread in 24 countries of America and also exists in Asia. According to the WHO, the disease may affect nearly 4 million people across the world. Aedes aegypti mosquito, which spreads Chikungunya and Dengue, spreads Zika virus too. It causes serious birth defects and other neurological disorders. The Indian government has formed a technical group for monitoring the situation.

India gears up to combat Zika virus

The Zika virus spread by (Aedes aegypti mosquito) causes microcephaly, a birth defect in which babies are born with smaller heads which further restricts brain development). The virus has already tightened its grip in south and central America. Accordingly, India is also preparing to deal with any type of situation. The union health ministry is getting testing kits that can be used for detecting the virus.

National Framework for Elimination of Malaria 2016–2030

On Feb 11, 2016, Jagat Prakash Nadda, Union Health and Family Welfare Minister, issued the National Framework for Malaria Elimination (NFME) 2016–2030 in New Delhi. The framework sums up India's strategy for eradication of the disease by 2030. NFME document defines goals, objectives, strategies, targets and timelines to eradicate the disease from India. The framework will serve as a road map for planning malaria eradication from India in a phased manner.

DEFENCE AND SECURITY

Indigenous Sonar Dome

On Mar 29, 2016 India got another feather in its cap when the Defense Minister Manohar, Parrikar dedicated the first indigenous composites bow mounted sonar dome to the nation at Def Expo 2016 in Quepem, Goa. The sonar dome will be handed over to Mazgaon Docks, Mumbai for installation on the Indian Navy warships. The sonar dome is a great achievement towards the 'Make in India' movement. With this, India has joined a selected group of nations that are capable of realizing large composites structure with multi functional requirement, complex geometry and high structural rigidity.

Factfile: Sonar, an acronym for Sound Navigation and Ranging, is a very vital element in a navy warship. It acts as a ship's eyes and ears under water. It uses sound propagation to navigate, communicate with or detect objects on or under the surface of the water, such as other vessels. All Anti Submarine Warfare (ASW) ships are equipped with a sonar array under water to track movement of hostile objects. Sonar domes shields the Sonar arrays to protect its electronics and sensors.

Avalanche Strike at Siachen Army Post

On Feb 3, 2016 a major avalanche struck an Indian army post in the northern Siachen Glacier area on February 3, 2016. The army post that bore its brunt was manned by one Junior Commissioned Officer (JCO) and nine soldiers. The 10 soldiers from the Madras regiment were deployed at the section-level post at an altitude of 19,600 feet on the northern glacier when the freak accident took place.

SUPREME COURT AND OTHER IMPORTANT COURT VERDICTS

On Protection of Good Samaritans

On March 30, 2016 the apex court approved the union government's guidelines to protect good samaritans helping road accident victims, from being needlessly harassed by police or any other authority. A bench comprising Justice, V. Gopala Gowda and Arun Mishra instructed the union government to publicize these guidelines widely so that people helping accident victims are not harassed by any authority.

Ruling on Women's Entry to Places of Worship

On April 1, 2016 the Bombay High Court instructed Maharashtra government to take positive steps to make sure that the law to prevent discrimination against women on entry to places of worship is adhered. The court remarked that it is 'the fundamental right of a woman' and it is the duty of the government to protect it. The court was hearing a Public Interest Litigation (PIL) that had been filed by Pune-based activists, Vidya Bal and advocate Neelima Vartak in February 2016. The PIL highlighted the 'discriminatory treatment' against women in different temples of Maharashtra. The petitioners cited the example of Shani Shingnapur Temple in Ahmednagar. The reference of the Kartikeya Temple in Parvati, Pune, where women are allowed to see the idol once a year on an auspicious day, was also made in the court.

SUMMITS, ORGANIZATIONS & INTERNATIONAL TREATIES

Convention on CSC ratified by India

India forwarded its instrument of ratification of the Convention of Supplementary Compensation for Nuclear Damage (CSC), 1997 to the International Atomic Energy Agency (IAEA) at Vienna, Austria on Feb 4, 2016. The instrument is a significant multilateral treaty regarding liability and compensation for damage due to a nuclear incident. India's permanent representative in Vienna, Rajiva Misra submitted the instrument to Juan Carlos Lentijo, Acting Director General of IAEA. The CSC was

ratified after five years of its signing on October 27, 2010. The convention came into force for India on May 4, 2016. According to law, the convention comes into force after 90 days of submission of ratification.

Maritime India Summit 2016

The inaugural Maritime India Summit took place in Mumbai from April 14 to 16, 2016. The summit was inaugurated by Prime Minister, Narendra Modi. The summit offered a platform for participation, engagement and interaction from 42 countries. The thematic session on maritime nations underlined the global nature of the shipping industry and the significance of co-operation & collaboration between maritime countries.

ENVIRONMENT & BIODIVERSITY

45 Stranded Whales Die on Tuticorin Beach

Fishermen in Tuticorin had to struggle hard in trying to rescue around 100 whales that were struck on the Tuticorin beach. They could save only about 40 whales, while a total of 45 whales died. As per the sources, the whales may have reached the beach after a journey of around 1000 km across the Pacific. It was in the afternoon that fishermen noticed the pod of whales coming towards the beach.

INDIA—BILATERAL

India—South Korea

Pact for Development of Ports Signed

India and South Korea signed a memorandum of understanding (MoU) for co-operation and mutual assistance in development of ports and other port related matters on April 13 during the inaugural Maritime India Summit 2016 in Mumbai. On April 6, 2016, the union cabinet approved the proposal of the shipping ministry for signing of this MoU.

India—USA

India Gets US Support for NSG and MTCR

During June 2016, visit of Indian Prime Minsiter, Narendra Modi, the India-US joint statement released looked forward to India's imminent entry into the Missile Technology Control Regime (MTCR), India's application to join the Nuclear Suppliers Group (NSG).

Factfile: MTCR was established in April 1987, it is a voluntary association of 34 countries — 35, once India is formally included — and four 'unilateral adherents' that follow its rules: Israel, Romania, Slovakia, and Macedonia. The group aims to slow the spread of missiles and other unmanned delivery technology that could be used for chemical, biological and nuclear attacks. The Nuclear Suppliers Group (NSG) is a 48 nation group frames and implements agreed rules for exporting nuclear equipment, with a view to controlling the spread of nuclear weapons; members are admitted only by consensus.

Logistics Exchange Agreement

In a significant move, India and US have decided 'in principle' on a logistics support agreement that would facilitate both militaries to share each other's facilities. The decision that could have far reaching implications for India's military posture was first proposed in 2004 but was resisted by the UPA government. The Logistics Exchange Memorandum of Agreement (LEMOA) was the highpoint of Ashton Carter, US Defense Secretary visited India from April 10–13, 2016.

LIGO Observatory Agreement

On March 31, 2016 India and US signed a memorandum of understanding (MoU) for establishing a new Laser Interferometer Gravitational wave Observatory (LIGO) in India. The observatory will play significant role in conducting forward advanced research on numerous aspects of gravitational wave astronomy.

India—Maldives

Six Agreements Signed to Boost Bilateral Ties

On April 11, 2016 India and Maldives entered into six agreements in various sectors, including avoidance of double taxation, conservation and restoration of ancient mosques; tourism and defence. India and Maldives signed a mutual agreement regarding Orbit Frequency Coordination of South Asia Satellite 48°E. The agreement shall be useful for performing intersystem orbit frequency co-ordination for the operation of South Asia Satellite and fulfilling ITU level regulatory requirements and getting international level protection/recognition for the South Asia Satellite.

India—UAE

9 Bilateral Agreements Signed

Crown Prince of Abu Dhabi and Deputy Supreme Commander of United Arab Emirates Armed Forces Sheikh Mohamed Bin Zayed Al Nahyan visited India from Feb 10 to 12, 2016. During the visit, India signed nine agreements with United Arab Emirates (UAE). The agreements involved a range of fields such as cyber security, infrastructure, renewable energy and finance. Major agreements signed included MoU on technical co-operation in cyber space and combating cyber crime; MoU on technical cooperation in cyber space and in the area of combating cyber crime; MoU on establishing a framework for facilitating the participation of UAE institutional investors in infrastructure investments in India; MoU on co-operation in the exploration and use of outer space for peaceful purposes; MoU for bilateral co-operation in the field of insurance supervision among others.

India—Nepal

9 Bilateral Agreements Signed

The prime minister of Nepal, K.P Sharma was on a six day state visit to India from Feb 19–24, 2016. It was his maiden to India after taking over as a prime minister. The visit followed the patch of bitterness in mutual relations due to India's objection to some of the provisions in the new Nepalese constitution concerning the Indian community in

Nepal, known as 'Madhesis'. It was first official visit a Nepalese prime minister since 2011. During the visit India and Nepal signed seven agreements and MoUs to promote the mutual co-operation. The agreements included utilization of Indian grant of $250 million to Nepal for post earthquake reconstruction and another on improving of roads in Terai region.

India—Germany

Agreement on Namami Gange Programme

On April 13, 2016, the ministry of water resource, river development and Ganga rejuvenation and the German International Co-operation (GIZ) of Germany signed an implementation agreement for Ganga rejuvenation under the Namami Gange Programme in New Delhi. The agreement aims to enable responsible stakeholders at national and state level to adopt integrated river basin management approach for the rejuvenation of the river Ganga. The approach will be based on Indo-German knowledge exchange and practical experience on strategic river basin management matters, effective data management system and public engagement. The project will be undertaken in close co-operation with other national and international initiatives.

India—Mangolia

$1 Billion Line of Credit Extended

On April 28, 2016, India offered a Line of Credit (LoC) of $1 billion to Mongolia. The Exim Bank has offered the line of credit worth $1 billion to Mongolia for the development of its railways and related infrastructure. The exim bank has so far extended two LoCs to Mongolia, on behalf of the government amounting to $1.02 billion.

India—Pakistan

JeM chief taken into protective custody, confirms Pak minister

A Pakistani minister has confirmed that Maulana Masood Azhar, chief of the Jaish-e-Mohammad terror group, along with his associates has been taken into protective custody. The minister also stated that the JeM chief may be arrested in case he is proved guilty in the January 2 attack at the Pathankot Air base. Besides Azhar, his brother Rauf and five others have also been allegedly involved in the attack.

India—Iran

$150 Million Credit to Iran Approved

On Feb 24, 2016, the union cabinet headed by Prime Minister, Narendra Modi gave its approval for providing a credit of $150 million to Iran for the development of Chabahar Port. Exim Bank will provide the loan. The ministry of finance, external affairs and shipping has been authorized to approve the final contract with Iran and to resolve any issue regarding the implementation of the project. It has also been authorized to form a company in Iran for the execution of the Chabahar Port development project and related activities.

India—EU

EU-India Agenda for Action 2020

On Mar 30, 2016, Prime Minister, Narendra Modi participated in the 13th India-EU summit held in Brussels. He had a meeting with European Commission President Donald Tusk. The European Commission (EC) stated that India and the European Union (EU) acknowledged the EU-India agenda for action 2020: as a common, road map for the strategic partnership in the next five years. He, however, remained silent on the issue of negotiations on the Bilateral Trade and Investment Agreement (BTIA). It is the official free trade pact pending since 2007. The leaders applauded that both sides had re-engaged in discussions on how to carry forward the EU-India broad based BTIA negotiations.

India—France

On January 24, 2016, India and France signed 16 agreements/MoUs in Delhi during President, Francois Hollande's official visit from January 24 to 26, 2016. The agreements included a MoU on the purchase of 36 rafale aircrafts. Francois Hollande was the chief guest at the 67th India's republic day celebrations. All the deals were worth an estimated $15 billion. Besides this, French companies will invest $10 billion in India over the next five years. The deals included many sectors such as aviation, nuclear energy, space, urban development and railways. Another important agreement signed was in railways. Alstom signed a preliminary contract with Indian Railways to manufacture 800 electric locomotives in Madhepura, Bihar. Indian Railways signed another agreement with French Railway Company Societe Nationale des Chemins de Fer (SNCF) to conduct a joint feasibility study for developing Ludhiana and Ambala stations. India and France also focused on nuclear energy.

French troops to march down Rajpath on Republic Day

For the very first time in the history of India's republic day celebrations, a contingent of French troops marched down the Rajpath. Accounting to the French President Francois Hollande, was the chief guest for this year's republic day celebrations, a French contingent comprising 56 personnel of the 35th infantry regiment of the 7th armoured brigade marched along with the Indian soldiers.

India—Bahrain

Bilateral Trade & Counter-Terrorism Ties

Sushma Swaraj, External Affairs Minister, held discussion with foreign minister of Bahrain Khalid bin Ahmed Al Khalifa in Manama on various fields. They also asserted strengthening relations in key areas such as bilateral trade and counter terrorism. Swaraj was on a two-days visit to attend maiden India-Arab League Co-operation Forum's meeting. Secretary East Anil Wadhwa informed media that discussions were held between India and Bahrain on issues such as double taxation avoidance agreement, transfer of sentenced persons etc.

India—Saudi Arabia

On April 3, 2016, PM Narendra Modi signed five agreements with Saudi Arabia to improve bilateral co-operation between the two asian nations. The PM was on an official

visit to Saudi Arabia. The agreements which were signed include agreement on labour co-operation between the ministry of labour, Saudi Arabia and ministry of external affairs, India for recruitment of general category workers; technical co-operation. Programme between the Bureau of Indian Standards (BIS) and the Saudi Standards, Metrology and Quality Organization (SASO); Executive programme for co-operation in the field of handicrafts between the Export Promotion Council for Handicraft (EPCH), India and Saudi Commission for Tourism and National Heritage; MoU between Financial Intelligence Unit of India and Saudi Arabia concerning co-operation in the exchange of intelligence related to money laundering, terrorism financing and related crimes; and framework for investment promotion co-operation between Invest India and the Saudi Arabian General Investment Authority (SAGIA).

India—Afghanistan

4 Gunmen Target Indian Consulate in Mazar-i-Sharif

Four unidentified attackers attacked the Indian consulate in northern Afghanistan's Mazar-i-Sharif. The Afghan Special Forces have been successful in killing two of the four gunmen. No deaths of Indians have been reported. No terrorist group claimed responsibility for the attack.

Agreement on Visa-Free Travel by Diplomats

On February 1, 2016, India and Afghanistan signed an agreement for visa free travel by their diplomats. The pact was signed in a meeting between Afghan Chief Executive Officer (CEO) Abdullah Abdullah's and Prime Minister, Narendra Modi. They discussed important bilateral and regional issues, including co-operation in security matters. They also talked on the role of international community to ensure peace and stability in Afghanistan. During the meeting they also shared intentions of further consolidating the India-Afghanistan relationship also re-energising the strategic partnership between the two nations.

Indian PM Inaugurated Salma Dam

As a sign of consolidating relations between India and Afghanistan, the prime minister of India Narendra Modi helped inaugurate Afghanistan's biggest hydroelectric dam. The Salma Dam was first planned in 1976, and it could be completed only after its construction resumed following decades of civil war. The dam is located in Herat province bordering Iran. An amount of $290 million has been spent on its construction. The dam will increase Afghanistan's installed power capacity by about 10% and make water available for an area of about the size of New York City. India has invested nearly $2 billion in Afghanistan since the collapse of Taliban regime in 2001, including the construction of its new parliament building.

India—Qatar

India's Petronet LNG purchases LNG at almost Half the Price from Qatar's Rasgas in Renegotiated Deal

In one of the biggest overseas successes for Prime Minister, Narendra Modi, Petronet LNG has signed a significant renegotiated deal with Rasgas of Qatar. According to the

revised deal the latter will supply LNG at half the rate that had been negotiated earlier. Oil Minister, Dharmendra Pradhan stated that as per the earlier deal the Qatar Company supplied LNG to LNG at $12–13 per mmbtu. After the renegotiated deal, Rasgas will supply LNG at just $6–7 per mmbtu, enabling India save nearly $605 million annually. Rasgas also waived off a penalty of $1.5 billion that it had imposed on Petronet.

MISCELLANEOUS

Pak Singer Adnan Sami gets Indian Citizenship

On Jan 1, 2016 the Ministry of Home Affairs granted Indian citizenship to Pakistani origin singer and actor Adnan Sami. He applied for Indian citizenship on May 26 2015, on humanitarian grounds. He was a Canadian citizen and has been living in India since March 2001 on visa.

INDIAN ECONOMIC CURRENT AFFAIRS

OVERVIEW OF THE INDIAN ECONOMY
THE UNION BUDGET 2016–17
THE ECONOMIC SURVEY 2015–16
THE RAILWAY BUDGET 2016–17

OVERVIEW OF THE INDIAN ECONOMY

India's economy has evolved as a shining spot in the global economy, becoming one of the fastest growing large economies. The growth of 7.6% the GDP at consistent market prices in 2015–16, as per the advanced estimates of the Central Statistical Office, compares favourably with growth in the last three years (7.2% in 2014–15, 6.6% in 2013–14 and 5.6% in 2012–13). It is important to note that this growth is achievable despite slack global demand that diminished India's exports considerably, and two continuous below-normal monsoons that adversely affected agricultural output and productivity.

The macroeconomic consistency has improved considerably with the continuance of fiscal wisdom, reduced inflation, lower current account deficit, and healthy foreign exchange reserves.

In the year 2015–16, the government did a fine balancing act of meeting the requirements of higher untied devolution to states and Union Territories according the recommendations of the fourteenth Finance Commission, and, maintaining fiscal prudence while increasing capital expenditure. The year also witnessed moderation in general price level, with considerable reduction in the price of Indian basket of crude oil and commodity prices, along with the government's smart food supply management policy. Low levels of current account deficit along with modest rise in capital inflows led to accretion in foreign exchange reserves by $ 10.6 billion in the initial half of 2015–16.

The foreign exchange reserves of the country were at $ 351.5 billion as on February 5, 2016. All this proves that India's economy has very smartly faced the global challenges, and the near term growth prospects look positive.

The continuation of the reform momentum that was built in 2014–15 can be seen even this year. The reforms that were started previous year for debottlenecking the economy, removing structural hurdles, encouraging industry and enterprise via Make-in-India programme and the steps taken to improve the ease of doing business, enhancing programme delivery through direct benefit transfer (DBT), promoting saving and financial linkages through expansion of banking services and liberalising foreign direct investment (FDI) policy in different sectors have been continued. The new steps taken such as Public Sector Banks' Revamp Plan, UDAY (Ujwal DISCOM Assurance Yojana) for financial rejuvenation of the sick power distribution companies, Start-up India for utilising fresh entrepreneurial potential, complement the on-going reforms. The business environment has been improved considerably with the implementation of these reforms. It has also increased investors' confidence, which has been accepted by multi-lateral institutions and can be seen in faster economic growth and greater investment inflows to the country.

GDP growth

According to the advanced estimates released by the Central Statistical Office, it is estimated that the economy would grow at 7.6% in 2015–16. It is higher than the growth of 7.2% which was achieved in 2014–15. The growth in farm, industry and services is assessed at 1.1%, 7.3% and 9.2% in 2015–16 against (–) 0.2%, 5.9% and 10.3% respectively in 2014–15. This indicates an increase in industrial growth, supported by manufacturing which is assessed to grow at 9.5% in comparison to 5.5% in 2014–15. The growth in farm sector stayed due to second continuous year of slack monsoon. The growth of GDP during April-December 2015 was 7.5%, in comparison to 7.4% in the same time period in 2014–15. From the view of demand, the growth in private final consumption expenditure at 7.6% in 2015–16 has been an important factor of growth. It has been estimated that both the exports and imports will decline by 6.3% in 2015–16. The decline in exports will mainly be due to slack global demand and decline in imports will be largely due to international petroleum prices.

What to Expect in 2016–17

Encouraged by the performance of the economy in the first three quarters of 2015–16, that witnessed speeding up of economic growth, modest inflation, moderate current account deficit, strong foreign exchange reserves, encouraging tax revenues, rising foreign direct investment (FDI) flows accompanied by the government's measures to speed up reforms insignificant fields including banking, infrastructure, power, taxation, etc., the future of the economy looks bright. The consolidation of growth in India has been anticipated by multi-lateral institutions. However, there are certain risks such as slack global growth, slowdown and rebalancing in China's economy, increased instability in financial markets, and steady tightening in the monetary policy in the US loom large over the expected performance of the economy. Considering these conditions, the rate of nominal growth of the economy is projected to be near 11% in 2016–17.

UNION BUDGET 2016–17

The Union Budget 2016–17 of India was presented by the Finance Minister, Arun Jaitley, on Feb 29, 2016. The key highlights of the budget are given below:

BUDGET SNAPSHOT
(all figures in Rs. Crore)

Legend: REVENUE Receipts; REVENUE Capital; EXXPENDITURE Non-Plan; EXPENDITURE Plan

| | 2014-15 (Actuals) | 2015-16 (BE) | 2015-16 (RE) | 2016-17 (BE) |

Revenue Receipts: 1101472, 1141575, 1206084, 1377022
Revenue Capital: 1201029, 1312200, 1308194, 1428050
Expenditure Non-Plan: 562201, 635902, 579307, 601038
Expenditure Plan: 462644, 465277, 477197, 550010
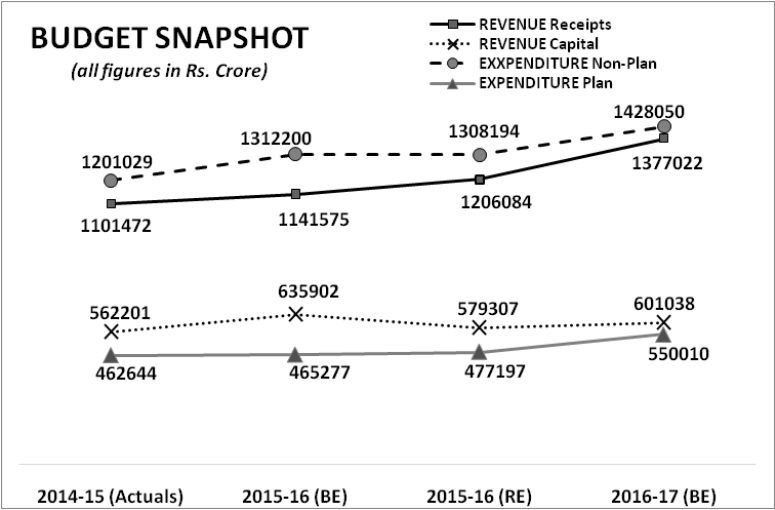
BE → Budget Estimates; RE → Revised Estimates.

KEY FEATURES OF BUDGET 2016–2017

SUMMARY OF EXPENDITURE

		(In crores of Rupees)		
		Budget 2016–2017		
		Revenue	Capital	Total
1	TOTAL EXPENDITURE (2+3)	1731036.83	247023.62	1978060.45
2	Non Plan Expenditure	1327408.73	100641.72	1428050.45
3	Plan Expenditure	403628.10	146381.90	550010.00
4	Central Assistance for State & UT Plans	227551.38	14349.06	241900.44
5	BUDGET SUPPORT FOR CENTRAL	176076.72	132032.84	308109.56
6	Resources of Public Enterprises	—	398138.84	398138.84
7	CENTRAL PLAN (5+6)	176076.72	530171.68	706248.40

Growth of Economy accelerated to 7.6% in 2015–16. India hailed as a 'bright spot' amidst a slowing global economy by IMF. Robust growth achieved despite very unfavourable global conditions and two consecutive years shortfall in monsoon by 13%. Foreign exchange reserves touched highest ever level of about $350 billion. Despite increased devolution to States by 55% as a result of the 14th finance commission award, plan expenditure increased at RE stage in 2015–16 – in contrast to previous years. Among the challenges in 2016–17, the risks of further global slowdown and turbulence, and additional fiscal burden due to 7th Central Pay Commission recommendations and OROP remain atop.

FISCAL DISCIPLINE

- Fiscal deficit in RE 2015–16 and BE 2016–17 retained at 3.9% and 3.5%. Revenue Deficit target from 2.8% to 2.5% in RE 2015–16.
- Total expenditure projected at ₹19.78 lakh crores. Plan expenditure pegged at ₹5.50 lakh crores under Plan, increase of 15.3%. Non-Plan expenditure kept at ₹14.28 lakh crores.
- Special emphasis to sectors such as agriculture, irrigation, social sector including health, women and child development, welfare of scheduled castes and scheduled tribes, minorities, infrastructure.
- Mobilisation of additional finances to the extent of ₹31,300 crores by NHAI, PFC, REC, IREDA, NABARD and Inland Water Authority by raising Bonds.
- Planned / Non-Planned classification to be done from 2017–18. Every new scheme sanctioned will have a sunset date and outcome review.
- Rationalised and restructured more than 1500 Central Plan Schemes into about 300 central sector and 30 centrally sponsored schemes.
- Committee to review the implementation of the FRBM Act.
- Budget Estimates of Expenditure for 2016–2017 show a net increase of ₹1,92,669 crores over the Revised Estimates. Non-Plan Expenditure and Plan Expenditure have shown increase of ₹1,19,856 crores and ₹72,813 crores respectively. The Major items where variations have occurred are indicated are shown in the table here:

		(₹ in crores)			
		Revised 2015–16	Budget 2016–17	Variation Saving(–)/ Excess(+)	
NON PLAN					
1.	Interest Payments	442620	492670	(+)	50050
2.	Pensions	95731	123368	(+)	27637
3.	Defence	224636	24099	(+)	24463
4.	Grants to State Governments	105346	115645	(+)	10299

5.	Police	52680	59796	(+)	7116
6.	Education	12811	14551	(+)	1740
7.	Postal Deficit	6749	8416	(+)	1667
8.	Elections	2211	3731	(+)	1520
9.	Agriculture & allied services	2734	4016	(+)	1282
10.	Subsidies	257801	250433	(–)	7368
11.	Other Non Plan expenditure	104875	106325	(+)	1450
Total Non Plan Expenditure		**1308194**	**1428050**	**(+)**	**119856**
PLAN					
1.	Central Plan	261089	308110	(+)	47021
2.	Central Assistance for State & UT Plans	216108	241900	(+)	25792
Total Plan Expenditure		**177197**	**550010**	**(+)**	**72813**
Total Expenditure					
(Plan+Non Plan)		**1785391**	**1978060**	**(+)**	**192669**

IMPORTANT BUDGET INFOGRAPHICS

	BUDGET AT A GLANCE (Union Budget 2016–17)	2014–2015 Actuals @	2015–2016 Budget Estimates	2015–2016 Revised Estimates	2016–2017 Budget Estimates
1	**Revenue Receipts**	**1101472**	**1141575**	**1206084**	**1377022**
	2 Tax Revenue (net to centre)	*903615*	*919842*	*947508*	*1054101*
	3 Non-Tax Revenue	*197857*	*221733*	*258576*	*322921*
4	**Capital Receipts (5+6+7)$**	**562201**	**635902**	**579307**	**601038**
	5 Recoveries of Loans	*13738*	*10753*	*18905*	*10634*
	6 Other Receipts	*37737*	*69500*	*25312*	*56500*
	7 Borrowings and other liabilities*	*510725*	*555649*	*535090*	*533904*
8	**Total Receipts (1+4)$**	**1663673**	**1777477**	**1785391**	**1978060**
9	**Non-Plan Expenditure**	**1201029**	**1312200**	**1308194**	**1428050**
	10 On Revenue Account, of which,	*1109394*	*1206027*	*1212669*	*1327408*
	11 Interest Payments	*402444*	*456145*	*442620*	*492670*
	12 On Capital Account	*91635*	*106173*	*95525*	*100642*

13	**Plan Expenditure**	**462644**	**465277**	**477197**	**550010**
14	*On Revenue Account*	*357597*	*330020*	*335004*	*403628*
15	*On Capital Account*	*105047*	*135257*	*142193*	*146382*
16	**Total Expenditure (9+13)**	**1663673**	**1777477**	**1785391**	**1978060**
17	*Revenue Expenditure (10+14)*	*1466992*	*1536047*	*1547673*	*1731037*
18	*Of Which, Grants for creation of Capital Assets*	*130760*	*132472*	*132004*	*166840*
19	*Capital Expenditure (12+15)*	*196681*	*241430*	*237718*	*247023*
20	**Revenue Deficit (17–1)**	**365519**	**394472**	**341589**	**354015**
	As percentage of GDP	*2.9%*	*2.8%*	*2.5%*	*2.3%*
21	**Effective Revenue Deficit (20–18)#**	**234759**	**268000**	**209585**	**187175**
	As percentage of GDP	*1.9%*	*2.0%*	*1.5%*	*1.2%*
22	**Fiscal Deficit {16–(1+5+6)}**	**510725**	**555649**	**535090**	**533904**
	As percentage of GDP	*4.1%*	*3.9%*	*3.9%*	*3.5%*
23	**Primary Deficit (22–11)**	**108281**	**99504**	**92469**	**41234**
	As percentage of GDP	*0.9%*	*0.7%*	*0.7%*	*0.3%*

*Deviation in BE 2015–16 is due to better caption of information. [$ Excluding receipts under Market Stabilization Scheme; *Includes draw-down of Cash Balance.]*

Notes: 1. GDP for BE 2016–2017 has been projected at ₹15065010 crores assuming 11% growth over the Advance Estimates of 2015–2016 (₹13567192 crores) released by CSO.

2. Individual items in this document may not sum up to the totals due to rounding off.

Source: Budget document 2016–17.

Rupee Comes From

Corporation Tax 19p.
Income tax 14p.
Customs 9p.
Borrowings and Other Liabilities 21p.
Union Excise Dutie 12p.
Non-debt Capital Receipts 3p.
Service tax and Other taxes 9p.
Non-Tax Revenues 13p.

Borrowings 21p.
Receipts 79p.

Income tax
Customs
Union Excise Duties
Service tax and Other taxes
Non-Tax Revenues
Non-debt Capital Receipts
Borrowings and Other Liabilities
Corporation Tax

RUPEE GOES TO

RUPEE GOES TO

BE → Budget Estimates; RE → Revised Estimates.

RESOURCES TRANSFERED TO STATES

(all figures in Rs. crore)

(Includes Net Resources Transferred and Investment from National Small Savings Fund)

Year	Value
2005-06	256283
2006-07	262642
2007-08	268773
2008-09	289062
2009-10	335892
2010-11	437089
2011-12	436461
2012-13	503303
2013-14	540579
2014-15	716365
2015-16	870674
2016-17	937705

ROADMAP & PRIORITIES

- 'Transform India' to have a significant impact on economy and lives of people.
- Government to focus on –
  - —ensuring macro-economic stability and prudent fiscal management.
  - —boosting on domestic demand
  - —continuing with the pace of economic reforms and policy initiatives to change the lives of our people for the better.
- Focus on enhancing expenditure in priority areas of - farm and rural sector, social sector, infrastructure sector employment generation and recapitalisation of the banks.
- Focus on Vulnerable sections through:
  - —Pradhan Mantri Fasal Bima Yojana
  - —New health insurance scheme to protect against hospitalisation expenditure
  - —Facility of cooking gas connection for BPL families
- Continue with the ongoing reform programme and ensure passage of the Goods and Service Tax bill and Insolvency and Bankruptcy law
- Undertake important reforms by:
- giving a statutory backing to AADHAR platform to ensure benefits reach the deserving.
- freeing the transport sector from constraints and restrictions.

- incentivising gas discovery and exploration by providing calibrated marketing freedom.
- enactment of a comprehensive law to deal with resolution of financial firms.
- provide legal framework for dispute resolution and re-negotiations in PPP projects and public utility contracts.
- undertake important banking sector reforms and public listing of general insurance companies undertake significant changes in FDI policy.

CO-OPERATIVE FEDERALISM
- More Power to States
(Net Resources Transferred to States)

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                                              9.21
                           8.21
           6.75
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| Actual 2014-15 | Revised Estimates 2015-16 | Budgeted Estimates 2016-17 |
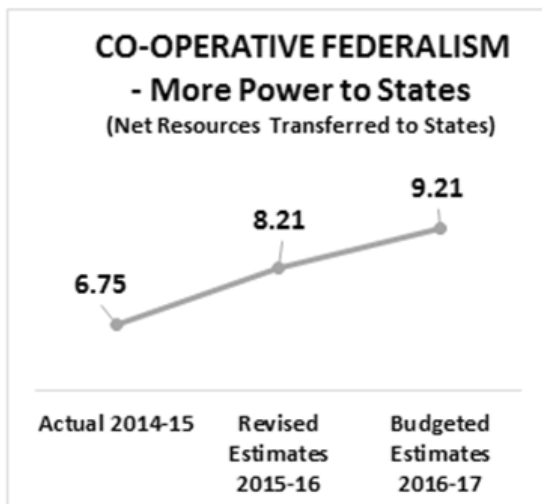
AGRICULTURE AND FARMERS' WELFARE

- Allocation for Agriculture and Farmers' welfare is ₹35,984 crores.
- 'Pradhan Mantri Krishi Sinchai Yojana' to be implemented 28.5 lakh hectares will be brought under irrigation.
- Implementation of 89 irrigation projects under AIBP, which are languishing for a long time, will be fast tracked.
- A dedicated long term irrigation fund will be created in NABARD with an initial corpus of about ₹20,000 crores.
- Programme for sustainable management of ground water resources with an estimated cost of ₹6,000 crores will be implemented through multilateral funding.
- Five lakh farm ponds and dug wells in rain fed areas and 10 lakh compost pits for production of organic manure will be taken up under MGNREGA.
- Soil health card scheme will cover all 14 crores farm holdings by March 2017.
- 2,000 model retail outlets of fertilizer companies will be provided with soil and seed testing facilities during the next three years.

- Promote organic farming through '*Parmparagat Krishi Vikas Yojana*' and 'Organic Value Chain Development in North East Region'.
- Unified agricultural marketing e-platform to provide a common e-market platform for wholesale markets.
- Allocation under *Pradhan Mantri Gram Sadak Yojana* increased to ₹19,000 crores. Plan to connect remaining 65,000 eligible habitations by 2019.
- To reduce the burden of loan repayment on farmers, a provision of ₹15,000 crores has been made in the BE 2016–17 towards interest subvention.
- Allocation under Prime Minister Fasal Bima Yojana ₹5,500 crores.
- ₹850 crores for four dairy projects - '*Pashudhan Sanjivani*', '*Nakul Swasthya Patra*', '*E-Pashudhan Haat*' and National Genomic Centre for indigenous breeds.

INCREASED ALLOCATION TO KEY SECTORS

■ 2015-16 Revised Estimates
■ 2016-17 Budgeted Estimates

Sector	2015-16 Revised Estimates	2016-17 Budgeted Estimates
Agriculture and Irrigation	25988	47912
Social Sectors Incl. Education and Health	139619	151581
Rural Development and Drinking Water	90185	101775
Infrastructure and Energy	180610	221246

Series "2015-16 Revised Estimate
Value: 180610

RURAL SECTOR

- Allocation for rural sector- ₹87,765 crores.
- ₹2.87 lakh crores will be given as grant in aid to gram panchayats and municipalities as per the recommendations of the 14th Finance Commission.
- Every block under drought and rural distress will be taken up as an intensive Block under the Deen Dayal Antyodaya Mission.
- A sum of ₹38,500 crores allocated for MGNREGA.
- 300 rurban clusters will be developed under the Shyama Prasad Mukherjee Rurban Mission.
- 100% village electrification by May 1, 2018.

- District level committees under chairmanship of senior most lok sabha MP from the district for monitoring and implementation of designated central sector and Centrally Sponsored Schemes.
- Priority allocation from Centrally Sponsored Schemes to be made to reward villages that have become free from open defecation.
- A new Digital Literacy Mission Scheme for rural India to cover around 6 crores additional household within the next 3 years.
- National Land Record Modernisation Programme has been revamped.
- New scheme Rashtriya Gram Swaraj Abhiyan proposed with allocation of ₹655 crores.

SOCIAL SECTOR INCLUDING HEALTH CARE

- ₹1,51,581 crores were allocated for social sector including education and health.
- ₹2,000 crores allocated for initial cost of providing LPG connections to BPL families.
- New health protection scheme will provide health cover up to ₹ 1 lakh per family. For senior citizens an additional top-up package up to ₹30,000 will be provided.
- 3,000 Stores under Prime Minister's Jan Aushadhi Yojana will be opened during 2016–17.
- 'National Dialysis Services Programme' to be started under National Health Mission through PPP mode.
- 'Stand Up India Scheme' to facilitate at least two projects per bank branch. This will benefit at least 2.5 lakh entrepreneurs.
- National Scheduled Caste and Scheduled Tribe Hub to be set up in partnership with industry associations.
- Allocation of ₹100 crores each for celebrating the birth centenary of Pandit Deen Dayal Upadhyay and the 350th birth anniversary of Guru Gobind Singh.

ALLOCATION TO VULNERABLE SECTORS

- 2015-16 Revised Estimates
- 2016-17 Budgeted Estimates

	Welfare of Women	Welfare of Children	SC Sub Plan	ST Sub Plan
2015-16 Revised Estimates	81,249	64,635	20,963	34,675
2016-17 Budgeted Estimates	90,625	65,758	24,005	38,833
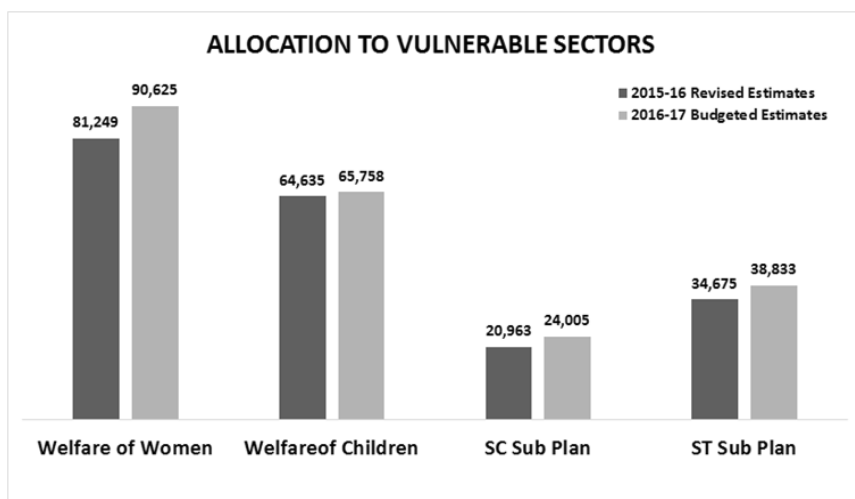
EDUCATION, SKILLS AND JOB CREATION

- 62 new *Navodaya Vidyalayas* will be opened.
- *Sarva Shiksha Abhiyan* to increasing focus on quality of education.
- Regulatory architecture to be provided to ten public and ten private institutions to emerge as world-class teaching and research institutions.
- Higher Education Financing Agency to be set-up with the initial capital base of ₹1000 crores.
- Digital depository for school leaving certificates, college degrees, academic awards and mark sheets to be set-up.

SKILL DEVELOPMENT

- Allocation for skill development – ₹1804 crores.
- 1500 multi skill training institutes to be set-up.
- National Board for Skill Development Certification to be setup in partnership with the industry and academia.
- Entrepreneurship education and training through massive open online courses.

JOB CREATION

- GoI will pay contribution of 8.33% for of all new employees enrolling in EPFO for the first three years of their employment. Budget provision of ₹1000 crores for this scheme.
- Deduction under the Section 80JJAA of income tax act will be available to all assesses who are subject to statutory audit under the Act.
- 100 model career centres to be operational by the end of 2016–17 under National Career Service.
- Model Shops and Establishments Bill to be circulated to states.

INFRASTRUCTURE AND INVESTMENT

- Total investment in the road sector, including PMGSY allocation, would be ₹97,000 crores during 2016–17.
- India's highest ever kilometres of new highways were awarded in 2015. To approve nearly 10,000 kms of national highways in 2016–17.
- Allocation of ₹55,000 crores in the budget for roads. Additional ₹15,000 crores to be raised by NHAI through bonds.
- Total outlay for infrastructure- ₹2,21,246 crores.
- Amendments to be made in Motor Vehicles Act to open up the road transport sector in the passenger segment.
- Action plans for revival of un-served and underserved airports to be drawn up in partnership with the state governments.
- To provide calibrated marketing freedom in order to incentivise gas production from deep-water, ultra deep-water and high pressure-high temperature areas.
- Comprehensive plans, spanning next 15 to 20 years, to augment the investments in nuclear power generation to be drawn up.

- Steps to revitalise PPPs:
- Public Utility (resolution of disputes) Bill will be introduced during 2016–17.
- Guidelines for renegotiation of PPP concession agreements will be issued.
- New credit rating system for infrastructure projects to be introduced.
- Reforms in FDI policy in areas of insurance and pension, asset reconstruction companies, stock exchanges.
- 100% FDI to be allowed through FIPB route in marketing of food products produced and manufactured in India.
- A new policy for management of government investment in public sector enterprises, including disinvestment and strategic sale, approved.

FINANCIAL SECTOR REFORMS

- A comprehensive code on resolution of financial firms to be introduced.
- Statutory basis for a monetary policy framework and a Monetary Policy Committee through the Finance Bill 2016.
- A Financial Data Management Centre to be set up.
- RBI to facilitate retail participation in government securities.
- New derivative products will be developed by SEBI in the commodity derivatives market.
- Amendments in the SARFAESI Act 2002 to enable the sponsor of an ARC to hold up to 100% stake in the ARC and permit non-institutional investors to invest in securitization receipts.
- Comprehensive Central Legislation to be bought to deal with the menace of illicit deposit taking schemes.
- Increase in the members and benches of the Securities Appellate Tribunal.
- Allocation of ₹25,000 crores towards recapitalisation of public sector banks.
- Target of amount sanctioned under *Pradhan Mantri Mudra Yojana* increased to ₹1,80,000 crores.
- General insurance companies owned by the government to be listed in the stock exchanges.

GOVERNANCE AND EASE OF DOING BUSINESS

- A task force has been constituted for rationalisation of human resources in various ministries.
- A comprehensive review and rationalisation of autonomous bodies should be done.
- Bill for targeted delivery of financial and other subsidies, benefits and services can be paid by using the Aadhar framework to be introduced.
- Introduce DBT on pilot basis for fertilizer.
- Automation facilities will be provided in 3 lakh fair price shops by March 2017.
- Amendments in companies act should be done time to time to improve enabling environment for start-ups.

- Price stabilisation fund with a corpus of ₹900 crores to maintain the stable prices of Pulses.
- '*Ek Bharat Shreshtha Bharat'* programme will be launched to link states and districts in an annual programme that connects people through exchanges in areas of language, trade, culture, travel and tourism.

SIMPLIFICATION AND RATIONALIZATION OF TAXES

- 13 cesses, levied by various ministries in which revenue collection is less than ₹50 crores in a year to be abolished.
- For non-residents providing alternative documents to PAN card, higher TDS, need not to apply.
- Revision of return extended to central excise assesses.
- Additional options for banking companies and financial institutions, including NBFCs, for reversal of input tax credits with respect to non-taxable services should be introduced.
- Customs act to provide for deferred payment of customs duties for importers and exporters with proven track record.
- Customs Single Window Project to be implemented at major ports and airports starting from the beginning of next financial year.
- Increase in free baggage allowance for international passengers. Filing of baggage only for those carrying dutiable goods.

RELIEF TO SMALL TAX PAYERS

- Raise the ceiling of tax rebate under section 87A from ₹2000 to ₹5000 to lessen tax burden on individuals with income upto ₹5 laks.
- Increase the limit of deduction of rent paid under section 80GG from ₹24000 per annum to ₹60000, to provide relief to those who live in rented houses.
- The income tax slabs and rates for GY 2016–17 (assessment year 2017–18) are given in the table below:

Income Tax Slabs & Rates: FY 2016–2017 (AY 2017–18)			ReLakhs.com
Income Slabs	General Category (non-senior citizens)	Senior Citizens (60 & above years of age, but below 8 years)	Very Senior Citizens (80 years & above of age)
	Income Tax Rates		
Upto ₹2,50,000	Nil	Nil	Nil
₹2,50,001 to ₹3,00,000	10%	Nil	Nil
₹3,00,001 to ₹5,00,000	10%	10%	Nil
₹5,00,001 to ₹10,00,000	20%	20%	20%
Above ₹10,00,000	30%	30%	30%

BOOST EMPLOYMENT AND GROWTH

- Increase the turnover limit under Presumptive Taxation scheme under section 44AD of the income tax act to ₹2 crores to bring big relief to a large number of assesses in the MSME category.
- Extend the presumptive taxation scheme with profit deemed to be 50%, to professionals with gross receipts up to ₹50 lakh.
- Phasing out deduction under Income Tax.
- Accelerated depreciation wherever provided in IT Act will be limited to maximum 40% from April 1, 2017.
- Benefit of deductions for Research would be limited to 150% from April 1, 2017 and 100% from April 1, 2020.
- Benefit of section 10AA to new SEZ units will be available to those units which commence activity before March 31, 2020.
- The weighted deduction under section 35CCD for skill development will continue up to April 1, 2020.
- Corporate tax rate proposals:
- New manufacturing companies incorporated on or after March 1, 2016 to be given an option to be taxed at 25% + surcharge and cess provided they do not claim profit linked or investment linked deductions and do not avail of investment allowance and accelerated depreciation.
- Lower the corporate tax rate for the next financial year for relatively small enterprises i.e. companies with turnover not exceeding ₹5 crores (in the financial year ending March 2015), to 29% plus surcharge and cess.
- 100% deduction of profits for three out of five years for start up set up during April, 2016 to March, 2019. MAT will apply in such cases.
- 10% rate of tax on income from worldwide exploitation of patents developed and registered in India by a resident.
- Complete pass through of income-tax to securitization trusts including trusts of ARCs. Securitisation trusts required to deduct tax at source.
- Period for getting benefit of long term capital gain regime in case of unlisted companies is proposed to be reduced from three to two years.
- Non-banking financial companies shall be eligible for deduction to the extent of 5% of its income in respect of provision for bad and doubtful debts.
- Determination of residency of foreign company on the basis of Place of Effective Management (POEM) is proposed to be deferred by one year.
- Commitment to implement General Anti Avoidance Rules (GAAR) from April 1, 2017.
- Exemption of service tax on services provided under Deen Dayal Upadhyay Grameen Kaushalya Yojana and services provided by assessing bodies empanelled by Ministry of Skill Development & Entrepreneurship.

- Exemption of service tax on general insurance services provided under Niramaya Health Insurance Scheme launched by national trust for the welfare of persons with Autism, Cerebral Palsy, Mental Retardation and Multiple Disability.
- Basic custom and excise duty on refrigerated containers reduced to 5% and 6%.

MAKE IN INDIA

- Changes in customs and excise duty rates on certain inputs to reduce costs and improve competitiveness of domestic industry in sectors like IT hardware, capital goods, defence production, textiles, mineral fuels and mineral oils, chemicals and petrochemicals, paper, paperboard and newsprint, maintenance repair and overhauling [MRO] of aircrafts and ship repair.

MOVING TOWARDS A PENSIONED SOCIETY

- Withdrawal up to 40% of the corpus at the time of retirement to be tax exempt in the case of National Pension Scheme (NPS). Annuity fund which goes to legal heir will not be taxable.
- In case of superannuation funds and recognized provident funds, including EPF, the same norm of 40% of corpus to be tax free will apply in respect of corpus created out of contributions made on or from 2016.
- Limit for contribution of employer in recognized Provident and Superannuation Fund of ₹1.5 lakh per annum for taking tax benefit. Exemption from service tax for Annuity services provided by NPS and Services provided by EPFO to employees.
- Reduce service tax on Single premium Annuity (Insurance) Policies from 3.5% to 1.4% of the premium paid in certain cases.

PROMOTING AFFORDABLE HOUSING

- 100% deduction for profits to an undertaking in housing project for flats upto 30 sq. metres in four metro cities and 60 sq. metres in other cities, approved during June 2016 to March 2019 and completed in three yea ₹MAT to apply.
- Deduction in the additional interest rates of ₹50,000 per annum for loans up to ₹35 lakh sanctioned in 2016–17 for first time home buyers, where house cost does not exceeds ₹50 lakh.
- Distribution made out of income of SPV to the REITs and INVITs having specified shareholding will not be subjected to Dividend Distribution Tax, in respect of dividend distributed after the specified date.
- Exemption from service tax on construction of affordable houses up to 60 square metres under any scheme of the central or state government including PPP Schemes.
- Extend excise duty exemption, presently available to concrete mix manufactured at site for use in construction work to ready mix concrete.

RESOURCE MOBILIZATION FOR AGRICULTURE, RURAL ECONOMY AND CLEAN ENVIRONMENT

- Additional tax at the rate of 10% of gross amount of dividend will be payable by the recipients receiving dividend in excess of ₹10 lakh per annum.
- Surcharge to be raised from 12% to 15% on persons, firms and co-operative societies having income above ₹1 crore.
- Tax to be deducted at the rate of 1% on purchase of luxury cars exceeding value of ₹10 lakh and purchase of goods and services in cash exceeding value of ₹ 2 lakh.
- Securities Transaction Tax in case of 'Options' is proposed to be increased from 0.017% to 0.05%.
- Equalization levy of 6% of gross amount for payment made to non-residents exceeding ₹1 lakh a year in case of B2B transactions.
- Krishi Kalyan Cess, @ 0.5% on all taxable services, w.e.f. June 1, 2016. Proceeds would be exclusively used for financing initiatives for improvement of agriculture and welfare of farmers. Input tax credit of this cess will be available for payment of this cess.
- Infrastructure cess, of 1% on small petrol, LPG, CNG cars, 2.5% on diesel cars of certain capacity and 4% on other higher engine capacity vehicles and SUVs. No credit of this cess will be available nor credit of any other tax or duty be utilized for paying this cess.
- Excise duty of '1% without input tax credit or 12.5% with input tax credit' on articles of jewellery [excluding silver jewellery, other than studded with diamonds and some other precious stones], with a higher exemption and eligibility limits of ₹6 crores and ₹12 crores respectively.
- Excise on readymade garments with retail price of ₹1000 or more raised to 2% without input tax credit or 12.5% with input tax credit.
- 'Clean Energy Cess' levied on coal, lignite and peat renamed to 'Clean Environment Cess' and rate increased from ₹200 per tonne to ₹400 per tonne.
- Excise duties on various tobacco products other than beedi raised by about 10 to 15%.
- Assignment of right to use the spectrum and its transfers has been deducted as a service leviable to service tax and not sale of intangible goods.

PROVIDING CERTAINITY IN TAXATION

- Committed to providing a stable and predictable taxation regime and reduce black money.
- Domestic taxpayers can declare undisclosed income or such income represented in the form of any asset by paying tax at 30%, and surcharge at 7.5% and penalty at 7.5%, which is a total of 45% of the undisclosed income. Declarants will have immunity from prosecution.
- Surcharge levied at 7.5% of undisclosed income will be called Krishi Kalyan surcharge to be used for agriculture and rural economy.

- New Dispute Resolution Scheme to be introduced. No penalty in respect of cases with disputed tax up to ₹10 lakh. Cases with disputed tax exceeding ₹10 lakh to be subjected to 25% of the minimum imposable penalty. Any pending appeal against a penalty order can also be settled by paying 25% of the minimum of the imposable penalty and tax interest on quantum addition.
- High Level Committee chaired by revenue secretary to oversee fresh cases where assessing officer applies the retrospective amendment.
- One-time scheme of Dispute Resolution for ongoing cases under retrospective amendment.
- Penalty rates to be raised to 50% of tax in case of under-reporting of income and 200% of tax where there is a misreporting of facts.
- Disallowance will be limited to 1% of the average monthly value of investments yielding exempt income, but not exceeding the actual expenditure claimed under rule 8D, Section 14A of Income Tax Act.
- Time limit of one year for disposing petitions of the tax payers seeking waiver of interest and penalty.
- Mandatory for the assessing officer to grant stay of demand once the assessee pays 15% of the disputed demand, while the appeal is pending before commissioner of income-tax (appeals).
- Monetary limit for deciding an appeal by a single member bench of ITAT enhanced from ₹15 lakhs to ₹50 lakhs.
- 11 new benches of Customs, Excise and Service Tax Appellate Tribunal (CESTAT).

TECHNOLOGY FOR ACCOUNTABILITY

- Expansion in the scope of e-assessments to all assesses in seven mega cities in the coming years.
- Interest rate of 9% p.a. against normal rate of 6% p.a. for delay in giving effect to appellate order beyond ninety days.
- 'e-sahyog' to be expanded to reduce compliance cost, especially for small tax payers.

BUDGET ALLOCATION TO MAJOR SECTORS

Defence (₹2,49,099 crores)

This includes revenue and capital expenditure on defence services, net of recoveries and revenue receipts. The components are army (₹1,13,732.72 crores), navy (₹17,424.79 crores), air force (₹23,655.83 crores), ordnance factories (₹1,217.61 crores), research and development (₹6,728.05 crores) and capital outlay on all the above services (₹86,340 crores) for modernisation of defence forces.

Petroleum Subsidy (₹26,947 crores)

Government modulates the retail selling price of diesel, PDS kerosene and domestic LPG to insulate consumers from the full impact of international crude prices. This includes ₹19,802.79 crores for subsidy on LPG and ₹7,144.21 crores for kerosene subsidy.

Tax Collection (₹12,017.24 crores)

The provisions are for expenditure of tax collecting agencies and relate mainly to the income tax department (₹5,131.16 crores), customs (₹3,176.73 crores) and central excise (₹3,579.68 crores). The expenditure relating to customs includes provision for coast guards (₹1,624.41 crores).

Education (₹14,551.04 crores)

The provision includes ₹2,695.47 crores for Kendriya Vidyalayas, ₹571 crores for Navodaya Vidyalaya Samiti, ₹2441.94 crores for University Grants Commission, ₹2008.71 crores for Indian Institutes of Technology and ₹1065.05 crores for National Institutes of Technology. This also includes provisions for Indian Institutes of Management (₹5 crores), Support to Indian Institute of Science and Indian Institutes of Science for Education and Research (₹302.52 crores), and assistance to other institutions (₹191.42 crores).

Medical, Public Health and Family Welfare (₹5188.63 crores)

The provision includes ₹920 crores for Central Government Health Scheme, ₹2077.55 crores for major central and medical institutions ₹384 crores for medical education, training and research. This also includes ₹252.70 crores towards ayurveda, yoga, naturopathy siddha and homoeopathy.

Information and Broadcasting (₹3,203.99 crores)

The provision includes grants to Prasar Bharati ₹2716.86 crores) towards meeting salary and salary related expenditure and ₹487.13 crores for the various information and publicity agencies like Films Division, Directorate of Advertising and Visual Publicity, Press Information Service, Song and Drama Division, Publications Division, etc.

Labour Welfare (₹4,722.42 crores)

The provision includes ₹4,025 crores for contribution to the Social Security for Employees' Pension Scheme, 1995. Other schemes for which provision has been made include Industrial Relations, Working Conditions and Safety, Labour Welfare, Labour Education and Training of Craftsmen and Supervisors.

Social Security and Welfare (₹1,329.60 crores)

The provision includes ₹760.16 crores for pension and other benefits to freedom fighters, ₹61.03 crores for child and women welfare and ₹67 crores for the welfare and empowerment of persons with disabilities.

Secretariat Social Services (₹570.12 crores)

This includes a provision of ₹107.62 crores for Health and Family Welfare Secretariat, ₹95.99 crores for higher education, ₹47.89 crores for labour & employment and ₹70.32 crores for information & broadcasting.

Others (₹2568.55 crores)

This includes art & culture (₹723.73 crores), housing & urban development (₹959.53 crores), and sports & youth services (₹166 crores).

ECONOMIC SERVICES

Agriculture and Allied Activities (₹4,015.54 crores)

The provisions are for various schemes relating to crop husbandry, plantations, soil and water conservation, animal husbandry, dairy development, fisheries, forestry and wild life, food, storage, warehousing, etc. Major provision is for agricultural research and education (₹2,906.64 crores).

Foreign Trade & Export Promotion (₹1,711.76 crores)

The provision is mainly towards duty drawback CST (₹1,200 crores) for deemed export benefits.

Industry and Minerals (₹2,758.68 crores)

The main provisions are for village and small industries, the Geological Survey of India, the industrial projects of Department of Atomic Energy, including nuclear fuel projects and for organisations and schemes relating to textiles and jute. The provision for projects of Department of Atomic Energy takes into account ₹487.93 crores as net receipts on Fuel Fabrication Facilities, which is treated as a departmentally run commercial undertaking. This includes provision for Bhaba Atomic Research Centre (₹487.20 crores).

Transport (₹4133.35 crores)

The provisions mainly relate to maintenance of roads and bridges (₹3,525.64 crores), including national highways (₹2,837.57 crores), Border Roads Organisation (₹644 crores) and assistance to major and non-major ports (₹213.93 crores), lighthouses and lightships

Department is treated as a commercial undertaking and its receipt and expenditure are estimated ₹250 crores.

Science, Technology and Environment (₹7513.50 crores)

The provisions include ₹3,717.05 crores for Atomic Energy Research, ₹1,480.99 crores for Space Research, ₹390.53 crores for the Schemes of the Department of Science and Technology, ₹1,750.20 crores for the Council of Scientific and Industrial Research, ₹83.42 crores for ecology and environment and ₹50.72 crores for oceanographic research.

Census, Surveys and Statistics (₹808.81 crores)

The provision is mainly for National Sample Survey Organisation.

HIGHLIGHTS OF PLAN 2016–2017

The Gross budgetary support for 2016–17 is ₹5,50,010 crores, shows an increase of 15.26% over the Revised Estimates of 2015–16, and 18.2% over BE 2015–16.

It reflects the Government's commitment to further boost public investment in infrastructure on the one hand and provide sufficient allocation for development expenditure, particularly in of agriculture sector, areas of social welfare and employment generation.

The plan estimates of 2016–17 have to be seen in the context of the revised funding pattern on the recommendation of the sub-group of chief ministers on rationalisation of Centrally Sponsored Scheme.

As per the decision of government, the existing funding pattern of schemes defined as *'Core of the Core'* schemes have been retained. These schemes are:

- Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGA)
- National Social Assistance Programme
- Umbrella Scheme for the Development of Scheduled Castes
- Umbrella Programme for Development of Scheduled Tribes (Tribal Education and Van Bandhu Kalyan Yojana)
- Umbrella Programme for Development of Backward Classes and other vulnerable groups
- Umbrella Programme for Development of Minorities: (a) Multi Sectoral Development Programme for Minorities. (b) Education Scheme for Madaras and Minorities.

The funding pattern of core schemes, which form part of the National Development Agenda, will be shared 60:40 between the centre and the states (90:10 for the 8 north eastern and 3 himalayan states). A list of these schemes is given below:

- Cattle Development
- Green Revolution: (a) Krishi Unnati Yojana; (b) Rashtriya Krishi Vikas Yojana
- White Revolution - Rashtriya Pashudhan Vikas Yojna (livestock mission, veternary services and dairy Development)
- Blue Revolution
- Pradhan Mantri Krishi Sinchai Yojana – (a) Accelerated Irrigation Benefit and Flood Management Programme (Har Khet Ko Paani) (b) Per Drop More Crop; (c) Integrated Watershed Development Programme
- Pradhan Mantri Gram Sadak Yojana
- National Rural Drinking Water Mission
- Swachh Bharat Abhiyan—(a) Swachh Bharat Abhiyan – Rural; (b) Swachh Bharat Abhiyan - Urban
- National Health Mission (NHM)—(a) NHM - Rural and Urban Mission; (b) NHM - Human Resources in Health and Medical Education; (c) NHM - AYUSH
- Rashtriya Sawasthya Suraksha Yojana
- National Education Mission (NEM)—(a) NEM - Sarva Shiksha Abhiyan; (b) NEM - Rashtriya Madhyamik Siksha Abhiyan; (c) NEM - Teachers Training and Adult Education; (d) NEM - Rashtriya Uchhtar Siksha Abhiyan
- Mid Day Meals Programme
- Integrated Child Development Services (Umbrella ICDS)—(a) Core ICDS; (b) National Nutrition Mission; (c) Maternity Benefits Programme; (d) Scheme for Adolescent Girls; (e) Integrated Child Protection Scheme
- Pradhan Mantri Awas Yojna (PMAY)—(a) PMAY Rural; (b) PMAY Urban
- National Livelihood Mission (NLM)—(a) NLM-Rural; (b) NLM-Urban

- Forestry and Wild Life (F & WL)—(a) National Mission for Green India; (b) Integrated Development of Wildlife Habitats; (c) Conservation of Natural Resources and Ecosystems
- Urban Rejuvenation Mission – SMART Cities and AMRUT
- Modernization of Police Forces
- Infrastructure Facilities for Judiciary
- Member of Parliament Local Area Development Scheme

In case a scheme/sub-scheme in the above list has a central funding pattern less than 60:40, the existing funding pattern will continue.

The other optional schemes has listed in Annexure 'B' will be optional for the state governments and their fund sharing pattern will be 50:50 between the centre and the states, 80:20 for eight north-eastern states and three himalayan states.

- Border Area Development Programme
- National River Conservation Plan
- Shyama Prasad Mukherjee RURBAN Mission

EMPLOYMENT GENERATION

Mahatma Gandhi National Rural Employment Guarantee Scheme—the government has provisioned ₹38,500 crores for providing a legal guarantee of 100 days of wage employment in a financial year to every rural household whose adult members volunteer to do unskilled manual work. All the districts covering rural areas have been brought under NREGA with effect from April 1, 2008.

National Livelihood Mission (Rural & Urban)—₹3,325 crores has been provisioned in the budget for reducing poverty by enabling the poor rural and urban households to access gainful self-employment and skilled wage employment opportunities. It would ensure adequate coverage of vulnerable sections of the society including SCs/STs, women, minorities and persons with disabilities. For Pradhan Mantri Kaushal Vikas Yojana it has provisioned ₹1,700 crores, whereas for the Prime Minister's Employment Generation Programme it has kept aside ₹1,439 crores.

HOUSING

₹20,075 crores has been provisioned for the Pradhan Mantri Awas Yojana (Rural and Urban). The scheme provides assistance to rural and urban BPL households for construction of houses and upgradation of kutcha houses. 60% of the total allocation is for construction of houses for BPL families of SCs/STs.

RURAL DEVELOPMENT

Pradhan Mantri Gram Sadak Yojana— The government has provisioned ₹19,000 crores for providing connectivity to eligible unconnected rural habitations through good all-weather roads. The systematic upgradation of existing rural roads is also an essential component of the scheme.

Rural Drinking Water and Sanitation

₹5,000 crores is for the National Rural Drinking Water Programme for supplementing the states in their effort to provide safe drinking water to all rural habitations. Also, ₹9,000 crores is for Swachh Bharat Abhiyan for rural sanitation.

IRRIGATION

Pradhan Mantri Krishi Sinchai Yojana—₹2,340 crores for the development of micro irrigation (per drop more crop); ₹1,500 for Integration Watershed Development Programme; and, ₹2,000 crores for the accelerated irrigation benefit and flood management programme.

AGRICULTURE

₹5,500 crores for Pradhan Mantri Fasal Bima Yojana gets ₹5,550 crores; Rashtriya Krishi Vikas Yojana gets ₹5,400 crores and the Krishi Unnati Yojana gets ₹6.949 crores.

ANIMAL HUSBANDRY, DAIRYING AND FISHERIES

₹1,150 cores are kept aside for the White Revolution (Rashtriya Pashudhan Vikas Yojna); and, ₹450 for the Blue Revolution (including inland and marine fisheries).

FOOD AND PUBLIC DISTRIBUTION

₹52 crores for construction of godowns by Food Corporation of India and State Governments; ₹154 crores for construction of warehousing capacity; and, ₹75 crores for computerization of public distribution system operations.

ENVIRONMENT AND FORESTS

₹185 crores for Green India Mission: National Afforestation Programme, and ₹295 for Project Tiger.

MICRO, SMALL AND MEDIUM ENTERPRISES

₹530 crores for development of khadi, village & coir industries; ₹485 for technology upgradation and quality certification, and ₹351 crores for Infrastructure Development Programme.

CONSUMER AFFAIRS

₹900 cores are kept aside by the government as provision for the Price Stabilization Fund, and ₹94 crores for the consumer protection.

SCHOOL EDUCATION AND LITERACY

₹22,500 crores are allotted for Sarva Shiksha Abhiyan; ₹9,700 crores for National Programme of Mid-Day Meals in Schools; and, ₹3,700 crores for Rashtriya Madhyamik Shiksha Abhiyan.

HIGHER EDUCATION

₹5,755 crores are allotted for Technical Education; ₹2,050 crores for the University Grants Commission; and, ₹1,300 crores for the *Rashtriya Uchchtar Shiksha Abhiyan*.

WOMEN AND CHILD DEVELOPMENT

₹15,860 crores for Integrated Child Development Services (ICDS); ₹500 crores for Nirbhaya Schemes; ₹400 crores for Integrated Child Protection Scheme; ₹307 crores for Protection and Empowerment of Women; and, ₹100 crores for *Beti Bachao Beti Padhao* campaign.

INFORMATION TECHNOLOGY

₹1,282 crores for the Digital India Programme and telecommunication and electronic industries (Umbrella Programme); ₹800 crores for Unique Identification Authority of India for (i) issue of unique identification numbers for every resident, (ii) providing robust, ubiquitous and cost effective online authentication services, (iii) facilitating Aadhaar-enabled applications and payments, etc.

HEALTH

₹19,000 crores are allotted for National Health Mission; ₹2,450 crores for the Pradhan Mantri Swasthya Suraksha Yojana; and, ₹1500 crores for Rashtriya Swasthya Suraksha Yojana.

AYUSH

₹210 crores are allotted for support to AYUSH System; ₹265 crores for Research & Development; and, ₹400 crores for National Health Mission (AYUSH System).

INFORMATION AND BROADCASTING

₹650 crores for broadcasting sector; ₹125 crores People's Empowerment through Development Communication; and, ₹13 crores opening up of four new regional centers of IIMC in J&K, Kerala, Maharastra, and Mizoram states.

URBAN DEVELOPMENT

₹7205 crores for the smart cities & Atal Mission for Rejuvenation & Urban Transformation (AMRUT); ₹ – 10,000 crores for equity investment in Metro Rail Projects; ₹200 crores for the National Heritage Cities Programme; and, ₹2,300 crores for the Swacch Bharat Mission (Urban).

ROADS & HIGHWAYS

₹55,000 crores is budgeted for the Roads & Highways projects, of which ₹12,153 crores is kept aside for the Investment in National Highways Authority of India; ₹15,500 for the national highways (Original Works); and, ₹5,000 crores foe the Special Accelerated Road Development Programme for north east region.

POWER

₹3,000 are allotted for Deen Dayal Upadhyay Gram Jyoti Yojana; and, ₹5,500 for Integrated Power Development Scheme.

TOURISM

₹900 crores are allotted for Tourism Infrastructure Development Schemes; PRASAD, Swadesh Darshan.

TEXTILES

₹1480 crores are allotted for the Amended Technology Upgradation Fund Scheme; ₹700 crores for Village and Small Industries; and, ₹300 crores for the development of mega clusters.

SOCIAL JUSTICE AND EMPOWERMENT

₹2,791 for post-matric scholarship for scheduled castes; and, ₹885 crores for the post-matric scholarship for other backward classes.

DISABILITY AFFAIRS

₹130 crores are allotted for aids and appliances for handicapped; ₹193 crores for the Sugamya Bharat Abhiyan; and, ₹113 crores for various National Institutes for disabled persons.

TRIBAL AFFAIRS

₹1,400 crores are allotted for the assistance for scheme under provisio (I) of article 275 (1) of the constitution; ₹1250 for special central assistance for tribal sub-plan; and, ₹1,200 for Umbrella Scheme for education of ST children. Also, ₹600 crores for the Van Bandhu Kalyan Yojana has been provisioned in the budget.

DEVELOPMENT OF NORTH EASTERN REGION

₹800 core for Schemes of North-Eastern Council and ₹700 crores for the Non-Lapsable Central Pool of Resources (Central) have been budgeted.

MINORITY AFFAIRS

₹385 crores for 'Nai Manzil' (Education and Livelihood Programme) and ₹1,395 crores for pre and post matric scholarship has been budgeted.

HOME AFFAIRS

₹2,540 crores for Border Management and Development Programme, and ₹150 crores for the backend integration of distress signal from victims with mobile vans and control rooms (from Nirbhaya fund) has been budgeted.

SCIENCE AND TECHNOLOGY

The government has budgeted ₹4,000 crores for the science & technology; ₹2,300 crores for the scientific and industrial research; and, ₹1,600 crores for biotechnology.

SPACE

The government has budgeted ₹4,200 crores for space technologies; ₹843 crores for space applications; and, ₹796 crores for INSAT satellite system.

CIVIL AVIATION

₹1,700 crores has been budgeted in 2016–17 for equity infusion in Air India Limited.

ATOMIC ENERGY

₹3,122 crores are allotted for the Research and Development projects; ₹2,778 crores for Industrial and Mineral Sector projects; and, ₹9,860 crores for the Nuclear Power Schemes (inclusive of IEBR).

EARTH SCIENCES

The government has kept aside ₹360 crores for augmentation, operation and maintenance of Atmospheric Observation Systems Network to improve operational weather services and monsoon forecast in this budget. It has also budgeted ₹355 crores for ocean observational networks in the Indian Ocean and ocean advisory in various sectors and issue of warning of ocean disasters of tsunami and storm surges.

SPORTS

The government of India has provisioned in 2016–17 budget ₹350 crores for Rashtriya Yuva Sashaktikaran Abhiyan and, ₹215 crores for 'Khelo India'.

RASHTRIYA KALA SANSKRITI VIKAS

₹300 crores has been budgeted for Kala Sanskriti Vikas Yojana.

CHEMICALS AND PETROCHEMICALS

The government has provisioned ₹120 crores for promotion of chemical and petrochemical industries.

PHARMACEUTICALS

It has also provisioned ₹100 crores for eight National Institute of Pharmaceutical Education and Research (NIPER) and opening of three new NIPER. Also, ₹35 crores has been kept aside for the *Jan Aushadhi*.

INDUSTRY

₹1,400 crores are allotted for grants to Delhi Mumbai Industrial Corridor Project; ₹200 crores for investment promotion/ Make in India; and, ₹300 crores for the Indian Leather Development Programme.

POSTS

₹150 crores has been budgeted in 2016–17 for India posts payment bank; and, ₹300 crores for mechanisation and modernisation.

FINANCE

₹25,000 core for recapitalisation of public sector banks; ₹1,500 crores for Pradhan Mantri Mudra Yojana; ₹900 crores for Mudra Bank; ₹600 crores for India Aspiration Fund; ₹500 crores for NABARD; ₹450 crores for Aam Admi Bima Yojana; and, ₹200 for Atal Pension Yojana.

WATER RESOURCES RIVER DEVELOPMENT AND GANGA REJUVENATION

₹2,250 crores are allotted for Namami Gange for cleaning of the holy Ganga; ₹660 crores for water resource management; and, ₹250 crores for National River Conservation Plan.

RENEWABLE ENERGY

₹4,000 crores for Solar Energy Programme; and, ₹400 crores for Wind Energy Programme.

PHYSICAL TARGETS

FERTILIZER

➤ 237.89 lakh MT of nitrogenous fertiliser production targeted. ➤ 176.81 lakh MT of phosphatic fertiliser production targeted.

COAL AND LIGNITE

➤ 724.70 MT of domestic production of coal has been estimated during 2016–17, which is projected to be met from Coal India Limited and others. ➤ 26.80 MT of lignite production estimated during 2016–17.

STEEL

➤ 29.00 MT of iron ore production targeted by National Mineral Development Corporation Ltd. ➤ 19.07 MT of saleable steel production by Steel Authority of India Ltd. and Rashtriya Ispat Nigam Ltd. targeted.

NEW AND RENEWABLE ENERGY

➤ 12000 MW of Solar Energy ➤ 4100 MW of Wind Energy is targeted.

RAILWAYS

➤ 1500 kilometers of track renewal. ➤ 2000 kilometers of electrification. ➤ 800 kilometers of gauge conversion. ➤ 400 kilometers of new lines. ➤ 1600 kilometers of doubling. ➤ 747 locos additional manufacture is targeted.

ECONOMIC SURVEY 2015–16

On Feb 26, 2016, Arun Jaitley, the finance minister of India, tabled the economic survey 2015–16 in the parliament. The survey was prepared by the Chief Economic Adviser (CEA), Arvind Subramanian, suggested that the upsurge in investments in India is possible and there is no need to borrow more. Among other things, the survey has

very correctly recognised the necessity of rationalisation of fertilizer subsidies and has advised a reform package to handle the subsidy leakages and lopsided mix of fertilizer The economic survey, which has provided a platform to Arun Jaitley, India's Finance Minister's 3rd annual budget on Feb 26, 2016, predict that India's economy would grow by between 7.0% and 7.75% in the 2016–17 fiscal year. The survey was organised by the finance ministry's chief economic adviser Arvind Subramanian.

Economic Survey 2015–16

The economic survey 2015–16, that was presented in the parliament has indicated that India's estimated growth rate is in the range of 8 to 10% and same it requires a push in three vital fields i.e. encouraging entrepreneurship and limiting the role of the state, increased investments in health and education, and greater emphasis on agriculture.

Regarding the fiscal situation, the survey advocates enhancing the quality of expenditure and increasing revenues by making sure of improved tax compliances and utilising new resources for sustained fiscal strengthening.

Regarding building fiscal capacity, the survey suggests expanding the tax base and covering more people within the tax ambits through direct taxation irrespective of the source of income.

For developing agriculture, the survey has advocated increasing productivity by increasing the acreage under irrigation apart from adopting water efficient technologies and making optimum use of all inputs.

Highlights of the Economic Survey

Economic Outlook

- India's GDP growth is projected to grow at 7–7.5% in 2016–17 despite the diminishing global growth.
- Economic survey presents an enthusiastic depiction of the Indian economy.
- Amid continuing global headwinds, India continues to be one of the best performing economies.
- Inflation, fiscal deficit and current account balance have shown clear signs of improvement.
- The survey highlighted that increasing demand would be most essential and the implementation of the seventh pay commission and normal monsoons would hopefully provide some relief.
- The survey suggests that the economy would achieve 8.0% growth over the next couple of years.
- Moreover, India's long term potential growth rate is about 8–10% and achieving this potential needs a push on at least three points: supporting competition, more investments in health and education, and emphasis on agriculture.

Prices

- Wholesale price inflation had remained in the negative zone for over a year and the consumer price inflation is also as per RBI's indicative sphere.

- CPI inflation rate projected at 4.5–5.0% for 2016–17.
- The smart policies and handling of inflation by the government with the help of buffer stocking, apt release of cereals and import of pulses and minimal rise in Minimum Support Prices (MSP) of agricultural commodities assisted in keeping prices of essential commodities under control during 2015–16.
- The survey suggests that a rise in salaries and benefits as recommended by the 7th pay commission will probably not disturb prices and will have negligible impact on inflation.

Fiscal Deficit

- It appears that the fiscal deficit target which has been set at 3.9% of GDP is achievable as the Gross Tax Revenue (GTR) targets were achieved because of improved tax enthusiasm and prudent expenditure management, supported by falling oil prices.
- Regarding feasibility, two factors confound the fiscal task in 2016–17 and beyond, the 7th pay commission and necessity of enhancing public investment.
- There are still concerns over approval of GST bill, the disinvestment programme not achieving targets and the next level of subsidy rationalization remaining a work-in-progress.
- There is necessity to expand individual tax payers' base. Merely 5.5% of earning individuals are in the tax ambit, converting to a ratio of about 4% of tax payers to voters. This needs to be increased to a desirable figure of nearly 23%.
- For building fiscal capacity, the simplest way is to expand the tax base. Covering more and more people within the tax ambit through direct taxation will help in fulfilling the dream of Indian democracy.
- Rational taxation of the well-off individuals irrespective of their source of income industry, services, real estate or farm sector.

External Sectors

- The previous year's survey had recognised a fragile external environment as a major medium- term risk. It came out to be a short term risk as well, and the projections are that it might remain one in the coming period.
- Slack growth in developed and emerging economies has affected adversely India's exports and imports, chiefly on account of fallen prices of crude oil for which the country heavily depends on import.
- Country's Balance of Payments (BoP) condition continued to be comfortable during the first half of 2015–16 on account of the low levels of CAD along with reasonable rise in capital inflows.
- Current Account Deficit will probably be in the range of 1–1.5% of GDP in 2016–17.

Social Infrastructure, Employment & Human Development

- There are very large skill gaps in different productive sectors in India. The country has to handle the problem by increasing the employability of the labour force, which is associated with knowledge and skills development by means of quality education and training coupled with ensuring good health.

- The Economic Survey highlighted the need to improve the quality of education in both public and private sectors.
- To improve the delivery of public health services and infrastructure facilities, there is a need to increase both public and private investments.
- Making use of technology platforms and modernise models by supporting Jan Dhan Aadhar Mobile scheme can enhance the efficiency in delivery of services.

Banking and Financial Sector

- One of the most crucial short term challenges that the Indian economy is facing is the twin balance sheet problem- the dwindling financial conditions of the Public Sector Banks (PSBs) and some corporate houses.
- The twin balance sheet challenge is the chief obstruction to private investment and a comprehensive economic recovery.
- To resolve this challenge comprehensively 4 R's (Recognition, Recapitalization, Resolution, and Reform) are required.
- There is a need for the banks to value their assets close to true value (recognition) as the RBI has been stressing; with their doing so, their capital position must be protected through infusions of equity (re-capitalisation) as the banks have been demanding; the underlying stressed assets in the corporate sector must be sold or rehabilitated (resolution) as the government has been desiring; and future incentives for the private sector and corporates must be set-right (reform) to avoid a repetition of the problem, as everyone has been clamouring.

The Chakravyuha Challenge: Ease to Enter, Barriers to Exit

- India's economy has made great progress in removing hurdles for entry in firms, skill, and technology but negligible progress has been made to exit.
- It appears that India has an excessively large share of inefficient firms, having very low productivity and with little exit. This lack of exit produces externalities that damage the economy.
- Hindered exit has considerable fiscal, economic, and political costs.
- The Survey advocates five possible ways to resolve this problem: (i) Promotion of competition through private sector entry instead of change of ownership from public to private. (ii) Direct policy action through improved laws such as the Insolvency and Bankruptcy Code 2015 which will expedite exit. Institutions also need to be strengthened by empowering bureaucrats and reducing their susceptibility. (iii) By increased use of technology for the removal of persistent distortions by reducing human discretion and layers of intermediaries. (iv) By increasing transparency and showcasing social costs and benefits of various schemes and entitlements. (v) Highlighting exit as an opportunity towards a newer and better future.

RAILWAY BUDGET 2016—17

On Feb 25, 2016 the railway minister of India, Suresh Prabhakar Prabhu, tabled the railway budget for 2016–17. The budget has been presented to document a journey of transformation, the journey of our nation, by touching millions of human lives daily.

KEY FIGURES (in ₹ Crore)	Actual 2014–15	Budge 2015–16	Revised 2015–16	Budget 2016–17
Gross Traffic Receipts	1,56,711	1,83,578	1,67,834	1,84,820
Total Working Expenses	1,42,996	1,62,210	1,50,690	1,69,260
Net Railway Revenue	16,838	25,076	19,898	18,211
Dividend Payable to General Revenues	9,174	10,811	8,495	9,731
Operating Ratio	91.3%	88.5%	90.0%	92.0%
Excess	7,665	14,266	11,402	8,479

THEME OF THE BUDGET

- Overcoming challenges—Reorganize, Restructure and Rejuvenate Indian Railways
- Slogan—'*Chalo, Milkar Kuch Naya Karen*'
- Three pillars of the strategy i.e.
  Nav Arjan – New revenues,
  Nav Manak – New norms,
  Nav Sanrachna – New structures.

FINANCIAL PERFORMANCE OF INDIAN RAILWAYS IN 2015–16

- Gross traffic receipts witnessed net reduction by ₹15,744 crores in RE 2015–16 as against the BE target of ₹1,83,578 crores. Passenger earnings came down due to persistent negative growth trend since 2013–14.
- Freight earnings were affected due to low demand from the core sector leading to resetting the target in R.E. 2015–16 to ₹1,11,853 crores.
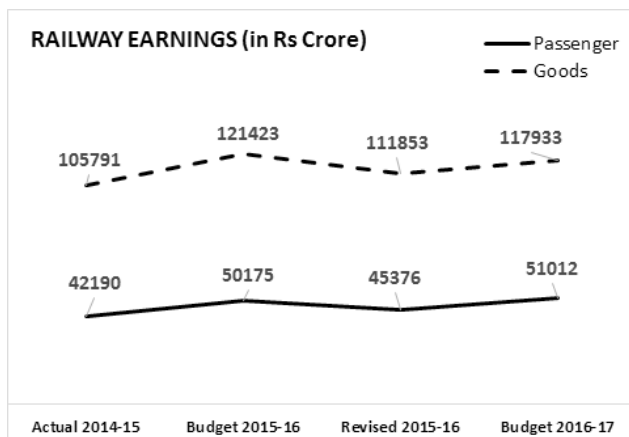
- Strict economy and austerity steps were taken to check the Ordinary Working Expenses (OWE) due to which budgeted ordinary working expenses of ₹1,19,410 crores fell in the revised estimates 2015–16 to ₹1,10,690 crores i.e. by ₹8,720 crores.

- BE had allocated an appropriation of ₹34,900 crores to the pension fund. However, the pension expenditure moderately decreased to ₹34,500 crores in RE.
- Internal resource generation decreased and appropriation to DRF fell to ₹5,500 crores in RE from the BE 2015–16 provisioning of ₹7,900 crores.
- Plan size for 2015–16, at present, is assessed at 1,00,000 crores.

BUDGET ESTIMATES 2016–17

WORKING RESULTS (In Rs. Crore)

— Gross Traffic Receipts
— — Total Working Expenses

156711   183578   167834   184820
142996   162210   150690   169260

Actual 2014-15   Budget 2015-16   Revised 2015-16   Budget 2016-17
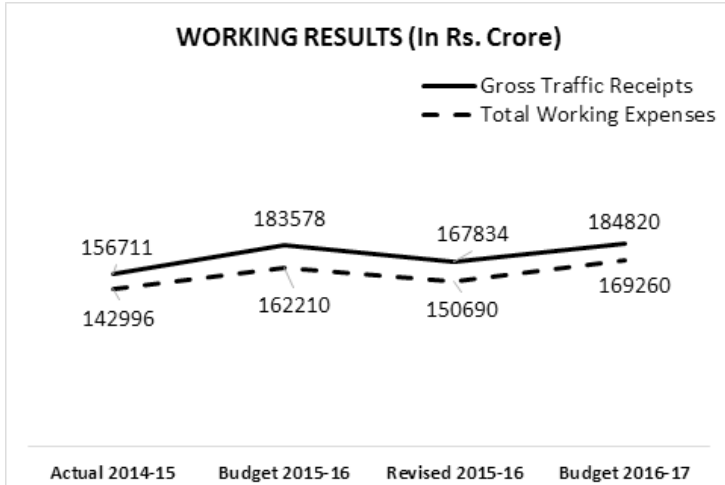
- The railway ministry intends to increase revenues and make sure of investments which can further the road-map of decongestion and increase line-capacity up-gradation as mentioned in 2015–16. The emphasis is on increased CAPEX with a mix of different sources of funding so that the projects may be provided with assured funding.
- Gross traffic receipts have been kept at ₹1,84,820 crores . Passenger earnings growth has been aimed at 12.4% and earnings target has been projected at ₹51,012 crores. The freight traffic is fixed at an increased traffic of 50MT with a hope of robust growth in the core sector of economy. Goods earnings are projected at ₹1, 17,933 crores. Other coaching and sundries are projected at ₹6,185 crores and ₹9,590.3 crores respectively.
- OWE has been provided for the implementation of the 7th CPC.
- Pension expenditure is budgeted at ₹45,500 crores in 2016–17.
- The internal resource position of the railways is affected by higher staff cost and pension liability. Accordingly, appropriation to DRF from revenue is projected at ₹3,200 crores and that from production units is at ₹200 crores. A withdrawal of ₹3,160 crores from DRF on net basis has been proposed though the gross expenditure will be met from DRF in the annual plan estimated at ₹7,160 crores. ₹5,750 crores proposed to be appro-priated to the capital fund. With a draw-down of ₹1,250 crores from previous balances

in the fund, plan requirement of ₹7,000 crores for repayment of principal component of lease charges to IRFC has been met.

• The organisation is formulating a plan size of ₹1,21,000 crores in 2016–17.

FINANCIAL PERFORMANCE

In 2015–16, savings of ₹8,720 crores neutralizing most of the revenue shortfall, expected or 90%; in 2016–17, Targeted Operating Ratio (OR) of 92%, control growth of ordinary working expenses by 11.6% after building in immediate impact of 7th PC, cutbacks planned in diesel and electricity consumption, generation of revenue aimed at ₹1,84,820 crores.

INVESTMENTS AND RESOURCES

Overhauling of process bottlenecks including allocation of powers to functional levels; average capital expenditure over 2009–14 is ₹48,100 crores, average growth of 8% per annum. In 2015–16 investment would be nearly two folds of the average of last five years. In 2016–17 CAPEX fixed at ₹1.21 lakh crores; execution through joint ventures with states, designing new frameworks for PPP, etc.

Vision Long-pending desires of the common man are expected to be fulfilled by 2020 i.e., the desires of availability of reserved accommodation on trains on demand, time tabled freight trains, modern technology to improve safety records, removal of all unmanned level crossings, improved levels of punctuality, increased average speed of freight trains, semi high speed trains plying along the golden quadrilateral, zero direct discharge of human waste.

Project Execution In 2015–16, Assured funding through LIC; upgradation of 2,500 kms broad gauge lines; upgradation of 1,600 kms of electrification, which is highest ever. In 2016–17, targeted upgradation 2,800 kms of track; upgradation of broad gauge lines at over seven kms per day in comparison to an average of about 4.3 kms per day in the last six years, is targetted. To increase to nearly 13 kms per day in 2017–18 and 19 kms per day in 2018–19; will generate jobs of about nine crores man days in 2017–18 and 14 crores man days in 2018–19. Allocation for railway electrification increased in 2016–17 by almost 50% aim to electrify 2,000 kms.

Dedicated Freight Corridor Nearly all contracts for civil engineering works to be given by March 31st 2016; ₹24,000 crores contracts awarded since November 2014 as against ₹13,000 crores contracts awarded in last six years; recommends to take up north-south, east-west and east coast freight corridors by means of innovative financing which includes PPP.

Port Connectivity Commissioning of Tuna Port and projects to provide rail connectivity to ports of Jaigarh, Dighi, Rewas and Paradip is under implementation; implementation of rail connectivity to the ports of Nargol and Hazira under PPP in 2016–17.

North East Opening of BG Lumding-Silchar section in Assam, connecting Barak Valley with rest of India, Agartala has been brought on to the BG network. Mizoram

and Manipur are shortly to appear on BG map of the country with upgradation of the Kathakal-Bhairabi and Arunachal-Jiribam Gauge Conversion projects.

Jammu and Kashmir   Katra-Banihal sections of Udhampur–Srinagar–Baramulla Rail Link Project is making satisfactory progress, 35 kms of tunnelling out of total 95 kms has been completed, Work to decongest traffic on Jalandhar–Jammu line is in full swing and doubling of two bridges to be upgraded and other two bridges to be completed by 2016–17.

Make in India   Two loco factories have been finalised; plan to increase the current procurement of train sets by 30%.

CAPACITY BUILDING FOR THE FUTURE THROUGH:

Transparency   Started online recruitments in 2015–16. This process is now being replicated for all positions. Social media is being used as a medium to bring in transparency. All procurement including procurement of works has been shifted to the e-platform. The trial of process leading to award the tender electronically has been completed and the same will be rolled out on a Pan-India basis in 2016–17.

Governance   The project sanction time has been compressed to 6–8 months in comparison with two years as earlier. Major result areas have been recognised to judge performance of GMs and DRMs. Performance related MOUs have also been signed with few zones, which will be replicated for all zones.

Internal Audit Measures   Specialised teams have been organised and have been given the responsibility to screen railway operations in particular areas to identify inefficiencies and check wastages.

Partnerships   Cabinet has given approval for JVs with state governments. 17 states have agreed and six MOUs have been signed with state governments. 44 new partnership projects covering nearly 5,300 kms and valuing nearly ₹92,714 crores have been mentioned in the budget papers.

Customer Interface   Interaction and feedback is provided through social media & dedicated IVRS system.

—*Stations being redeveloped:* Financial bid has been received for the redevelopment of Habibganj station, Bhopal. Cabinet approval for stations will be taken up under PPP.
—*Security has been upgraded:* Through helplines & CCTVs.
—*Safety:* 350 manned level crossings have been closed. 1,000 unmanned level crossings have been removed, 820 ROB/RUB have been completed in the current year and work is under progress in 1,350 of them.
—*To make travel comfortable:* More than 65,000 additional berths have been provided, 2,500 water vending machines have been installed; 'Mahamana Express' with modern revamped coaches have been introduced; 17,000 bio-toilets have been provided in trains; and world's first Bio-Vacuum toilet has been developed.
—*To improving punctuality:* Operations audit for Ghaziabad to Mughalsarai stations has been done.

—*Ticketing:* 1,780 automatic ticket vending machines, mobile apps & *Go India* smartcards for cashless purchase of UTS and PRS tickets have been introduced. The capacity of e-ticketing system has been enhanced from 2,000 tickets per minute to 7,200 tickets per minute. Now it can handle 1,20,000 concurrent users as against only 40,000 earlier.

—*Social initiatives:* Some of the provision such as one-time registration for availing concessions while booking tickets online. Online booking of wheelchairs and braille enabled new coaches introduced for the Divyang. (Note: Prime Minister, Narendra Modi has called the government departments to call the disabled as 'Divyang' instead of 'Viklang'. increased quota of lower berths for senior citizens and women, middle bays reserved in coaches for women, has been made for social wellbeing of travellers.

—100 stations have been provided with *Wi-Fi*. There is a plan to provide the service in 400 more stations.

Other major achievements • *Energy:* Savings of ₹3,000 crores per annum will be achieved in the next financial year, a year earlier than declared. The feat has been achieved by procuring power directly at competitive rates using IR's status as deemed distribution licensee. • *Rail University* – initially recognised the National Academy of Indian Railways at Vadodara. • *Digital India:* Application of Track Management System (TMS) has been launched. Inventory management module of TMS has led to inventory reduction by 27,000 MT which in turn led to saving of ₹64 crores and scrap identification of 22,000 MT in tune of ₹53 crores.

THE WAY AHEAD

Improving quality of travel

(For the unreserved passenger)

- **Antyodaya Express:** It is a unreserved, superfast service.
- **Deen Dayalu coaches:** These are unreserved coaches with drinking water and greater number of mobile charging points.

  (For the reserved passenger)

- **Humsafar:** It is fully air-conditioned third AC service with an optional service for meals.
- **Tejas** – It will showcase the future of train travel in India. It will run at speeds of 130 kmph and above. It will offer on board services such as entertainment, local cuisine, wi-fi, etc., through single service provider for making sure of accountability and improved customer satisfaction.
- **Humsafar and Tejas:** They will make sure cost recovery by means of tariff and non-tariff measures.
- **UDAY:** An overnight double-decker, Utkrisht Double-Decker Air-conditioned and Yatri Express on the busiest routes, are expected to increase carrying capacity by almost 40%.
- **Ticketing:** Sale of tickets will be done through hand held terminals. E-ticketing facility will be provided through foreign debit/credit cards. Bar coded tickets, scanners and access control will be introduced on a pilot basis.
- **Expansion of Vikalp:** Vikalp is a train on demand service that will provide choice of accommodation in particular trains to wait Page listed passengers. E-booking of tickets

facility on the concessional passes will be provided to journalists. Facility of cancellation of tickets through the 139 helpline will be available after verification using 'one time password' sent on registered phone number. CCTV cameras will be installed on windows and periodic audit of PRS website will be done in order to improve *tatkaal* services.

- **Cleanliness:** The provisions made to improve the cleanliness standards include '*Clean my Coach*' service through SMS, ranking of A1 and A stations based on periodic third party audit and passenger feedback; waste segregation and recycling centres and conducting awareness campaigns. Some of the other measures include additional 30,000 bio-toilets; constructing portable structures with bio-toilets at all platforms of select stations for senior citizens, *Divyang* and women travellers, plan to look for new means of providing and maintaining toilets such as advertisement rights, CSR, voluntary support from social groups.

- **Catering and stalls at stations:** IRCTC will handle catering services in a gradual manner. It will look for possibility of making catering services optional, providing additional 10 IRCTC operated base kitchens. IRCTC will build local ownership and empowerment, giving weightage to individuals holding district domicile for commercial licenses at stations.

- **Stoppages:** All the operational halts will be converted into commercial halts for the benefit of the passengers.

- **Rail Mitra Sewa:** Sarathi Seva in Konkan Railway will be expanded to help the old and disabled passengers, consolidating the prevailing services for helping passengers to book battery operated cars, porter services, etc. on a paid basis. The service will be provided in addition to the prevailing pick up and drop, and wheel chair services.

- **Measures for Divyang:** All stations are under redevelopment for making them accessible by *Divyang*. At least one *Divyang* friendly toilet at each platform in A1 class stations during the next financial year will be provided. Availability of wheelchairs in adequate numbers at these stations will also be made sure.

- **Travel Insurance to Passengers:** Passengers will be offered optional travel insurance for rail travels at the time of booking.

- **Hourly Booking of Retiring Rooms:** IRCTC will manage hourly booking of retiring rooms at the railway platforms.

- **Janani Sewa:** Children's menu items such as baby foods, hot milk and hot water would be made available in the train.

- **SMART (Specially Modified Aesthetic Refreshing Travel) Coaches:** The design and layout of coaches will make sure of higher carrying capacity and provision of new amenities which include automatic doors, bar-code readers, bio-vacuum toilets, water-level indicators, accessible dustbins, ergonomic seating, improved aesthetics, vending machines, entertainment screens, LED lit boards for advertising, PA system.

- **Mobile Apps:** All facilities will be integrated into two mobile apps which will deal with ticketing issues and for receipt and redressal of complaints and suggestions.

- **Improving Customer Interface:** The front-end staff and that which has been employed through service providers will be trained. Information boards in trains enumerating the

on-board services and also GPS based digital displays inside coaches will be installed to offer real time information regarding upcoming stoppages. Work on installation of a high-tech centralized network of 20,000 screens across 2000 stations for facilitating real time flow of information to passengers and also tap huge advertising potential is under progress. All A1 class stations will be managed with properly empowered station directors, supported by cross functional teams. Single person will be made accountable for providing all facilities on trains.

- *Pilgrimage centres:* The provision of passenger amenities and beautification on stations at pilgrimage centres such as Ajmer, Amritsar, Bihar Sharif, Chengannur, Dwarka, Gaya, Haridwar, Mathura, Nagapattinam, Nanded, Nasik, Pali, Parasnath, Puri, Tirupati, Vailankanni, Varanasi and Vasco will be taken on priority basis. The ministry also intends to run Aastha circuit trains to connect important pilgrim centres.

- *Porters:* The porters will be known as sahayaks, they will be provided new uniforms and will be trained in soft skills.

- *High Speed Rail:* Rail corridor from Ahmedabad to Mumbai is being undertaken for development of high speed rail with the assistance of the government of Japan. SPV for the execution of high speed projects will be registered this month. The chief advantage would be providing IR with technology advancements and new manufacturing efficiency.

- *Entertainment:* It has been proposed to invite FM radio stations for providing entertainment on board. The '*Rail Bandhu*' service will be extended to all the reserved classes of travellers and in all regional languages.

Passenger Traffic–Sub-urban Traffic—The approval for MUTP III has been received in principle. Tenders for elevated suburban corridors between Church gate- Virar and between CSTM-Panvel will be awarded soon. Ring railway system in Delhi will be revived. A new investment module for developing suburban systems in partnership with state governments will be launched for the development in Ahmedabad, Bengaluru, Hyderabad Chennai and Thiruvananthapuram.

WINNING BACK THE LOST MODAL SHARE

Expanding the freight basket of IR—Te railway will introduce time-tabled freight container, parcel and special commodity trains on a pilot basis. The railway will open container sector to all traffic excluding coal, specified mineral ores and part-loads during the non-peak season. The railway will grant access to all existing terminals/sheds to container traffic, where it is found feasible.

Rationalising the tariff structure—Tariff policy will be reviewed to develop a competitive rate structure *vis a vis* other modes. Multi-point loading/unloading will be allowed and differentiated tariffs will be applied to enhance utilization of substitute routes. Possibility of signing long run tariff contracts with major freight customers using pre-determined price escalation principles will be explored.

Building terminal capacity—Proposed to development of rail side logistics parks and warehousing in PPP mode has been proposed, of which 10 goods sheds will be developed

by TRANSLOC, the Transport Logistics Company of India, in 2016–17. Railways will soon inaugurate India's maiden rail auto hub in Chennai. Development of cold storage facilities on vacant land near freight terminals will be encouraged. The railways will give preferential usage of the facility to local farmers and fishermen. Railways are likely to issue a policy in this regard in the coming three months.

Nurturing Customers—Important customer managers will be appointed to liaison with major freight stakeholders. Each zonal railway will develop customer commitment charter showing service level commitments of IR. It will also explore the feasibility of opening up leasing of general purpose wagons.

Non-fare revenues

- Some of the measures taken to generate non- fare revenues include station redevelopment; monetizing land alongside tracks; monetizing soft assets – website, data, etc.; advertising; overhaul of parcel business - liberalize the current parcel policies including opening the sector to container train operators. The revenues from manufacturing activity aim at generating annualised revenues of about ₹4,000 crores by the year 2020.

Process Improvements

- **EPC projects—S**tandard document has been finalized and at least 20 projects will be implemented through this mode in 2016–17. The railway aims to award all works valuing above ₹300 crores through EPC contracts.
- **Performance output parameters based contracts—**Service contracts will be reviewed to integrate them and make them simpler and result oriented.
- **Leveraging technology for project management—**The railways intend to use modern drone and geo spatial based satellite technology for remotely monitoring the physical progress across chief projects. Monitoring of DFC will be made functional through this mode in 2016–17.
- **System-wide Information Technology integration—**System wide integration (horizontal and vertical), similar to an ERP through innovative partnership models has been introduced.

Rail Development Authority

- The railway will prepare a draft bill after holding extensive stakeholder consultations to enable fair pricing of services, encourage competition, protect customer interests and determine efficiency standards.

Undertaking Navarambh – A New Beginning

- *Navinikaran: Structural Interventions Organisational Restructuring*—Reorganization of the railway board along business lines has been proposed. The chairman of the railway board will be accordingly empowered. Initially, inter functional directorates will be set up in railway board that will focus on areas such as non-fare revenues, speed enhancement, motive power and information technology. They will also explore the

possibility of unifying cadres for fresh recruitment of officers. PPP cell will also be strengthened to improve ease of doing business with IR.

- *Sashaktikaran: Improving our planning practices—* A Railway Planning & Investment Organisation will be established which will for draft medium (five years) and long term (10 years), corporate plans, and will identify projects which will fulfil the corporate goals. It will also prepare a National Rail Plan to harmonise and incorporate the rail network with other modes of transport and create collaboration for achieving smooth multi-modal transportation network across the nation.

- *Aekikaran:* Consolidation: Establishing a holding company of companies owned by IR.

- *Shodh aur Vikas: Investing in the future:* A R&D organization, a Special Railway Establishment for Strategic Technology and Holistic Advancement, SRESTHA will be established. RDSO will concentration only on day to day issues, whereas, SRESTHA will undertake long run research.

- *Vishleshan – Analyzing Data:* The railways will create a dedicated, cross functional team called Special Unit for Transportation Research and Analytics (SUTRA) which will undertake detailed analytics which in turn will result into optimized investment decisions and procedures.

- *Navrachna – Innovation:* The railways will set aside ₹50 crores for providing innovation grants to employees, start-ups and small businesses.

Avataran–Seven Missions for the Transformation of IR

- Missions will be supervised by a mission director, who will report directly to the Chairman, Railway Board. He will also head a cross functional team empowered to take all significant decisions for a timely targeted delivery. Yearly result oriented performance targets for the mission will be set and the missions will decide the functional plans for short, medium and long terms and work accordingly.

- Some of the missions include Mission 25 Tonne for 25 tonne axle load, Mission Zero Accident for safety, Mission PACE (Procurement and Consumption Efficiency), Mission Raftaar for higher speeds, Mission Hundred for commissioning 100 sidings/ freight terminals, Mission beyond book keeping for accounting reforms, Mission Capacity Utilisation to prepare a blueprint for making use of the capacity created once DFC is commissioned etc.

Sustainability and Social Initiatives: Human Resources/ Skilling, Social initiatives, Environment

- The Railway ministry will collaborate with the Ministry of Health for ensuring cooperation between railway hospitals and government hospitals. 'AYUSH' systems will be introduced in 5 railway hospitals. Gang men will be provided with devices known as 'Rakshak' which will intimate them about approaching trains. The weight of the tools carried by them while patrolling will also be reduced. Toilets and air-conditioning in cabs for loco pilots will also be provided.

- Two chairs – One C T Venugopal chair on Strategic Finance, research and policy development and another Kalpana Chawla chair on geo-spatial technology will be set up.

- For youth – The organisation will accept 100 students from engineering and MBA schools for 2–6 months internships annually.
- The ministry will collaborate with Ministry of Skill Development, for skill development on IR premises.
- Energy audits, for reducing energy consumption in non-traction area by 10% to 15%, have been undertaken. Now all new light provisions will be LED luminaire and it is proposed that all Railway stations will be covered with LED luminaire in coming two to three years.
- An action plan has been drawn up for environmental accreditation, water management and waste to energy conversion. Over 2,000 locations have been provided with Rain Water Harvesting facility. On steel bridges, instead of steel sleepers, environment friendly composite sleepers produced from recycled plastic waste will be used.
- The railways have identified 32 stations and 10 coaching depots for installation of water recycling plants in next few years.

Tourism

- The railway is collaborating with state governments for running tourist circuit trains. The National Rail Museum has also been upgraded. Tourism will be promoted through railway museums and UNESCO world heritage railways.
- The railway will endeavour to spread awareness about our national animal, tiger. To achieve this objective, comprehensive packages including train journey, safaris and accommodation to cover the wildlife circuit comprising Kanha, Pench and Bandhavgarh will be offered.

INTERNATIONAL CURRENT AFFAIRS

GLOBAL FALLOUT FROM THE PANAMA PAPERS

Nearly 11.5 million records leaked from Mossack Fonseca which were published in April 2016 disclose that some companies are being used for alleged money laundering, tax evasion and arms and drug trades. Over 36,000 high-value properties in London are held by unknown buyers registered in tax havens. The value of those properties is estimated at over £200 billion (€250bn). It has made the UK's property market an attraction for the corrupt around the world. Over 20 nations have initiated investigations into possible financial misconducts by the world's rich and powerful following the revelations. As per the reports, the names of over 200 US passport holders are mentioned in the Panama Papers.

According to Australian Tax Office, it is scrutizing 800 Australian taxpayers associated with Mossack Fonseca. Of them, over 120 are associated with an associate offshore service provider situated in Hong Kong. Spanish citizens have also invested more than €1 billion in Panama.

Iceland's Prime Minister became the first major figure brought down by the leak of millions of records on offshore accounts as the scrutiny intensified around officials from other countries, including Ukraine's President.

Both China and Russia curbed news of the leaks and refuted any accusations of wrongdoings against government officials mentioned million financial documents from Panamanian law firm, Mossack Fonseca.

Number facts:

- A total of 214,488 offshore companies, trusts, and foundations are assimilated by Mossack Fonseca over past 40 years.
- An estimated sum of $22.9 trillion is stacked in tax havens world over. The sum is equivalent to combined annual economic output of US and Japan.
- More than 500 banks and subsidiaries have formed 15,000 offshore companies through Mossack Fonseca.
- A total of 143 politicians, including 12 national leaders, their families and associates, are known to have used offshore tax havens.

Terms of Trade:

- *Mossak Fonseca* is Panama's law firm. It sells anonymous offshore companies across the world.
- *Law firm*: Law firm founds a shell company for client who are registered in tax haven such as British Virgin Islands. A company can be founded for an amount as little as $1000.
- *Nominee Service*: Fake director is appointed for the company to conceal the name of the owners.
- *Shell Company*: A shell company gives the impression of a genuine business but it secretly helps owner to conceal origin of money and avoid paying tax.
- *Layering*: Owner invests money through a number of shell companies in various havens. Each time it becomes more difficult to trace the original. The whole process is known as 'layering'.
- *Integration*: Unaccounted money invested in a shell company is not laundered. Money is brought back into an economy as white and genuine money and is used to purchase high-value items.

Probes Initiated in Major Economies

Argentina— Federal prosecutor starts probes into President Maurico Macri's, business dealings in offshore companies between 1998 and 2009.

Panama— President Juan Carlos Varela, promises to enhance transparency in Panama's offshore financial business.

United States— The Internal Revenue Service is scrutinizing nearly 200 people with US passports whose names have figured in panama papers.

Italy— Country's tax officials are in a process of receiving formal decision to start investigation into 800 Italians named in Panama documents.

Portugal— Investigation into tax concealment by over 240 Portuguese named in papers begins.

Spain— Tax authorities are inspecting returns of citizens whose names appear for having offshore accounts. It is believed that the citizens have more than €1 billion financed in Panama.

UK— A task force is set to probe accusations of tax-concealing and money laundering. Prime Minister, David Cameroon, declared his personal tax returns. The banks in Britain were issued notice to disclose any ties with Mossack Fonseca.

Sweden— Country's four major banks (Nordeam, Swedbank, Handelsbanken and SEB) were named in the leaked documents.

Switzerland— Prosecutors state that the documents contain fresh evidence of corruption at FIFA.

Austria— Financial regulator is examining whether two banks broke the rules on money laundering.

France— Agencies in the country has launched preliminary investigation into the matters of money laundering and tax fraud.

Germany— Country declared that Mossack Fonseca has been under inquiry since 2015. At least 28 German banks availed services of Panama's law firm.

Pakistan— Prime Minister, Nawaz Sharif declares that accusations against his family will be examined by judicial commission that will be led by former supreme court judge.

Australia— Tax authorities are investigating 800 individuals whose names have appeared in leaks.

New Zealand— Independent review of tax laws to news on evidence of the country being used as tax haven. There are thousands of references to the country in leaked documents.

Prominent Politicians under the Scanner

Sigmundur David Gunnlaugsson— He was the prime minister of Iceland. He resigned from his post after leaked documents revealed that he and his wife owned offshore company in British Virgin Island.

Mauricio Macri— He is the president of Argentina. He acted as director of Fleg Trading offshore company that was registered in Bahamas.

David Cameron— He is the prime minister of UK. His late father was among five UK directors of Baltimore Holdings which is investment fund operated out of Bahamas.

Vladimir Putin— He is the president of Russia. His associates who manage his financial matters ran $2 billion network of holdings in British Virgin Islands and other offshore havens.

Petro Poroshenko— He failed to reveal British Virgin Islands-based Prime Asset Partners in his income and property declaration for 2014.

Nawaz Sharif— He is the prime minister of Pakistan. His children availed £7 million credit against four London flats owned by offshore companies.

Xi Jinping— He is the president of China. At least eight prominent Chinese officials and associates, including Xi's brother-in-law, Deng Jiagui, are associated with offshore trade.

EUROPEAN NATIONS

Refugees Problem

Over a million migrants and refugees entered into Europe in 2015, generating a crisis. Countries struggled to handle the inflow. The scenario created division in the EU over what could be best done about resettling people. Most number of migrants arrived by sea but some made their way over land, chiefly via Turkey and Albania. Winter could not stem the flow of people. According to UNHCR 135,711 people have reached Europe by sea since the start of 2016. The Syrian conflict has remained the biggest driver of migration. Besides this, the violence in Afghanistan and Iraq, abuses in Eritrea and poverty in Kosovo are also forcing people to look for new havens.

Not all of those entering into Europe claim asylum, but many do. Germany was the foremost country to receive highest number of new asylum applications in 2015 (over 476,000 applications). Hungary is second in terms of the asylum applications, having 177,130 applications by the end of December.

As per the estimates by the International Organization for Migration (IOM), over 1,011,700 migrants entered by sea in 2015, and about 34,900 by land. This is against 280,000 arrivals by land and sea in 2014. The figures do not include those who got in uncounted. Frontex, the EU's external border force, keeps a vigil on various routes that migrants use. It put the figure crossing into Europe in 2015 at more than 1,800,000.

Most of those coming to Greece take the comparatively short voyage from Turkey to the islands of Kos, Chios, Lesvos and Samos. They often travel in flimsy rubber dinghies or small wooden boats. Pressure on the EU have been mounting because of the burden faced by some countries, especially where the majority of migrants have been arriving such as Greece, Italy and Hungary.

EU—Turkey's Agreement to Handle Migrant Crisis takes Shape

On March 20, 2016, the EU entered into an agreement with Turkey, according to which the all 'irregular migrants' entering from Turkey into Greece from March 20 onwards would be sent back. The Greek authorities would individually verify each arrival. Priority will be given to those who have not tried to illegally enter the EU and the number is capped at 72,000. The EU would accelerate the allocation of €3 bn ($3.3 billion; £2.3 billion) to Turkey, to aid migrants. Both the parties agreed to intensify the process of Turkey join the European block, with talks scheduled to be held by July 2016.

Europe Swings to the Right

Rising disappointment with the European Union has resulted into right-wing parties attaining electoral success in an increasing number of European countries. Among the most unexpected changes are: Austria [Norbert *Hofer*—Freedom party (far-right group); won 49.8% in presidential elections]; France [Front National leader—Marine Le Pen;

could be a candidate for 2017 French presidency elections]; Netherlands [Party for Freedom—*(PVV)*—Geert Wilders; plans to curb Muslim immigration and ban Koran]; Germany [Alternative for Germany *(AfD)*—Frauke Petry; wants police to be given power to shoot illegal migrants]. The growth of the far right throughout Europe is associated with the impact of social media, as the new generation of young supporters adopt hard-line nationalist extremism and have formed anti-immigrant groups. In 2011, the German security agency identified nearly 25,000 right-wing extremists in Germany, which included 5,600 neo-Nazis. In November 2015, two of the Germany's most right-wing parties (anti-Islamic Pegida and the neo-Nazi NPD) garnered the support of over 320,000 people through their Facebook.

BREXIT—UK's Exit from EU

The 'Brexit-buster' deal that British Prime Minister, David Cameron, negotiated on February 22, 2016, has allowed Britain a clear exemption from the founding goal of 'ever closer union' along with protections for the London financial centre and subsequent treaty change. The resolution to give Britain a special status in the group indicates towards the apprehension of EU leaders that a Brexit could divide the block, driven by economic illness, refugee crisis and globalization.

What Other Nations think of UK's Demands?

Germany— Europe's most influential leader, Chancellor Angela Merkel, intends to keep Britain in EU, but is not ready to negotiate on freedom of movement. Germany will possibly take advantage from rules permitting UK to restrict welfare tourism.

Poland— President Andrzej Duda is against UK's purported emergency brake (4-year restrictions on in-work assistances for EU migrants). Nearly 700,000 Polish migrants (second largest group after Indians) reside in Britain.

Netherlands— Netherlands wishes to retain UK in EU. It also endorses Britain's vision of more competitive EU and collaboration with US and Canada. The major concerns areas for the Netherlands are welfare tourism and weakening of local wages by EU migrants. Prime Minister, Mark Rutte, who is the present rotating president of EU, may possibly play a vital role in reaching any settlement.

France— Brexit may prove to be a triumph for Marine Le Pen (Front National leader), which will boost hard-line anti-immigration, anti-EU groups. Club Med (France, Italy and Spain) would form three largest EU states next to Germany.

Denmark— Prime Minister, Lars Lokke Rasmussen largely endorses UK's suggested limit on migrant's child benefits payments and restraining freedom of movement. It intends to embrace Britain's policy of emergency brake.

Ireland— Opening up of Irish economy to UK means Brexit will have huge impact.

Sweden— Sweden is against UK's demands. It follows the most generous immigration policies.

Belgium— EU Council Chief, Donald Tusk, feels that Brexit will be disastrous not only for both Britain but also for EU.

Cost of UK Brexit

Negative views— According to reports generated by the Britain's Treasury, the UK economy will shrivel by between 3.8% and 9.5% (a loss of £68.7 billion to £171.8 billion) if it exits from the EU, on account of reduction in trade and foreign investment. Oxford Economics viewed nine different post-Brexit situations and anticipated a long-term cost to the British economy in every situation. The most pessimistic situation predicted is of a loss of 3.9% of GDP each year by 2030. According to the Centre for Economic Performance, London School of Economics (LSE), the post-Brexit reduction in FDI may result into 3.4% fall in real income (nearly £2200 of GDP per household).

Positive views— According to a report generated by 'Economists for Brexit' (a group of prominent British academics and financial-sector economists), the UK economy could expand up to 4% by the year 2030 if it exited the EU. After making an exit from the EU, the revenues are expected to generate from exporting to all countries as per World Trade Organization (WTO) laws and not levying any trade tariffs on imports from countries outside the EU. Consumer benefits from eliminating trade taxes, and EU guidelines on the environment, gender equality and working hours, while safeguarding London's standing as a global financial centre, would possibly improve GDP by more than £72 billion (€90bn).

THE NATIONS OF THE WORLD

AUSTRIA

Presidential Elections

On May 23, 2016, Alexander Van der Bellen (a 72 year old former economics professor, supported by the Austrian Green party) defeated his rival, Norbert Hofer (far-right Freedom Party) only when 700,000 postal ballots (around 10% of the available votes) were taken into account. As per Austrian media reports after the counting of postal votes, Van der Bellen got 50.2% and Hofer 49.8% (a margin of just 0.4 percentage points).

IRAQ

Fallujah offensive begins—'Operation Break Terrorism'

On May 24, 2016, the Security Forces of Iraq started 'Operation Break Terrorism' (with the active support from Shiite-dominated Popular Mobilization Units and local Sunni tribal mobilization forces) to chase away Islamic State (IS) from the important town of Fallujah. It is the last prominent IS stronghold in Anbar province of western Iraq. Iraqi Security Forces (ISF), tribal fighters and Iran-supported Shia militia, backed by US led air power, launched this operation to remove Islamic State (IS) from the town of Fallujah. There is a combined force of 35,000 fighters belonging to ISF, federal police and PMF (Popular Mobilization Force) in the region. Only 500–1000 IS fighters and 50,000 civilians remain inside the town.

MYANMAR

Htin Kyaw, the First Civilian President

On April 1st, Htin Kyaw (a staunch supporter of Aung San Suu Kyi) became country's first civilian president. With this, a period of over half a century of military rule came to an end. Aung San Suu Kyi (the Nobel laureate) looks to rule the dethroned junta-run Myanmar through a trusted proxy. Aung San Suu Kyi's party, the National League of Democracy (NLD), has been controlling the parliament since 2005's election. Htin Kyaw's father Min Thu Wun is national poet. He is an economics graduate from Oxford University. He worked as a senior executive with Daw Khin Kyi foundation which is a non-profit health and education charity. The foundation was named after Suu Kyi's mother.

GERMANY

State Election Results 2016

Christian Democrats (CDU), the ruling party of Chancellor Angela Merkel, suffered defeats at the hands of the anti-immigrant Alternative für Deutschland (AfD) party in three important state elections held in March 2016.

IVORY COAST

Laurent Gbagbo Trial

Laurent Gbagbo, former president of Ivory Coast, became the first ex-head of state to face trial at the world's only permanent war crimes court. He is accused of prompting political turbulence that left 3,000 dead five years ago. The appearance of Gbagbo at the International Criminal Court (ICC) on Jan 28, 2016 is the fallout of the turmoil that devastated the west African nation when he declined to step down after facing defeat against his bitter rival Alassane Ouattara, in elections held in November 2010.

PAKISTAN

Bacha Khan University Attack

On Jan 20, 2016, militants attacked the Bacha Khan University at Charsadda, in north-west Pakistan. About 20 people were killed in the attack. In a similar attack in 2014, over 130 students were killed at a school in Peshawar.

Easter Disaster

On Mar 27, 2016, christians who were celebrating Easter in a park were attacked by a suicide bomber. At least 74 people, including 29 children and 10 women were reportedly killed in the attack. Jamaat-ur-Ahrar (a splinter group of the Pakistani militants adopting Islamic State ideology) has claimed the responsibility for the bombing. Easter bombing, the second by the Jamaat-ur-Ahrar on christians since 2015, indicates at a clear shift in approach by Pakistani militants to target religious minorities such as christians and minority Shi'ite muslims.

Other Bombings

On Feb 18, 2106, in two different attacks on check posts at Mohmand, nine army men were reportedly killed. Mohmand, which hosts headquarters of Jamaat-ur-Ahrar militant group is a tribal region. On Mar 1, 2016, a roadside bomb attack on convoy at Mohmand, killed two Pakistani employees of US consulate. On Mar 7, 2016 a suicide bomber blew himself up at the entrance of a court complex, at Shabqadar in Swat province. The explosion killed 17 people in crowded morning.

Hindu Marriage Bill 2015 Approved

Pakistan has eventually after decades of postponement and fumbling proved for the Hindu minority community in Pakistan a religion specific marriage law. The parliamentary panel on Feb 9, 2016, unanimously approved the Hindu Marriage Bill 2015. The National Assembly Standing Committee on Law and Justice passed its final draft and this bill now move up in the national assembly. Notably, there is a fair chances for the bill to get the final nod as it is being backed by the ruling Pakistan Muslim League-Nawaz (PML-N).

SCOTLAND

Scottish Parliament Election Results

On May 6, 2016, the Scottish National Party (SNP) captured 63 seats to claim their third victory in Scottish Parliament elections. However, the party was still two seats behind forming a majority government. Conservative Party (31 seats) remained ahead of the Labour Party (24 seats). The Greens were placed at fourth position by winning 6 seats and the Lib Dems (5 seats) got fifth position.

UK

Julian Assange Exile

On Feb 5, 2016, a rights working group of the UN discovered that the founder of Wikileaks, Julian Assange, has been unlawfully apprehended by availing voluntary shelter in the Ecuadorian Embassy in London to evade arrest. Julian Assange had approached the Ecuadorian embassy in London in Jun 2015 and Ecuador allowed asylum to Assange, fearing that if he is extradited to Sweden to face his complainants, his human rights may be violated.

TAIWAN

Elects First Female President

On Jan 16, 2016, Tsai-wen, the chairwoman of Democratic Progressive Party and their presidential nominee clinched 56.1% votes in Taiwan's presidential elections thereby becoming the first female president of the Taiwan. Tsai took office on May 20, 2016. Tsai is also the first unmarried president elected as well as the first to have never held another elected post.

NIGERIA

Boko Haram Burns Nigerian Village

On Jan 30, 2016, the Boko Haram attacked the village of Dalori in Nigeria in which 65 people are reportedly killed. Children were abducted and the entire village was burnt in the attack. Nearly 2.5 million people from four countries have deserted their villages following attacks and threats by Boko Haram, so far.

Suicide Bombing in Nigerian Refugee Camp

On Feb 11, 2016, over 58 people were reported killed and 78 wounded in a suicide bomb explosion that took place at a refugee camp in Nigeria. It is reported that the suicide bombers were three girls who had been given shelter into the camp. Two of the girls blow themselves up while the third did not dare to do so. She surrendered before the authorities when she saw the members of her own family in the camp. The camp had been set up to provide shelter to people fleeing Boko Haram. So far, over 2.5 million people have deserted their homes from attacks and threats by the militant group.

SYRIA

Suicide Attack in Damascus

On Jan 31, 2016, over 70 people were killed in a suicide attack in Damascus. The attacks involved two suicide bombers and a car bomb that struck in Sayeda Zeinab of Damascus. It is an area where Syria's holiest Shi'ite shrine is located. The attack took place on the eve of Syria peace talks in Geneva.

Syria Peace Talks Begin

On Feb 1, 2016, Syria peace talks began in Geneva. The talks were mediated by the UN. The talks began the day after a suicide attack in Damascus in which more than 70 people were killed. ISIS was not invited for the talks. They had taken the responsibility of the Damascus bomb attack. Members of Syrian President, Bashar al-Assad's government along with major opposition groups took part in the talks. Meanwhile, the UN decided to suspend the talks, stating that was a need for more work to be done by everyone involved. Then only could any progress be made.

Donor Conference for Aid to Syria

At a donor conference that was held on Feb 5, 2016 in London, a number of countries together donated over $10 billion for providing aid to Syria. The donor countries included the United States, Germany, Norway and Kuwait. The collected money will be used for the welfare of people who had to flee Syria due to persistent Civil War.

Temporary cease-fire planned for Syria

On Feb 12, 2016, a partial cease-fire was announced for Syria so that the task of sending humanitarian aid to Syria could be completed by a UN task force. It was a partial cease-fire as UN designated terrorist groups, ISIS and the Nusra Front did not take part in it. Till February 2016, at least 470,000 people have been killed due to the war in Syria, which started in 2011. Life expectancy in Syria has gone down from age 70 to 56, a fall of 14 years since the start of the war. As per the terms of the cease fire, which was mediated by

the United States and Russia, both sides agreed to a 'cessation of hostilities,' government-led forces would end their siege of rebel-occupied towns, and humanitarian aid would be brought to those cities, which had been suffering due to shortage of food and medicine.

Parliamentary Elections

On April 12, 2016, Syria's parliamentary elections in Syria started in which nearly 3,500 candidates contested for the 250 seats. The elections had been boycotted by opposition groups. In the middle of about five years of civil war and on-going talks for a ceasefire, President Bashar al-Assad had announced the election. The Ba'ath Party-led National Progressive Front captured 200 of the 250 seats, whereas the opposition boycotted the elections. The voter turnout was 57.56%. Two Armenians were elected to the People's Council. A female Armenian candidate was elected for the first time. Meanwhile Germany and the US announced that they could not accept the outcomes of the elections as free and fair election was not possible in a war torn country with all the refugees in neighbouring countries.

Aleppo hospital attacks

On May 4, 2016, nearly 300 people were reported killed in a surge of fighting in Aleppo city. Hospitals and civilian areas came under attack from government warplanes and heavy shelling from rebel forces. It is a serious violation of international humanitarian laws to attack on medical facilities and civilians who are not participating directly in the war.

War creates millions of young refugees

According to a UNICEF report released on Mar 14, 2016 UNICEF nearly 3.7 million Syrian children born after the conflict started five years ago have led a lifetime of war. As per UNICEF estimates nearly 8.4 m children (80% of Syrians aged below 18 years) are in a need of humanitarian aid. UNICEF has verified about 1500 serious violations that include 400 deaths and 500 instances of mutilation due to explosive weapons in populated areas. Around 2.8 million children are out of school in the country or neighbourhood countries. Around 50% of the recruited by fighting sides aged below 15 this year, against 20% in 2014. Around seven million children live in poverty with children as young as three are doing odd jobs.

UKRAINE

Groysman Elected as the New Prime Minister

On April 14, 2016, the parliament of Ukraine accepted the resignation of Arseniy Yatsenyuk, and appointed speaker of the Ukrainian parliament Volodymyr Groysman the new prime minister. With this the government hopes to put an end to a month-long political crisis.

NORTH KOREA

Launches a Satellite into Orbit

On Feb 6, 2016, North Korea launched a rocket Kwangmyongsong, or shining star, to place a satellite into orbit. According to North Korean officials it was for peaceful purposes,

however, the US and South Korea criticized the endeavour as a disguised attempt to test their intercontinental ballistic missile technology. The UN Security resolutions have banned the use of this technology. Following the launch of the rocket that placed the satellite into orbit in February and a nuclear test conducted in January, which generated an earthquake of 5.1 magnitudes, a fresh round of sanctions were imposed on the country on March 3, 2016, by the UN Security Council. The fresh sanctions requested for examinations of all cargo entering and leaving North Korea. The sanctions also included a ban on the import of luxury watches, snowmobiles and Jet Skis, which are preferred by Kim Jong-un and his associates, and bringing more people under sanctions.

Missile threat

On May 31, 2016, North Korean intermediate-range Musudan missile failed in its launch. It is the latest failure in a series of high-profile failures. In the month of April, three test launches of the Musudan had also failed. It is believed that North Korea possesses around 20 to 30 Musudan missiles having a range of 2,500–3,500 km. These missiles can strike any part of Japan and the US territory of Guam.

Develops Cold-launch Technology

On April 26, 2016, the latest test launch of a KN-11 missile by North Korea shows that the country has been successful succeeded in developing 'cold launch' technology. Now it is capable of firing a ballistic missile vertically from a submarine known as submarine-launched ballistic missile (SLBM). A completely developed SLBM ability would expand the country's nuclear threat into new spheres. Till now, only the United States, Britain, France, Russia, China, and India have submarines that have SLBMs carrying capabilities.

CHINA

Deploys Missiles on Disputed Island

According to some reports released in Feb 2016, China has deployed missiles on a disputed island in the South China Sea. The reports immediately increased tension in the region because some other countries including Vietnam and the Philippines have also staked claims on the island. Leaders of these countries have also expressed concern over efforts of China to construct artificial islands in the same area.

Adopts Counter-Terrorism Law

The first comprehensive anti-terrorism bill of China which was passed at the end of 2015 came into execution on January 1, 2016. The law includes 97 articles mentioned in 10 chapters. The first and last chapters involve general and supplementary provisions, whereas the remaining chapters are concerned with chief issues on counter-terrorism like terrorism designation, prevention, intelligence gathering, investigation, emergency response, international cooperation, safeguards, and legal liabilities. Commenting on the final law, the Western media related it with the killing of a Chinese national by the Islamic State, various attacks by Uyghur extremists, the Christmas terrorism alert in the shopping neighborhood of Sanlitun in Beijing, and the banishment of a French journalist from China over her article accusing government policy for terrorist activities. All these incidents set a foundation on which the law came into being and could be implemented.

AIIB in Beijing

On Jan 17, 2016, a new International Development Bank was inaugurated by the Chinese President Xi Jinping. The bank is seen as a competitor to the US dominated World Bank and a Chinese endeavour to change the unwritten laws of global development finance. In spite of the opposition from the US and its allies including Australia, Britain, German, Italy, countries such as the Philippines and South Korea have decided to join the Asian Infrastructure Investment Bank (AIIB) recognizing China's rising economic influence. It is expected that the AIIB will give $10 billion-$15 billion as loans annually for the first five or six years. The bank is expected to start functioning in the second quarter of 2016.

TURKMENISTAN

TAPI Gas Pipeline Project

On April 8, 2016, the stakeholders of the TAPI Project i.e. Turkmenistan, Afghanistan, Pakistan and India agreed to invest $200 million in the project that will link gas-rich Turkmenistan with ready markets in Pakistan and India. It is expected that the ADB (Asian Development Bank) will overcome the challenges of constructing a $10 billion gas pipeline through the most violent areas of Afghanistan by the year 2020. The TAPI pipeline would originate in giant Galkynysh gas field in Turkmenistan and would transport 33 billion cubic meters (bcm) of gas every year.

BOSNIA

Bosnian Serb president Convicted of War Crimes

On March 24, 2016, Radovan Karadzic, the Bosnian Serb president was convicted of war crimes of genocide, war crimes, and crimes against humanity by a United Nations tribunal at The Hague, Netherlands. He had ordered the massacre of around 8,000 muslim man and boys in 1995 in Srebrenica during the war in Bosnia that raged from 1992–1995.

BOLIVIA

No Fourth Term for Bolivian President

On Feb 25, 2016, voters in Bolivia marginally defeated a referendum that would have allowed an alteration in the constitution to allow Evo Morales to go for the post of president again in 2020. He remained highly popular as a president; however, his popularity witnessed a fall for fathering a child out of marriage, allegations of corruption, and for consolidating power.

BRAZIL

Former President Arrested on Corruption Charges

March 4, 2016, the police grilled the former Brazilian president, Luiz Inacio Lula da Silva, for examination in a broad corruption case that involves many other government officials, business executives, and the state-owned oil company, Petrobras.

SOMALIA

US Led Airstrikes against Militants

On Mar 5, 2016, according to an intelligence official, The US conducted an airstrike that killed more than 150 al-Shabab militants, in co-operation with Somalia's intelligence service. The target of the strike was a forested military training camp run by the Islamic extremists 200 kilometres north of the capital Mogadishu. The camp was believed to be al-Shabab's main planning base.

BELGIUM

Brussels Terrorist Attacks

On 22 Mar 2016, during morning hours, three co-ordinated nail bombings took place in Belgium: two at Brussels airport in Zaventem, and one at Maalbeek metro station in Brussels. The capital city was locked down amid mounting security threats. A total of 35 people including three perpetrators were killed, and more than 300 people were injured in these explosions. Another unexploded bomb was discovered during a search operation at the airport. Islamic State of Iraq and the Levant (ISIL) claimed responsibility for the bombings.

CYPRUS

Brussels Terrorist Attacks

On Mar 30, 2016, the Cyprus police arrested an Egyptian citizen, Seif Eddin Mustafa, for hijacking an Egypt Air flight from Egypt to Cyprus and threatening to blow it up. His explosives were later found to be fake and he surrendered with all passengers safe after a bizarre six-hour standoff. He was described as 'psychologically unstable'.

USA

Presidential Elections 2016

By May 2016, Donald Trump attained the number of delegates that is necessary for securing the nomination for Republican president. Now Democrat candidates Hilary Clinton and Bernie Sanders face one another to gain the support of a majority of delegates in order to secure the presidential nomination. Hillary Clinton had won 2383 delegates whereas Bernie Sanders had 1539 of. However, Hillary still required 74 delegates on her side to secure the nomination. The presidential elections of 2016, which will be held on Nov 8, 2016, are the 58th US presidential election. Presidential electors will be elected by the voters and the electors will then elect a new president and vice president through the Electoral College. The twenty-second amendment to the United States constitution establishes a term limit which prevents the current President, Barack Obama, from being elected for a third term. The string of presidential primary elections and conventions is being conducted from February 1 to June 14, 2016, across the 50 states, the District of Columbia and US territories. The process of nomination is also a form of indirect election, in which voters cast ballots for electing delegates to a political party's nominating convention. The elected delegates then elect their party's presidential nominee.

Cyber Security National Action Plan (CNAP)

On Feb 10, 2016, the US government released $19 billion CNAP to deal with the new security threats rising out of emerging technologies that can be helpful to hackers. CNAP involves a series of measures, which differ by degrees in financial backing and plausibility.

ZIMBABWE

Drought Crisis

On February 5, 2016, Robert Mugabe, the president of Zimbabwe declared rural areas hit by severe draught as disaster hit. In these areas over a quarter of the population face food shortages. A number of African countries including South Africa, Malawi and Zambia as well as Zimbabwe have been severely affected by a regional drought aggravated by the El Niño weather phenomenon. The scenario has left tens of thousands of cattle dead, reservoirs depleted and crops destroyed. Zimbabwe, which was earlier known as the breadbasket of Africa, has suffered perennial shortages in recent years and has to depend to grains, imported from the neighbouring countries.

Adopts Chinese Yuan as its Main Currency

On Jan 1, 2016, Zimbabwe declared the Chinese Yuan a legal tender currency in order to boost trade with China. The declaration came when China promised that it would cancel Zimbabwe's $40m debts. It is to be noted that China became Zimbabwe's largest trading partner after Zimbabwe was isolated by its former western trading partners over its dismal human rights record. Zimbabwe abandoned its own currency (dollar) in 2009 following hyperinflation, which had peaked at around 500%. Since then, it has been using various foreign currencies, including the US dollar and the South African rand.

NEPAL

Committee on Provincial Demarcations

On Feb 19, 2016, a political committee was formed by the Nepalese government in order to resolve the issue of delineation of provinces as per the federal structure of the new Constitution, which has been raised by Madhesis. Madhesis have opposed the division of their homeland. The committee was formed hours before Prime Minister, K. P. Oli's much-anticipated maiden visit to India. Madhesis are largely of Indian-origin. They have been protesting violently for nearly six months over better representation in the Parliament and the federal structure of the new Constitution. The protest had claimed more than 50 lives before being called off suddenly.

FRANCE

Declares Economic Emergency

On Jan 20, 2016, Francois Hollande, the president of France declared that the nation is in the state of economic emergency. The declaration of state of economy arrived amidst

apprehensions of deteriorating financial situation in Germany. Germany and France are the two largest economies in the Eurozone. Germany, (GDP of $3.4bn) and France (GDP of $2.4bn) figure among the six largest economies in the world. It is feared that if the economies of both nations collapse it would generate a domino effect which would affect the entire Eurozone adversely and severely destabilize the world economy.

BANGLADESH

Draft of Citizenship Law 2016 Approved

On Feb 1, 2016, the draft of the Citizenship Law 2016 was given a final approval by the Bangladeshi cabinet. The law has been passed by consolidating the present Citizenship Act 1951 and the Bangladesh Citizenship Temporary Provisions Order 1972. The new law has six chapters and 28 sections which underline the processes involved in gaining citizenship, disqualification of getting citizenship, surrender and dissolution of citizenship.

BILATERAL/MULTILATERAL AFFAIRS

US—IRAN

Landmark Iran Nuclear Deal Goes into Effect

On January 16, 2016, the U.S and other European countries lifter sanctions on Iran. The lifting of long standing sanctions (both financial and oil) is an outcome of inspections that proved that Iran has destroyed the weapons as per the terms of the nuclear deal. Iran's assets worth around $100 billion have also been released after the inspections. The release of assets and lifting of sanctions came hours after a prisoner exchange between the US and Iran. Having concluded the landmark nuclear deal with Iran, President Obama addressed Iranians, asking them to 'pursue a new path' with the West.

RUSSIA—SYRIA

Russia Announces It Has Largely Withdrawn from Syria

On March 14, 2016, President Vladimir Putin commanded Russian military to withdraw most of its forces from Syria. It is seen as a signal to put an end to Russia's five-and-a-half month air expedition.

TURKEY—GREECE

Turkey Agrees to Take Migrants from Greece

Turkey, in a deal concluded with the European Union on Mar 18, 2016, agreed to adopt measures so that the movement of migrants leaving Turkey and heading for Greece can be curbed. Moreover, Turkey also promised to take migrants, who are not eligible for asylum, back from Greece. Europe has been facing a tough problem of rising numbers of people fleeing violence in Syria, Iraq, Afghanistan, and other places embroiled in fighting and seeking asylum.

US—CUBA

First US President to Visit Cuba in 88 Years

The Cuba's President Raul Castro, officially welcomed the US President Barack Obama and first lady on their visit to Cuba in March 2016. On March 20, 2016 the President reached Havana and on March 22, laid out vision for US-Cuba relations during his speech.

PAKISTAN—IRAN

MoUs on Strengthening Bilateral Relations

On Mar 26, 2016, Pakistan and Iran signed six Memoranda of Understanding (MoUs). The MoUs were on:

(i) Mutual assistant between Pakistan's Foreign Service Academy and Iran's School of International Relations.
(ii) Mutual assistance and exchange of information between the Securities and Exchange Commission of Pakistan and the Central Insurance of Iran.
(iii) Five Year Strategic Trade Cooperation Plan.
(iv) Mutual assistance on health research, training, medicine and medical technology.
(v) Mutual assistance between the Federation of Pakistan Chambers of Commerce and Industry and the Chamber of Commerce, Industries, Mines and Agriculture of Iran.
(vi) Mutual assistance between the Institute for Political and International Studies of Iran and Karachi Council on Foreign Relations (KCFR) of Pakistan.

NEPAL—CHINA

MoUs on Infrastructure Development

On Mar 21, 2016, Nepal and China inked the ten MoUs. The MoUs were on:

(1) Transit transport between China and Nepal.
(2) Construction, management and maintenance of the Xiarwa Boundary River Bridge, (Hilsa) Humla.
(3) Economic and technical co-operation to implement Pokhara Regional International Airport Project.
(4) Framework agreement on the provision of mixed loan to implement Pokhara Regional International Airport Project.
(5) Letters of exchange on project initiation for the feasibility study on Chinese assistance to Nepal for exploration of oil and gas resources;.
(6) Concerning the provision of goods for addressing climate change.
(7) To strengthen intellectual property system.
(8) Launching the joint feasibility study of China-Nepal Free Trade Agreement.
(9) Banking Regulatory Commission and Nepal Rastra Bank.
(10) Concessional Loan Agreement on Pokhara Regional International Airport.

IRAN—CHINA

Silk Route Train

On Feb 15, 2016, China revived the ancient silk route between China and Iran when a freight train from China entered into Iran's territory. As a part of China's One Belt One Road (OBOR) programme, the Yiwu-Tehran rail link cuts travel time between China's east coast and Iran. The China-Iran 'Silk Road Train' will run once-in-a-month. China may increase its frequency an increase in mutual trade. China's economic co-operation with Iran grew from $4 billion in 2003 to $53 billion in 2013 during the period of sanctions on Iran. It is now expected to rise in the coming years. In January, the two sides agreed to increase trade to $600 billion over the next decade.

Sign 17 MoUs to Strengthen Bilateral Cooperation

On Jan 23, 2016, Iran and China signed 17 MoU to revive maritime Silk Road and Silk Road Economic Belt. These MoUs are expected to take economic ties to a new height in future. Perhaps the most important of these is ambitious Silk Road. The historical silk route was used connecting the Europe and Eastern Asia of the medieval times. Major goods were transported in the extremities of the Eurasian landmass through this route.

IRAN—FRANCE

On Jan 28, 2016, France and Iran signed business deals worth €15 billion worth of business. The agreements which were signed included sectors like aviation, car-making, energy, shipping, infrastructure, railways, health and agriculture. However, French banks were apprehensive of doing business with Iran. An agreement was also signed between French export-credit group Coface and the Iranian central bank.

IRAN—ITALY

On April 12, Italian Prime Minister, Matteo Renzi's signed six agreements with Iran during his visit to Tehran. Both nations are looking forward to develop the co-operation in several economic, political and cultural fields. The spheres, in which the MoUs were signed, included tourism and cultural activities, industrial co-operation and co-operation between the Islamic Republic Railways with Italian Railway.

INDIA—FRANCE

International Solar Energy Alliance

On Jan 26, 2016, the French President, Francois Hollande, declared that the French Development Agency will provide €300 million for developing solar energy in India over the next five years. It will finance the initial projects to be undertaken by the International Solar Alliance (ISA). Hollande and Prime Minister, Narendra Modi had collectively inaugurated the solar alliance in Paris during the climate conference in December 2015. The alliance intends to unite 121 tropical countries in an effort encourage the use solar energy and abandon fossil fuels. Prime Minister, Modi had first talked about the solar alliance plan in 2014, announcing a five-time rise in India's target of solar energy production by 2022. The headquarters of the International Solar Alliance will

be set up at the National Institute of Solar Energy campus in Gurgaon. India will spend ₹175 crore for constructing the building, other infrastructure and meeting the recurring expenditure for five years.

SUMMIT AND ORGANIZATIONS

NATO—EU on Cyber Defence Cooperation

On Feb 10, 2016, NATO signed an agreement with the European Union to improve co-operation in cyber-defence. It is viewed as a step forward where two international organizations have joined hands to deal with modern forms of hybrid warfare.

EU—US Framework for Transatlantic Data Flows

On Feb 2, 2016, the EU and the US consented on the new framework of data flows that intends to safeguard the fundamental rights of Europeans when their data is transferred to the US and make sure of legal certainty for companies. In October 2105, the 15-year-old, Safe Harbour agreement was declared invalid by the European Court of Justice (ECJ). The court had found that US national security requirements weakened privacy protections –which meant that that the personal data of Europeans were not adequately safeguarded in the US.

NUCLEAR SECURITY SUMMIT 2016

The maiden Nuclear Security Summit was organised in Washington D.C., in 2010, which was followed by additional Summits in Seoul in 2012 and The Hague in 2014. These summits have attained adequate goals in the safety of nuclear materials. From March 31 to April 1, 2016, the fourth and final summit was held in Washington D.C. The summit was attended by all 53 states and four international organizations that had attended the 2014 summit, except Russia. A primary objective of the 2016 summit was to approve five action plans initiatives that would continue the work of the summit process.

SAARC

Disaster Management Centre

On Mar 18, 2016, the SAARC ministers agreed on setting up of a new SAARC Disaster Centre to be based at India while a prevailing centre in Pakistan would be expanded to watch over the environment.

Factbox: The SAARC Disaster Management Centre would be an active centre of regional co-operation for holistic management of disasters. The centre would serve the member countries by offering policy advice and helping in capacity building services such as strategic learning, research, training, system development, expertise promotion and exchange of information for effective disaster risk mitigation and for planning and co-ordinating a rapid regional response mechanism.

UNITED NATIONS

Global Initiatives by UNFPA and UNICEF to end Child Marriage

On Mar 8, 2016, (International Women's Day), the United Nations Population Fund and the United Nations Children's Emergency Fund promised to make endeavours to put an end to child marriage of young girls. The UNFPA and UNICEF promised to work with governments of countries with a high average of child marriage to safeguard the rights of adolescent girls, so that girls can attain their social and economic development goals.

Factbox: The global programme to accelarate action to end child marriage is being supported by Canada, Italy, United Kingdom, Netherlands, and the European Union. UNICEF and UNFPA are hoping to eliminate all child marriages by 2030. Child marriages may cause several consequences, such as, HIV/AIDS, domestic violence, without education, and even death if there are any complications with early pregnancy or childbirth.

UN—Columbia launch Trust Fund for Peace Building

On Feb 17, 2016, the United Nations and the government of Colombia declared that it would launch a new multi-partner trust fund in the capital city, Bogotá, to accelerate stabilization and peace building programmes. The funds would concentrate on particularly to support conflict areas

G20

Seek Crackdown of Terror Financing and Tax Havens

On April 15, 2016, taking action as a result of the Panama Papers scandal, the G20 nations, including India, sought a clampdown on tax heavens, shell companies and terror financing. A statement was issued in this regard by G20 nations after a meeting of its finance ministers and governors of central banks that was concluded in Washington (USA). Enhancing the transparency of the beneficial ownership of legal persons and legal arrangements is important to safeguard the integrity of the international financial system and to check misuse of these entities and arrangements for corruption, tax evasion, terror financing and money laundering.

BRICS

Approves its First Loan

On April 16, 2016, the BRICS bank gave approval to its first set of loans that involved financial assistance of $811 million that would be disbursed in tranches, supporting 2,370 MW of renewable energy capacity. The bank is providing $300 million to Brazil, $81 million to China, $250 million to India and $180 million to South Africa.

PARIS CLIMATE AGREEMENT

175 Nations sign on Earth Day

On April 23, 2016, the historic agreement on climate change achieved a milestone when a record 175 countries, including India, signed it. However, world leaders emphasized that

it required more action to combat a persistent rise in global temperatures. The planet is heating up to record levels, sea levels are rising and glaciers are melting, therefore, the pressure to have the Paris Agreement enforced and to have every country turn its words into deeds was urgent.

Key Points:

(1) It's the first comprehensive climate agreement in the world. According to the previous emissions treaty, the 1997 Kyoto Protocol, it was not mandatory for the developing countries to reduce emissions. Canada signed on to Kyoto, but later retracted in 2011.

(2) The agreement includes an obligation to keep the rise in global temperatures 'well below' 2°C.

(3) The deal also requests developed nations to provide $100 billion annually to developing countries by 2020. This would help countries fight climate change and foster greener economies.

(4) Countries will be responsible for preparing, maintaining and publishing their own greenhouse gas reduction targets. The agreement says these targets should be greater than the current ones and 'reflect the highest possible ambition.'

(5) The agreement sets an objective of a carbon-neutral world between 2050 and 2100.

GENERAL—MISCELLANEOUS

World's longest rail tunnel

On June 1, 2016, Switzerland formally opened the world's longest railway tunnel. Covering a distance of 57km under the Alps, trains will be allowed to run at a speed up to 250km/h. It will reduce the travel time across Europe considerably.

Factbox: World's longest Train Tunnels

- Gotthard Base Tunnel, Switzerland (57 km), was opened in 2016.
- Brenner Base Tunnel, Austria–Italy (55km), is expected to be completed by 2026.
- Seikan Tunnel, Japan (53.8 km), is an undersea tunnel and it was completed in 1988.
- Channel Tunnel, France–UK (50 km), is an undersea tunnel and it was completed in 1994.
- Lotschberg Base Tunnel, Switzerland (34.6 km), was completed in 2007.

Superbugs—bigger risk than Cancer

Annually an additional 10 million people could die by the year 2050 unless wide range changes at world level are decided to tackle rising resistance to antibiotics. The review on Antimicrobial Resistance (AMR), appointed by the British government, cautions that the financial cost to economies of drug resistance will amount to $100 trillion by 2050.

Oil breaks $50 barrier

In May 2016, the 'Brent crude' (the global yardstick for oil) surpassed the $50-a-barrel level for the first time since November 2015. It was on account of a reduction in US stockpiles by 4.2 million barrels to 537.1 million.

Banana plague poses global threat

In April 2016, discussions on how to fight the spread of a soil fungus known as Tropical Race 4 (Panama Disease) were held at the International Banana Congress in Miami. The TR4 is destroying banana plantations through Asia and infecting farms in Africa, the Middle East and Australia very swiftly. It has prompted the UN to appeal for $50m to combat the epidemic that has posed a severe threat to a $36bn industry. Countries that are already under threat include Lebanon, Jordan, Pakistan, Thailand, Indonesia, Mozambique, Taiwan, Philippines, Malaysia, and Australia.

Factbox: Fursarium fungus lives in soil. It first attacks roots and soon spreads through entire plant. Spores pollute soil for decades. It spreads through soil transportation caused by workers, machinery, animals, flooding etc. Tropical Race 1 (TR-1), the first strain, had nearly eliminated Gros Michel banana in 1950s. Only Cavendish variety was found to be resistant to it. Tropical Race 4 (TR-4) is a new strain. It was detected first in Taiwan in 1990. It is known to be capable of destroying Cavendish (only variety grown for international market). Efforts are being made to check it before it spreads in Latin America, which accounts for 25% of all bananas produced worldwide, and 80% of total exports in the world.

INTERNATIONAL DISASTERS

EgyptAir Flight Crash

On May 19, 2016, the EgyptAir flight MS804, crashed into the Mediterranean with 66 people on board. The flight was on its journey from Paris, France to Cairo, Egypt. French marine search company ALSEAMAR has joined the hunt for the black boxes. ALSEAMAR will make use of modern technology 'intelligent buoys' which is connected to underwater acoustic listening devices.

Possible MH370 wreckage found

A piece of debris discovered off the southeast African coast on March 3, 2016, (possibly from missing Malaysia Airlines flight MH370) is being handed over to Australia for examination. It may turn out to be the second such piece of debris found from MH370, which went missing on March 8, 2014, while on a routine overnight journey from Kuala Lumpur to Beijing carrying 239 passengers and crew.

Zika Virus Spreads from Latin America

More than 20 nations in the Western Hemisphere have confirmed outbreak of Zika Virus. These nations are: Barbados, Bolivia, Brazil, Colombia, Ecuador, El Salvador,

French Guiana, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Martinique, Mexico, Panama, Paraguay, Saint Martin, Suriname, Venezuela and Puerto Rico.

Key Points: Mosquitoes transmit Zika virus, its spreading quickly across continents and infection is like that of yellow fever and West Nile virus. Zika got its name from the Ugandian 'Zika' forest where it was first discovered. It is common in Africa and Asia where people have become immune. Generally people in Western Hemisphere are not no immune to it.

SPORTS CURRENT AFFAIRS

OLYMPIC GAMES 2016

The 31st edition of the summer olympics games, properly known as Rio Olympics 2016 or Rio 2016, will be held at Rio de Janeiro, Brazil, Aug 5–21, 2016. With more than 10,500 athletes will feature in 28 olympic sports, a total of 41 disciplines and 306 events. The athletes' village at Rio 2016 is the largest in olympic history ever that will accommodate all the athletes, and dignitaries. The official emblem for Rio 2016 has three figures (yellow, green, and blue) in Brazilian flag colours, representing Sugarloaf Mountain. The logo encompassed four concepts: contagious energy, harmonious diversity, exuberant nature, and olympic spirit. Official mascot of Rio 2016 is Vinicius.

Flashpoints:

- On Aug 5, 2016, the Rio 2016 will be inaugurated at the Maracanã Stadium.
- Two new sports have been included in the olympics: Rugby Seven, and Golf. The sailing event of 'Water-surfing' would be replaced by 'Kite-surfing'.
- Debutant, South Sudan and Kosovo are two new participant nations.
- Zika, the outbreak of the mosquito-borne virus in Brazil, is a threat for organizers.
- IOC President, Thomas Bach, will officiate as his first olympics.
- Rio will become the first South American city to host the summer olympics and first since 1968 to be held in Latin America.
- Rio 2016 are the olympics that is being held in any Portuguese-speaking country.
- Notably, at the time of Rio 2016—a summer olympics, Rio will be going through its winter season.

NATIONAL GAMES 2016

At the closing ceremony of the 35th national games in Kerala, it was announced that the 36th national games will be held at Goa in November 2016 and the 37th National Games will be held in January 2019 in Amravati, Andhra Pradesh.

Summary Report: Though it has been proposed that the national games will be held once in two years, it has seen a shaky schedule. After 2002, games held in Andhra Pradesh, it took Guwahati nearly five years to conduct the games. Before its opening on February 12,

2011, the 34th national games had been postponed six times. The games were scheduled to be held at Kerala in 2012, however, they were finally held from January 31st to February 14th, 2015 after a delay of almost three years.

12TH SAF GAMES 2016

The 12th South Asian Games were held at Guwahati and Shillong, India from February 5–16, 2016. The 2016 edition of the South Asian Games was the first international multi-sporting event ever held in the North–Eastern region. Athletes from eight member countries (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka) participated in the event. Nearly 3500 individuals including athletes (2672 for 22 sports), delegates and sports officials from eight countries participated in the event.

Summary Report

India's dominance at the regional level remained unchallenged as the country was crowned overall champions for the 12th consecutive time, with a record-breaking haul of 308 medals. Women boxers won all the three gold medals on offer and the judokas also managed to bag, two gold and two silver on the last day of the games. The final medal tally for the country read 188 gold, 99 silver and 30 bronze medals. It was a big leap in medal haul for the Indians. India had won 175 medals, including 90 gold, in the last (11th) edition of the games in 2010. Sri Lanka stood at the second spot with a haul of 186 medals (25 gold, 63 silver and 98 bronze). Pakistan was placed third with a count of 106 medals (12 gold, 37 silver and 57 bronze).

Final Medal Tally

Nations	Gold	Silver	Bronze	Total
India	188	99	30	308
Sri Lanka	25	63	98	186
Pakistan	12	37	57	106
Afghanistan	7	9	19	35
Bangladesh	4	15	56	75
Nepal	3	23	34	60
Maldives	0	2	1	3
Bhutan	0	1	15	16

Highlights— ➤ Narendra Modi, the Indian PM officially inaugurated the Games. ➤ Motto of the games—'Play for Peace, Progress and Prosperity'. ➤ Mascot of the Games: 'Tikur,' the baby rhino. ➤ Anthem of the Games—'Ei Prithibi Ek Krirangan' (The world is a playground), a song by Bhupen Hazarika.

The 12th edition of the games was initially scheduled to be held at Kathmandu, Nepal (2012), and later was re-planned for Delhi (2013, 2015). However, it finally held in Guwahati and Shillong in 2016.

TENNIS GRAND SLAMS

Super Table

General Info	Australian Open	French Open	Wimbledon	US Open
Edition (2016)	104th	115th	130th	136th
Founded in	111 years ago in 1905	125 years ago in 1891	139 years ago in 1877	135 years ago in 1881
Hosted by/Venue	Melbourne, Australia	Paris, France	London, England	New York City, US
Venue/Stadium	Melbourne Park	Stade Roland Garros	All England Lawn Tennis & Croquet Club	USTA Nillie Jean King National Tennis Centre
Surface	Hard (Plexi-cushion)	Clay	Grass	Hard
Prize Money	A$ 44,000,000 (2016)	€ 28,028,600 (2015)	£ 26,750,000 (2015)	US$42,253,400 (2015)

Current Champions	Australian Open		French Open		Wimbledon		US Open	
	2015	2016	2015	2016	2015	2016	2015	2016
Men's Single	Novak Djokovic (Serbia)	Novak Djokovic (Serbia)	Stan Wawrinka (Switzerland)	Novak Djokovic (Serbia)	Novak Djokovic (Serbia)	Novak Djokovic (Serbia)	Novak Djokovic (Serbia)	
Women's Single	Serena Williams (USA)	Angelique Kerber (Germany)	Serena Williams (USA)	Garbine Muguruza (Spain)	Serena Williams (USA)		Flavia Pennetta (Italy)	

Men's Double	Simone Bolelli/Fabio Fognini (Italy)	Jamie Murray (USA)/ Bruno Soares (Brazil)	Ivan Dodig (Croatia)/ Marcelo Melo (Brazil)	Feliciano Lopez/Marc Lopez (Spain)	Jean-Julien Rojer (Netherlands)/ Horia Tecau (Romania)	Pierre-Hugues Herbert/ Nicolas Mahut (France)
Women's Double	Bethanie Mattek-Sands (USA) /Lucie Safarova (Rusaia)	Martina Hingis (Switzerland)/ Sania Mirza (India)	Lucie Safarova (Russia)/ Bethaine Mattek-Sands (USA)	Caroline Garcia/ Kristina Mladenovic (France)	Martina Hingis (Switzerland)/ Sania Mirza (India)	Martina Hingis (Switzerland)/ Sania Mirza (India)
Mixed Double	Martina Hingis (Switzerland)/ Leander Paes (India)	Elena Vesnina (Russia)/ Bruno Soares (Brazil)	Anna-Lena Grönefeld (Germany)/ Rojer Jean-Julien (Netherlands)	Leander Paes (India)/ Martina Hingis (Switzerland)	Leander Paes (India)/ Martina Hingis (Switzerland)	Leander Paes (India)/ Martina Hingis (Switzerland)

MOST TITLES	Numbers	Player	Numbers	Player	Numbers	Player	Numbers	Player
Men's Single	6	Novak Djokovic, Roy Emerson	9	Rafael Nadal	7	Pete Sampras, Roger Federer	5	Jimmy Connors, Pete Sampras, Roger Federer

Category					
Women's Single	11	Margaret Court — 7	Chris Evert — 9	Martina Navratilova — 6	Chris Evert, Serena Williams
Men's Double	10	Adrain Quist — 13	Max Decugis — 9	Todd Woodbridge — 6	Bob Bryan, Mike Bryan
Women's Double	12	Thelma Coyne Long — 7	Martina Navratilova — 7	Martina Navratilova — 9	Martina Navratilova
Mixed Doubles (Male)	4	Harry Hopman/Colin Long — 7	Max Decugis — 4	Owen Davidson (Australia)/Leander Paes — 4	Bob Bryan
Mixed doubled (Female)	4	Daphne Cozens/Nell Hopman/Nancye Bolten/Thelma Coyne Long — 7	Suzanne Lenglen — 4	Martina Navratilova — 3	Margret Court, Billie Jean King, Martina Navratilova

ICC 2016 T–20 WORLD CUP

The 2016 ICC World Cup T-20 tournament was held in India from March 8–April 3, 2016. The semi-finals were played in Mumbai and New Delhi while the final was played in Kolkata. The tournament has seen five different winners in the men's event since its start in 2009. However, the inaugural cup of women's event was won by England team in 2009 before Australia won three straight titles 2010, 2012 and 2014.

In 2016 tournament, men's team faced defeat in the semi-final against West Indies. England defeated New Zealand in the other semi-final to reach the final. The final was played between West Indies and England on April 3, 2016, at Eden Gardens, Kolkata. Needing 19 runs from the last over to win, Carlos Brathwaite (West Indies) stunned everyone, hitting four sixes consecutive on first four balls, to lift the cup. It was West Indies' second T-20 world title. They had earlier won it in 2012. The West Indians had also won the under-19 title in February 2016. West Indies women's team also won their maiden ICC World T-20. In the final, West Indies convincingly defeated the Australians by eight wickets.

CUPS, TROPHIES AND TOURNAMENTS

ARCHERY

International	
Ankara World Archery Indoor Championship Cup 2016 (Mar 1—6, 2016)	• Recurve Event [Men—**Gold:** Heorhiy Ivanytsky (UKR); **Silver:** Sergii Makarevych (UKR); Brady Ellison (USA) ||Women—**Gold:** Lisa Unruh (GER); **Silver:** Natalia Lesniak (POL); Claudia Mandia (ITA)].
	• Compound Event [Men—**Gold:** Sebastien Peineau (FRA); **Silver:** Mike Schloesser (NED); Omid Taheri (IRI) || [Women—**Gold:** Irene Franchini (ITA); Silver: Albina Loginova (RUS); Sarah Prieels (BEL).]

ATHLETICS

International	
IAAF World Indoor Championship 2016, Portland *(held in Mar 17—21, 2016)*	**Major Results***:* 60 m—Men: Trayvon Bromell (USA); Women: Barbara Pierre (USA) ➤ 400 m— Men: Pavel Maslak (CZE); Women: Oluwakemi Adekoya (BRN) ➤ 400x4 m Relay— Men: USA; Women: USA.
Stockholm Marathon 2016	**Major Results***:* Men—Stanley Kipchirchir Koech (KEN) ➤ Women—Jane Moraa Onyangi (KEN)

IAAF World Challenge Beijing 2016	**Major Results***: 100 m—Men: Justin Gatlin (USA); Women: Murielle Ahoure (CIV) ➤ 800 m— Men: Kipyegon Bett (KEN); ➤ 200m Women: Veronica Campbell-Brown (JAM) ➤ 3000 m Steeple— Men: Exekiel Kemboi (KEN) ➤ 1500 m Women: Hellen Onsando Obiri (KEN) ➤ 110 m Hurdle— Men: Majd Eddin Ghazal (SYR); Women: Danielle Willams (JAM) ➤ 4x100 m Relay— Men: China; Women: China.
London Marathon 2016	**Major Results***: Men—Eliud Kipchoge (KEN) ➤ Women—Jemima Sumgong (KEN)
Marathon Dusseldorf 2016	**Major Results***: Men—Japhet Kosgei (KEN) ➤ Women—Zsofia Erdelyi (HUN)
Boston Marathon 2016	**Major Results***: Men—Hayle Lemi Berhanu (ETH) ➤ Women—Baysa Atsede (ETH)
Berlin Half Marathon	**Major Results***: Men—Richard Mengich (KEN) ➤ Women—CHERNO Elizeba (NED)

National

29ᵗʰ Federation Cup Athletics Championship (April 2016)	**Major Results**: 800m women—Tintu Lukka(RSPB) ➤ 200m Women —Jyothi HM (CBAN) ➤ Dutee Chand (ORI) ➤ 400m Hurdles women— Jauna Murmu (ONGC) ➤ 400m Hurdles Men—Jithin Paul (KER) ➤ Javelin Throw women Final— Anu Rani ➤ 1500m Men—Ajay Kumar Saroj (ONGC) ➤ 1500m Women—OP Jaisha (KER) ➤ 3000m women final—Lalita Shivaji Babar (MAH) ➤ 400m Men Final—Arokiarajiv S. (Tamil Nadu) ➤ Anilda Thomas (KER) ➤ High Jump Women Final—Sahana Kumar (KAR) ➤ Long Jump Men Final—K. Prem Kumar (RSPB) ➤ Shotput Women Hepta3—Purnima Hembram (ORI) ➤ High Jump Women Hepta—Purnima Hembram (ORI) ➤ Hammer Throw Women final—Sarita Prakash Singh (UP) ➤ 110m Hurdles Men Final—Suresh Arumugam (TN) ➤ 100m Hurdles Women Finals—Pinki Rani (HAR) ➤ Javelin Throw Men Final—Vipin Kasana (UP) ➤ Pole Vault Men Final—Preeth J (TN) ➤ Shot Put Men Deca 3—Jagtar Dhillon.

BADMINTON

International

Swiss Open 2016	**Major Results:** Men's Single—HS Prannoy (IND) def Marc Zwiebler (GER) ➤ Women single—HE Bingjiao (CHN) def Wang Yihan (CHN)
YONEX German Cup 2016	**Major Results:** Men's Single—Lin Dan (CHN) def Chou Tien Chen (TWN) ➤ Women single—Li Xuerui (CHN) def Wang Shixian (CHN)

Syed Modi International Badminton Championship 2016	**Major Results:** Men's Single—Kidambi Srikanth Dan (IND) def Huang Yuxiang (CHN) ➤ Women single—Sung Ji Hyun (KOR) def Sayaka Sato (JPN) ➤ Men's Doube—V Shem Goh (MAL)/Wee Kiong Tan (MAL), def Prannav Jet (IND)/Akshey Dewalkar (IND)
China International Challenge 2016	**Major Results:** Men's Single—Lin Guipu (CHN) def Zaho Jun Peng (CHN) ➤ Women single—Hui Xirui (CHN) def Gao Fangjie (CHN)
Yonex Sunrise India Open 2016	**Major Results:** Men's Single—Kento Momota (JPN) def Victor Axelsen (DEN) ➤ Women single—Ratchanok Intanon (THI) def li Xuerui (CHN)
Yonex All England Open 2016	**Major Results:** Men's Single—Lin Dan (CHN) def Tian Houwei (CHN) ➤ Women single—Nozomi Okuhara (JPN) def Wang Shixian (CHN)

National	
All India Doubles Ranking Badminton Tournament, 2016	**Major Results:** Men's Double—Vighnesh Devlekar and Rohan Kapoor def Kiran Kumar B. and Gopi raju G. ➤ Women Double—Apama Balan and Meghana J. def Shruti K.P. and Haritha M.H. ➤ Men's Doubles—Jishnu Sanyal and Shivam Sharma def Hemanagendra Babu T. and Diju V. ➤ Women's Doubles—Poorvisha S. Ram and Arathi Sara Sunil def Sruthi K.P. and Harlia M.H. ➤ Mixed Doubles—Arun Vishnu and Apama Balan def Hemangendra Babu T. and Poorvisha S. Ram
All India Senior Ranking Badminton Tournament 2016	**Major Results:** Men's Single—Shreyansh Jaiswal def Rahul Yadav ➤ Women Single—Thulasi P.C. def Ruthvika Shivani G. ➤ Mixed Doubles—Arun Vishnu and Apama Balan def Rohan Kapoor and Kuhoo Garg

BASKETBALL

International	
South Asian Basketball Association (SABA) Championship for U-18 Men	**Major results:** India def. Sri Lanka [127—52]; India def. Bangladesh [90—31]; India def. Nepal [117—40]

National	
66th Senior National Basketball Championship 2016	Results: Men's Event— 1st: Services; 2nd Uttrakhand; 3rd Tamil Nadu (Most Valueable Player: Joginder Singh) • Women's Event—1. Indian railways; 2. Kerala; 3. Delhi (Most Valuable Player: Navaneetha PU)

BILLIARDS AND SNOOKER

	International
World Billiards Scottish Open	**Final:** David Causier (ENG) def Phil Mumford (ENG).
World Billiards LITE task UK Open	**Final:** Robert Hall (ENG) def Roxton Chapman (ENG).
World Billiards Irish Open	**Final:** Mike Russell (ENG) def Dave Sneddon (SWE).
World Billiards LITE task European Open	**Final:** Mike Russell (ENG) def Peter Gilchrist (SIN).
World Snooker Championship 2016	**Final:** Mark Selby (ENG) def Ding Junhui (CHN).

BOXING

	International
AIBA Women's World Boxing Championship Astana 2016	**Final Medal Standing: 1st** Kazakhstan [Gold—4; Silver—0; Bronze—2]; **2nd** China [Gold—2; Silver—2; Bronze—2]; **3rd** USA [Gold—1; Silver—1; Bronze—3]

CHESS

	International
Women's FIDE Grand-Prix, Tehran 2016	**Final Ranking:** 1st—Ju Wenjun (CHN); 2nd—K. Sarasadat (IRI); 3rd—Zhao Xue (CHN) [Indian Player— Koneru Humpy (5th) and Harika Dronavalli (9th)]
Women's FIDE Grand-Prix, Georgia 2016	**Final Ranking:** 1st—Gunina Valentina (RUS; 2nd—Kosteniuk Alexandra (RUS); 3rd—Batsiashvili Nino (GEO).
Asian Nations Cup 2016	**Standard Open Ranking:** Men's Event—1st India; 2nd China and 3rd Kazakhstan || Women's Event—1st China; 2nd Uzbekistan; and 3rd Kazakhstan
	Rapid Open Ranking: Men's Event—1st China; 2nd Vietnam and 3rd India.
	Women's Event—1st China; 2nd Uzbekistan; and 3rd India.
	National
36th National Team Chess Championship 2016	**Final Standing** *(Top—5):* **1st** Railway Sports Promotion Board—A; **2nd** Airport Authority of India; **3rd** Air India; **4th** Petroleum Sports Promotion Board; **5th** Delhi.

CRICKET

International
The Frank Worrell Trophy (West Indies in Australia Test Series) Dec 2015—Jan 2016	**Result:** Australia 2—0 (3 Tests)
Basil D'Oliveira Trophy (England in South Africa Test Series) Dec 2015—Jan 2016	**Result:** England 2—1 (4 Tests)
Trans—Tasman Trophy (Australia in New Zealand Test Series) Jan 2016	**Result:** Australia 2—0 (2 Tests)
Sri Lanka in New Zealand ODI Series (Dec 2015—Jan 2016)	**Result:** New Zealand 3—1 (5 ODIs)
India in Australia ODI Series (Jan 2016)	**Result:** Australia 4—1 (5 ODIs)
Pakistan in New Zealand ODI Series (Jan 2016)	**Result:** New Zealand 2—0 (3 ODIs)
Chappell—Hadlee Trophy Australia in New Zealand (Feb 2016)	**Result:** New Zealand 2—1 (3 ODIs)
England in South Africa ODI Series (Feb 2016)	**Result:** South Africa 3—2 (5 ODIs)
India in Australia ODI Series (Jan 2016)	**Result:** Australia 2—0 (2 T20Is)
Sri Lanka in New Zealand T-20Is Series (Jan 2016)	**Result:** New Zealand 2—0 (2 T20Is)
Afghanistan in Zimbabwe T-20Is Series (Jan 2016)	**Result:** Afghanistan 2—0 (2 T20Is)
Pakistan in New Zealand T-20Is Series (Jan 2016)	**Result:** New Zealand 2—1 (3 T20Is)
Walton T20 Cricket Series Zimbabwe in Bangladesh (Jan 2016)	**Result:** Drawn 2—2 (4 T20Is)
India in Australia T-20Is Series (Jan 2016)	**Result:** India 3—0 (3 T20Is)
Sri Lanka in India T-20Is Series (Feb 2016)	**Result:** India 2—1 (3 T20Is)
Asia Cup Held in Bangladesh (Feb—Mar 2016)	**Result:** Winner India
England in South Africa T-20Is Series (Feb 2016)	**Result:** South Africa 2—0 (2 T20Is)
Australia in South Africa T-20Is Series (Jan 2016)	**Result:** Australia 2—1 (4 T20Is)
World Cup T-20 Mar—Apr 2016	**Result:** West Indian Winner

National	
Ranji Trophy 2015/16	**Final:** Mumbai vs Saurashtra at Pune — Feb 24–26, 2016; Saurashtra 235 and 115 (48.2 over); Mumbai 371. **Winner**: Mumbai
Vijay Hazare Trophy 2015/16	**Final:** Delhi vs Gujarat at Bangalore — Dec 28, 2015; Gujarat 273(50 /50 over) and; Delhi 134 (32.4/50 over). **Winner**: Gujarat
Syed Mushtaq Ali Trophy 2015/16	**Final:** Uttar Pradesh vs Baroda at Mumbai — Jan 20, 2016; Uttar Pradesh 163/7 (20/20 Over) and; Baroda 125/7 (20/20 over) **Winner**: Uttar Pradesh
Deodhar Trophy 2015/16	**Final:** India-A vs Ind—B at Kanpur — Jan 29, 2016; India-A 286/7 (50/50 Over) and; India-B 199 (40.4/50 over). **Winner**: India-A
Irani Cup 2015/16	**Final:** Rest of India v/s Mumbai (winner of Ranji Trophy) at Mumbai — Mar 6–10, 2016; Mumbai 603 and 182 and; Rest of India 306 and 482/6 (129.4 over Target 480). **Winner**: Rest of India

FOOTBALL

International	
AFC Cup 2015	**Winner:** Johor Darul Ta'zim (Malaysia)
SAAF Championship 2015	**Winner:** India def. Afghanistan (2—1)
English Premier League 2015–16	**Winner:** Leicester City. **Final Ranking:** 1st—Leister City *(Champion)*; 2nd—Arsenal; 3rd—Tottenham; 4th—Manchester City; 5th—Manchester United.
Lal Liga 2015/16 (Spain)	**Winner:** Barcelona. **Final Ranking:** 1st—Barcelona *(Champion)*; 2nd—Real Madrid; 3rd—Atl. Madrid; 4th—Villarreal; 5th—Ath Bilbao.
Champions League 2015/16 (Europe)	**Winner:** Real Madrid def. Atl. Madrid (2-1)
National	
Hero i-League 2015–16	**Final Ranking:** 1st—Bengaluru FC *(Champion)*; 2nd—Mohan Bagan; 3rd—Kingfisher East Bengal; 4th—Sporting Club de Goa.
Federation Cup 2016	**Winner:** Mohun Magan def. Aizawl (5—0) in the finals.
Indian Soccer League (ISL)	**Winner:** Chennai def. Goa (3—2).

AWARDS & HONOURS

AWARDS AND HONOURS—NATIONAL HONOURS
(National & International)

Padma Awards 2016

Padma Awards, one of the highest civilian awards of the country, are conferred in three categories, namely, Padma Vibhushan, Padma Bhushan and Padma Shri. The awards are given in various disciplines/ fields of activities, namely, art, social work, public affairs, science and engineering, trade and industry, medicine, literature and education, sports, civil service, etc. 'Padma Vibhushan' is awarded for exceptional and distinguished service; 'Padma Bhushan' for distinguished service of high order and 'Padma Shri' for distinguished service in any field. The awards are announced on the occasion of republic day every year. These awards are conferred by the president of India at ceremonial functions which are held at Rashtrapati Bhawan usually around March/April every year. This year the president of India has approved conferment of Padma Awards to 112 persons as per the list below.

10 Padma Vibhushan

S. No	Name	Field	State
1.	Yamini Krishnamurthi	Art- Classical dance	Delhi
2.	Rajinikanth	Art-Cinema	Tamil Nadu
3.	Girija Devi	Art-Classical Vocal	West Bengal
4.	Ramoji Rao	Literature & Education- Journalism	Andhra Pradesh
5.	Viswanathan Shanta	Medicine- Oncology	Tamil Nadu
6.	Ravi Shankar	Others-Spiritualism	Karnataka
7.	Jagmohan	Public Affairs	Delhi
8.	Vasudev Kalkunte Aatre	Science & Engineering	Karnataka
9.	Avinash Dixit **(Foreigner)**	Literature & Education	USA
10.	Late Dhiru Bhai Ambani **(Posthumous)**	Trade & Industry	Maharashtra

19 Padma Bhushan

S. No.	Name	Field	State
1.	Anupam Kher	Art—Cinema	Maharashtra
2.	Udit Narayan Jha	Art—Playback Singing	Maharashtra
3.	Ram V. Sutar	Art—Sculpture	Uttar Pradesh
4.	Heisnam Kanhailal	Art—Theatre	Manipur

5.	Vinod Rai	Civil Service	Kerala
6.	Yarlagadda Lakshmi Prasad	Literature & Education	Andhra Pradesh
7.	N.S. Ramanuja Tatacharya	Literature & Education	Maharashtra
8.	Barjinder Singh Hamdard	Literature & Education - Journalism	Punjab
9.	Nageshwar Reddy	Medicine—Gastroenterology	Telangana
10.	Swami Tejomayananda	Other—Spiritualism	Maharashtra
11.	Hafeez Contractor	Others—Architecture	Maharashtra
12.	Ravindra Chandra Bhargava	Public Affairs	Uttar Pradesh
13.	Venkata Rama Rao Alla	Science & Engineering	Andhra Pradesh
14.	Saina Nehwal	Sports—Badminton	Telangana
15.	Sania Mirza	Sports—Tennis	Telangana
16.	Indu Jain	Trade & Industry	Delhi
17.	Late Swami Dayanand Sarawasati **(Posthumous)**	Others—Spiritualism	Uttarakhand
18.	Robert Blackwill **(Foreigner)**	Public Affairs	USA
19.	Pallonji Shapoorji Mistry **(NRI/PIO)**	Trade & Industry	Ireland

The list comprises of 10 Padma Vibhushan, 19 Padma Bhushan and 83 Padma Shri awardees. 19 of the awardees are women and the list also includes 10 persons from the category of foreigners, NRIs, PIOs (include one posthumous) and four Posthumous awardees.

Gallantry Awards 2016 (Major Awards)

- **Ashok Chakra**
  Lance Naik Mohan Nath Goswami (*Posthumous*), 9 PARA (Special Force)
- **Kirti Chakra**
  Subedar Mahendra Singh, Sena Medal, 9 PARA (Special Force)
  Sepoy Jagdish Chand (*Posthumous*), 546 DSC Platoon
- **Shaurya Chakra**
  Colonel Santosh Yashwant Mahadik (Posthumous), Sena Medal, 41 Rashtriya Rifle (PARA)
  Major Praphul Kumar Bhardwaj, 12 PARA (Special Force)
  Major Anurag Kumar, 9 PARA (Special Force)
  Major Sandip Yadav, 55 Rashtriya Rifle (Armed)
  Lieutenant Harjinder Singh, 3 Kumaon
  Naik Satish Kumar (*Posthumous*), 21 Rashtriya Rifle (Guards)

Naik Kheem Singh Mehra, 21 Kumaon
Sepoy Dharma Ram (*Posthumous*)**,** 1 Rashtriya Rifle (MAHAR)

Arjuna Awards 2015

➤ Naib Subedar Sandeep Kumar—Archery ➤ M.R. Poovamma—Athletics ➤ Kidambi Srikanth Nammalwar—Badminton ➤ Mandeep Jangra—Boxing ➤ Rohit Sharma—Cricket ➤ Dipa Karmakar —Gymnastic ➤ Sreejesh P.R.—Hockey ➤ Manjeet Chhillar—Kabaddi ➤ Abhilasha Shashikant Mhatre—Kabaddi ➤ Sawarn Singh—Rowing ➤ Anup Kumar Yama—Roller Skating ➤ Jitu Rai—Shooting ➤ S. Sathish Kumar—Weightlifting ➤ Bajrang—Wrestling ➤ Babita Kumari—Wrestling ➤ Yumnam Sanathoi Devi—Wushu ➤ Sharath M. Gayakwad—Para-Swimming

Dronacharya Awards 2015

➤ Naval Singh— Athletics-Para-sports; ➤ Anoop Singh—Wrestling ➤ Harbans Singh—Athletics- Lifetime ➤ Swatantar Raj Singh—Boxing- Lifetime ➤ Nihar Ameen—Swimming-Lifetime

Dhayan Chand Award 2015

➤ Romeo James—Hockey ➤ Shiv Prakash Mishra—Tennis ➤ T.P.P. Nair—Volleyball

Rashtriya Khel Protsahana Purushkar 2015

➤ **Category**: Employment of sportspersons and sports welfare measures—Haryana Police ➤ **Category**: Sports for Development—Sports Coaching Foundation, Hyderabad ➤ **Category**: Identification and nurturing of budding /young talent—Directorate General of Military Training; ➤ **Category**: Encouragement to sports through Corporate Social Responsibility—Coal India Limited.

Rajiv Gandhi Khel Ratna 2015   Sania Mirza (Tennis)

AWARDS AND HONOURS—MAJOR INTERNATIONAL AWARDS (National & International)

Nobel Prizes 2015

- **Physics:** Takaaki Kajita and Arthur B. McDonald, for the discovery of neutrino oscillations, which shows that neutrons have mass.
- **Chemistry:** Tomas Lindahl, Paul Modrich and Aziz Sancar—for mechanistic studies of DNA repair.
- **Physiology or Medicine:** William C. Campbell and Satoshi Ōmura—for their discoveries concerning a novel therapy against infections caused by roundworm parasites; and Youyou Tu—for her discoveries concerning a novel therapy against Malaria.

- **Literature:** Svetlana Alexievich, for her polyphonic writings, a monument for suffering and courage in our time.
- **Peace Prize:** National Dialogue Quartet—for its decisive contribution to the building of a pluralistic democracy in Tunisia in the wake of the Jasmine Revolution of 2011.
- **The Sveriges Riksbank Prize in Economic Sciences:** Angus Deaton—for his analysis of consumption, poverty, and welfare.

Right Livelihood Awards 2015 (The Alternative Awards): Sheila Watt-Cloutier (Canada); Tony de Brum (Marshall Islands); Kasha Jacqueline Nabagesera (Uganda); and, Gino Strada (Italy).

UNESCO Peace Prize 2016 (Guillermo Cano World Press Freedom Prize 2016): Khadija Ismayilova, an investigative journalist from Azerbaijan, currently imprisoned.

World Beauty Pageant Awards (2015–16)

Miss Universe 2015: Pia Wurtzbach (Philippines).
Miss World 2015: Mireia Lalaguna (Spain).
Miss Asia-Pacific 2016: Natalie Stejskalova (Czech Rep.)
[Note: 2015 edition of the event was not held].
Miss Earth 2015: Angelia Ong (Philippines).
Miss International 2015: Edymar Martinex (Venezuela).
Miss Grand International 2015: Claire Elizabeth Parker (Australia)
[Note: Anea Garcia of Dominican Republic was dethroned and later Claire Elizabeth Parker was crowned].
Miss United Continent 2015: NathaliaLago (Brazil)
[Note: Sushrii Shreya Mishraa (India) won Third Runner-Up, Best National Costume, **Miss Photogenic** awards at the event. India's Vartika Singh was the 1st Runner-Up in the event].
Miss Supranational 2015: Stephania Vasquez Stegman (Paraguay).

53rd Femina Miss India 2016

Winner: Priyadarshini Chatterjee (Guwahati, Assam); **Runner-UP:** Sushruthi Krishna (Bangalore, Karnataka); **Second Runner-Up**: Pankhuri Gidwani (Lucknow, UP).
[Note: Priyadarshini Chatterjee will now represent India at the International platform of Miss World 2016, while Sushruthi Krishna will be eligible to take part in Miss International 2016, and Pankhuri Gidwani will take part in Miss Grand International beauty pageant 2016].

AWARDS AND HONOURS—BUSINESS & PUBLIC POLICY (National & International)

Golden Peacock Awards 2015–16

Central Banking Awards   2015 Winner (Governor of the Year): Raghuram Rajan [Governor of Reserve Bank of India (RBI)]

AWARDS AND HONOURS—FILM AND ENTERTAINMENT (National & International)

63rd National Film Festival Awards [denotes 'Swarna Kamal' or Golden Lotus Award presented]

Individual Awards: ➤ Best Direction: Sanjay Leela Bhansali for 'Bajirao Mastani' ➤ Best Actor: Amitabh Bachchan, Piku ➤ Best Actress: Kangana Ranaut, Tanu Weds Manu Returns ➤ Best Supporting Actor: Samuthirakani for *Visaaranai* ➤ Best Supporting Actress: Tanvi Azmi, Bajirao Mastani

Best Film Awards: ➤ Best Film: Baahubali ➤ Best Hindi Film: Dum Laga Ke Haisha ➤ Best Malayalam Film: Pathemari ➤ Best Tamil Film: Visaaranai ➤ Best Telugu Film: Kanche ➤ Best Sanskrit Film: Priyamanasam ➤ Best Kannada Film: Thithi ➤ Best Marathi Film: Ringan ➤ Best Maithili Film: Mithila Makhaan ➤ Best Punjabi Film: Chauthi Koot ➤ Best Bengali Film: Sankhachil ➤ Best Konkani Film: Enemy ➤ Best Assamese Film: Kothanodi ➤ Best Haryanvi Film: Satrangi ➤ Best Wancho Film: The Head Hunter ➤ Best Khasi Film: Onaatah ➤ Best Manipuri Film: Eibusu Yaohanbiyu ➤ Best Mizo Film: Kima's Lode Beyond the Class ➤ Best Odiya Film: Pahada Ra Luha

Special Category Awards: ➤ Best Popular Film Providing Wholesome Entertainment: Bajrangi Bhaijaan ➤ Best Film on Environment Conservation/Preservation: Valiya Chirakulla Pakshikal ➤ Best Children's Film: Duronto ➤ Best Film on Social Issue: Niranayakam

Special Awards: ➤ Nargis Dutt Award for Best Feature Film on National Integration: Nanak Shah Fakir ➤ Indira Gandhi Award for Best Debut Film of a Director: Neeraj Ghaywan, Masaan ➤ Special Mention: Ritika Singh for the film Irudhi Suttru

Music, Dance and Technical Awards: ➤ Best Choreography: Remo D'Souza, Deewani Mastani song in Bajirao Mastani ➤ Best Female Playback Singer: Monali Thakur, Moh Moh Ke Dhage ➤ Best Cinematography: Sudeep Chaterjee, Bajirao Mastani ➤ Best Screenplay Writer (Original): Juhi Chaturvedi (Piku) and Himanshu Sharma (Tanu Weds Manu Returns) ➤ Best Screenplay–Dialogues: Juhi Chaturvedi (Piku) and Himanshu Sharma (Tanu Weds Manu Returns) ➤ Best Music Direction: M. Jayachandran for Song Kaathirunnu Kaathirunnu for the Ennu Ninte Moideen ➤ Best Music Direction—Background Score: Ilaiyaraaja, Thaarai Thappattai ➤ Best Editing: Late Kishore T.E. for Visaranai ➤ Best Costume Designer and Best Make-up Artist for film: Nanak Shah Fakir.

Non-Feature Films Awards: ➤ Best Non-Feature Film: Amdavad Ma Famous (Gujarati) ➤ Best Non-Feature Film Direction: Kamuki (Malayalam) ➤ Special Mention: Ritika Singh for the film Irudhi Suttru

Best Book on Cinema: Rajkumar Samagra Charithre (Kannada) Author: Doddahulluru Rukkoji.

Dadasaheb Phalke Award (Swarna Kamal)—Manoj Kumar (Actor, Filmmaker)

Dadasaheb Phalke Film Foundation Award 2016—Priyanka Chopra (Actress and singer)

Oscars 2016 (88th Academy Awards)

Best Picture—Spotlight [Steve Golin, Michael Sugar, Blye Pagon Faust] ➤ Best Actor—Leonardo DiCaprio [The Revenant] ➤ Best Actress—Brie Larson [Room] ➤ Best Supporting Actress—Alicia Vikander [The Danish Girl] ➤ Best Supporting Actor—Mark Rylance [Bridge of Spies] ➤ Best Director—Alejandro González Iñárritu [The Revenant] ➤ Best Foreign Language Film—Son of Saul [László Nemes] ➤ Best Original Screenplay—Spotlight [Tom McCarthy, Josh Singer] ➤ Best Cinematography— Emmanuel Lubezki [The Revenant] ➤ Best Original Song—Writing's on the Wall [Sam Smith, Jimmy Napes] ➤ Best Visual Effects—Ex Machina [Andrew Whitehurst, Sara Bennett, Paul Norris] ➤ Best Costume Design—Jenny Beavan [Mad Max: Fury Road] ➤ Best Writing Adapted Screenplay—The Big Short [Adam McKay, Charles Randolph] ➤ Best Live Action Short Film—Stutterer [Benjamin Cleary, Serena Armitage] ➤ Best Animated Feature Film—Inside Out [Pete Docter, Jonas Rivera] ➤ Best Film Editing—Margaret Sixel [Mad Max: Fury Road] ➤ Best Sound Editing—David White [Mad Max: Fury Road] ➤ Best Sound Editing—Mark Mangini [Mad Max: Fury Road] ➤ Best Original Music Score—The Hateful Eight [Ennio Morricone] ➤ Best Documentary Feature—Amy [Asif Kapadia, James Gay-Rees] ➤ Best Sound Mixing—Gregg Rudloff [Mad Max: Fury Road] ➤ Best Sound Mixing—Chris Jenkins[Mad Max: Fury Road] ➤ Best Sound Mixing—Ben Osmo [Mad Max: Fury Road] ➤ Best Production Design— Lisa Thompson [Mad Max: Fury Road] ➤ Best Production Design—Colin Gibson [Mad Max: Fury Road] ➤ Best Animated Short Film—Bear Story [Gabriel Osorio, Pato Escala Pierart] ➤ Best Makeup—Lesley Vanderwalt [Mad Max: Fury Road] ➤ Best Makeup— Elka Wardega [Mad Max: Fury Road] ➤ Best Makeup—Damien Martin [Mad Max: Fury Road] ➤ Best Documentary Short Subject—A Girl in the River: The Price of Forgiveness [Sharmeen Obaid-Chinoy]

73rd Golden Globe Awards 2016

Films: Best motion picture, drama—The Revenant ➤ Best motion picture, musical or comedy—The Martian ➤ Best performance by an actress in a motion picture, drama— Brie Larson, 'Room' ➤ Best performance by an actress in a motion picture, musical or comedy—Jennifer Lawrence, 'Joy' ➤ Best performance by an actor in a motion picture, drama—Leonardo DiCaprio, 'The Revenant' ➤ Best performance by an actor in a supporting role in a motion picture—Sylvester Stallone, 'Creed' ➤ Best performance by actress in a supporting role in a motion picture— Kate Winslet, 'Steve Jobs' ➤ Best director, motion picture—Alejandro González Iñárritu, 'The Revenant' ➤ Best performance by an actor in a motion picture, musical or comedy— Matt Damon, 'The Martian' ➤ Best screenplay, motion picture—Aaron Sorkin, 'Steve Jobs' ➤ Best original score, motion picture—Ennio Morricone, 'The Hateful Eight' ➤ Best motion picture, animated—'Inside Out' ➤ Best original song, motion picture— 'Writing's on the Wall,' 'Spectre' ➤ Best motion picture, foreign language—'Son of Saul'

Television: Best television series, drama—'Robot,' USA ➤ Best television series, musical or comedy—'Mozart in the Jungle,' Amazon Video ➤ Best television limited

series or motion picture made for television—'Wolf Hall,' PBS ➤ Best performance by an actor in a television series, drama—Jon Hamm, 'Mad Men' ➤ Best performance by an actor in a television series, musical or comedy—Gael García Bernal, 'Mozart in the Jungle' ➤ Best performance by an actor in a leading role in a series, limited series or motion picture made for television—Oscar Isaac, 'Show Me a Hero' ➤ Best performance by an actor in a supporting role in a series, limited series or motion picture made for television—Christian Slater, 'Robot' ➤ Best performance by an actress in a TV series, drama—Taraji P. Henson, 'Empire' ➤ Best performance by an actress in a supporting role in a series, limited series or motion picture made for television—Maura Tierney, 'The Affair' ➤ Best performance by an actress in a leading role in a series, limited series or motion picture made for television—Lady Gaga, 'American Horror Story: Hotel' ➤ Best performance by an actress in a television series, musical or comedy—Rachel Bloom, 'Crazy Ex-Girlfriend'

61st Film Fare Awards 2016

➤ Best Film—Bajirao Mastani ➤ Best Director—Sanjay Leela Bhansali - Bajirao Mastani ➤ Best Actor in a Leading Role (Male)—Ranveer Singh - Bajirao Mastani ➤ Best Actor in a Leading Role (Female)—Deepika Padukone – Piku ➤ Best Actor in a Supporting Role (Male)—Anil Kapoor - Dil Dhadakne Do ➤ Best Actor in a Supporting Role (Female)—Priyanka Chopra - Bajirao Mastani ➤ Best Music—Ankit Tiwari, Meet Bros. Anjjan and Amaal Mallik - Roy ➤ Best Lyrics—Irshad Kamil - Agar tum saath ho (Tamasha) ➤ Best Playback Singer (Male)—Arijit Singh - Sooraj dooba (Roy) ➤ Best Playback Singer (Female)—Shreya Ghoshal - Deewani mastani (Bajirao Mastani) ➤ Best Action—Sham Kaushal - Bajirao Mastani ➤ Best Background Score—Anupam Roy - Piku ➤ Best Choreography—Pandit Birju Maharaj - Mohe rang do laal (Bajirao Mastani) ➤ Best Cinematography—Manu Anand - Dum Laga Ke Haisha ➤ Best Costume—Anju Modi and Maxima Basu - Bajirao Mastani ➤ Best Dialogue—Himanshu Sharma - Tanu Weds Manu Returns ➤ Best Editing—A Sreekar Prasad - Talvar ➤ Best Production Design—Sujeet Sawant, Sriram Iyengar and Saloni Dhatrak - Bajirao Mastani ➤ Best Screenplay—Juhi Chaturvedi - Piku ➤ Best Sound Design—Shajith Koyeri - Talvar ➤ Best Story —Vijayendra Prasad - Bajrangi Bhaijaan ➤ Best VFX—Prana Studio - Bombay Velvet

Critics Categories: ➤ Best Film—Piku ➤ Best Actor (Male)—Amitabh Bachchan – Piku ➤ Best Actor (Female)—Kangana Ranaut - Tanu Weds Manu Returns.

Speical Awards: ➤ Lifetime Achievement Award—Moushumi Chatterjee ➤ RD Burman Award—Armaan Mallik

Debut Awards: ➤ Best Debut (Male)—Sooraj Pancholi – Hero ➤ Best Debut (Female)— Bhumi Pednekar - Dum Laga Ke Haisha ➤ Best Debut Director—Neeraj Ghaywan - Masaan

Dubai International Film Festival (DIFF) Awards *[Muhr Awards]*

Muhr Emirati Awards: ➤ Best Director—A tale of water, palm trees and family (UAE) Nasser Aldhaheri (director) ➤ Best Muhr Emirati Short—Omnia (UAE) Amna Al Nowais (director) ➤ Best Muhr Emirati Feature—Going to heaven (UAE) Saeed Salmeen Al-Murry (director).

Muhr Gulf Short Awards: ➤ Special Jury Prize—Peddiers (UAE) Hind al Fahhad (director) ➤ Best Muhr Gulf Short—The Boss (UAE, Iraq and Qatar) Rizgar Husen (director)

Muhr Short Awards— ➤ Special Jury Prize—Mariam (UAE, France, Saudi Arabia, USA and Qatar) Faiza Ambah (Director); ➤ Best Muhr Short—Ave Maria (France, Germany and Palestine) Basil Khalil (Director)

Muhr Feature Awards: ➤ Best Actress—Nawara (Egypt) Menna Shalabi (Cast) ➤ Best Actor—Borders of Heaven (Tunisia and UAE) Lotfi Abdelli (Cast) ➤ Best Director—We Have Never Been Kids (UAE, Egypt, Qatar and Lebanon) Mahmood Soliman (Director) ➤ Special Jury Prize Muhr Feature—Let Them Come (Algeria and France) Salem Brahimi (Director) ➤ Best Muhr Non-Fiction Feature—We Have Never Been Kids (UAE, Egypt, Qatar and Lebanon) Mahmood Soliman (Director) ➤ Best Muhr Fiction Feature—As I Open My Eyes (France, Belgium, Tunisia and UAE) Leyla Bouzid (Director)

The Emirates Nbd People's Choice Award: • **Best Film**—The Idol (Palestine, Netherlands, Qatar, UK and UAE) Hany Abu-Assad (Director)

TOIFA Awards 2016 [Times of India Film Awards]

➤ Best Actor in a Negative Role - Nawazuddin Siddiqui (Badlapur) ➤ Best Actor in a Comic role - Deepak Dobiyal (TWMR) ➤ Best debut (Male) - Sooraj Pancholi (Hero) ➤ Best debut (Female) - Bhumi Pednekar (Dum Laga Ke Haisha) ➤ Best Debut Director—Neeraj Ghaywan (Masaan) ➤ Best Music Composer - Sanjay Leela Bhansali (Bajirao Mastani) ➤ Best Album winner - Roy (Ankit Tiwari, Meet Brothers and Amal Mallik) ➤ Best Song of the Year—Hamari Adhuri Khaani - Jeet Gangauli (Hamari Adhuri Kahani) ➤ Best Playback Singer (Male)—Papon - 'Moh Moh ke Dhagey' from (Dum Laga Ke Haisha) ➤ Best Playback singer (Female) —Shreya Ghoshal - Mohe rang do lal (Bajirao Mastani) ➤ Best Lyricist—Varun Grower - 'Moh Moh ke Dhagey' (Dum Laga Ke Haisha) ➤ Best Supporting Actor Male—Anil Kapoor (Dil Dhadakne Do) ➤ Best Supporting Actor Female—Priyanka Chopra (Bajirao Mastani) ➤ Lifetime Achievement Award—Amitabh Bachchan ➤ Best Film Critic's Choice awards—Talvar ➤ Best Actor (Critics Choice) Male—Amitabh Bachchan (Piku) ➤ Best Actor (Critics Choice) Female—Kalki Koechlin (Margarita With A Straw)

AWARDS AND HONOURS—SCIENCE AND TECHNOLOGY (National & International)

Infosys Prize 2015

Prof Umesh Waghmare (Engineering and Computer Science); Jonardon Ganeri (Humanities); Amit Sharma (Life Sciences); Prof Mahan Mj (Mathematical Sciences); Prof G. Ravindra Kumar (Physical Sciences); and, Srinath Raghavan (Social Sciences).

Heinz Award 2015

Sangeeta Bhatia, Indian-Origin scientist in MIT—for Technology, the Economy, and Employment.

AWARDS AND HONOURS—ART & LITERATURE (National & International)

Pulitzer Prize 2016

➤ Public Service Prize—Associated Press ➤ Spot News Photography Prize—Sergey Ponomarev ➤ Spot News Photography Prize—Tyler Hicks ➤ Spot News Photography Prize—Mauricio Lima ➤ Spot News Photography Prize—Daniel Etter ➤ Feature Photography Prize—Jessica Rinaldi ➤ Fiction Prize—The Sympathizer [Viet Thanh Nguyen] ➤ International Reporting—Alissa J. Rubin ➤ National Reporting—The Washington Post ➤ Feature Writing Prize—Kathryn Schulz ➤ Drama Prize— Hamilton (Lin-Manuel Miranda) ➤ History Prize—Custer's Trials: A Life on the Frontier of a New America (T. J. Stiles) ➤ Investigative Reporting Prize—Michael Braga ➤ Investigative Reporting Prize—Leonora LaPeter Anton ➤ Investigative Reporting Prize—Anthony Cormier ➤ Editorial Writing Prize—John Hackworth ➤ Biography or Autobiography Prize—Barbarian Days: A Surfing Life [William Finnegan] ➤ General Non-Fiction Prize—Black Flags: The Rise of ISIS [Joby Warrick] ➤ Poetry Prize—Ozone Journal [Peter Balakian] ➤ Criticism Prize—Emily Nussbaum ➤ Explanatory Reporting Prize—T. Christian Miller ➤ Explanatory Reporting Prize—Ken Armstrong ➤ Editorial Cartooning Prize—Jack Ohman ➤ Local Reporting Prize—Lisa Gartner ➤ Local Reporting Prize—Cara Fitzpatrick ➤ Local Reporting Prize—Michael LaForgia ➤ Music Prize—In for a Penny, In for a Pound [Henry Threadgill] ➤ Commentary Prize—Farah Stockman ➤ Breaking News Reporting Prize—Los Angeles Times.

Martin Luther King Junior Award   'Combatants for Peace'—in Israel and Palestine.

Turner Prize 2015   Assemble (Granby Four Streets Project)

Jnanpith Awards 2015   Raghuveer Chaudhuari, a novelist, poet and critic from Gujarat.

Sahitya Academy Awards 2015

Kula Saikia (Assamese); B.K. Brahma (Bodo); Dhain Singh (Dogri); Cyrus Mistry (English); Rasik Shah (Gujarati); Ramdarash Mishra (Hindi); K.V. Tirumslesh (Kannada); Bashir Bhadarwahi (Jashmiri); Uday Bhembre (Konkani); Man Mohan Jha (Maithili);

K.R. Meera (Malayalam); Shetri Rajen (Manipuri); Arun Khopkar (Marathi); Gupta Pradhan (Nepali); Bibhuti Pattanaik (Odia); Jaswinder Singh (Pubjabi); Madhu Acharya Ashawadi (Rajasthani); R.S. Awasthi (Sanskrit); Rabilal Tudu (Santhali); Maya Rahi (Sindhi); A Madhavan (Tamil); Volga (Telugu); Shamim Tariq (Urdu).

Vyas Samman 2015   Sunita Jain poetry collection 'Kshama'.

Sahitya Shiromani Samman 2016   Gulzar, noted lyricist and poet. Amongst the other noted Hindu Urdu writers who were conferred the Sahitya Shiromani Samman were Virendra Narain Yadav from Patna, Abilash Awasthi from Mumbai, D.C. Pandey 'Nazar' from Kanpur, Javed Danish and Tejasvi from Karnataka. The Sahitya Shree Samman awards were conferred on Kumar Vishwas from Noida, Alok Srivastava from Delhi and Nirmal Darshan from Lucknow. Special Kaustubh Award was conferred on Gopal Das 'Neeraj' and Bhartendu Harishchand Award was conferred on Arjun Chauhan from Mumbai, Yaad Dehalvi from Lucknow and Salim Arif from Mumbai.

Natya Kala Acharya Honour   Alarmel Valli, dancer. *Gutti Vasu Memorial Prize* for Best Dancers was shared by Meera Sreenarayanan and Sudharma Vaidyanathan and the second prize went to R. Gayathri.

AWARDS AND HONOURS—SPORTS AWARDS (National & International)

BBC Spots Personality Trophy 2015   Andy Murray (38), Tennis player

FIFA Awards 2015

Ballon d'Or or the FIFA World Player of the Year—1st place: Lionel Messi (Barcelona); 2nd place: Cristiano Ronaldo (Real Madrid); 3rd place: Neymar (Barcelona)

FIFA Women's World Player of the Year—Carli Lloyd (USA)

FIFA World Coaches of the Year for Men's Football— Luis Enrique Martínez (FC Barcelona)

FIFA World Coaches of the Year for Women's Football— Jill Ellis (US national coach)

FIFA Puskás Award for the best goal— Brazilian Wendell Lira from Goianésia

FIFA FIFPro World XI, the best team of 2015—Manuel Neuer (Germany/FC Bayern Munich) in goal; Dani Alves (Brazil/FC Barcelona), Marcelo (Brazil/Real Madrid), Sergio Ramos (Spain/Real Madrid) and Thiago Silva (Brazil/Paris Saint-Germain) in defence; Andrés Iniesta (Spain/FC Barcelona), Luka Modrić (Croatia/Real Madrid) and Paul Pogba (France/Juventus) in midfield; and Cristiano Ronaldo (Portugal/Real Madrid), Lionel Messi (Argentina/FC Barcelona) and Neymar (Brazil/FC Barcelona) in attack.

ICC Awards 2016

In men's category: Steve Smith (Australia)—Sir Garfield Sobers Trophy for ICC Cricketer of the Year 2015.
AB de Villiers (South Africa)—ODI Cricketer of the Year.
Faf du Plessis (South Africa)—T20I Performance of the Year

Josh Hazlewood (Australia)—the Emerging Cricketer of the Year award.

Khurram Khan (Afghanistan)—Associate and Affiliate Cricketer of the Year award.

Brendon McCullum (New Zealand)—Spirit of Cricket Award.

In women's category:

Meg Lanning—ICC Women's ODI Cricketer of the Year.

Stafanie Taylor—ICC Women's T20I Cricketer of the Year.

BCCI Awards 2016

Polly Umrigar Trophy for International Cricketer-of-the-Year—Virat Kohli.

Col. C.K. Nayudu Lifetime Achievement Award—Syed Kirmani.

Lala Amarnath Awards for Best All-rounder in Ranji Trophy: Jalaj Saxena (Madhya Pradesh);

Lala Amarnath Awards for Best all-rounder in domestic limited-over competitions: Deepak Hooda (Baroda).

Madhavrao Scindia Awards for Highest scorer in Ranji Trophy: Robin Uthappa (Karnataka)

Madhavrao Scindia Awards for highest wicket-taker in Ranji Trophy: R. Vinay Kumar (Karnataka) & Shardul Thakur (Mumbai).

M.A. Chidambaram Trophy for Best under-23 cricketer: Almas Shaukat (Uttar Pradesh);

M.A. Chidambaram Trophy for Best under-19 cricketer: Anmolpreet Singh (Punjab);

M.A. Chidambaram Trophy for Best under-16 cricketer: Shubman Gill (Punjab);

M.A. Chidambaram Trophy for Best woman cricketer-senior: Mithali Raj (Railways);

M.A. Chidambaram Trophy for Best Woman cricketer-junior: Devika Vaidya (Maharashtra).

Best Umpire in domestic cricket: O. Nandan.

AWARDS AND HONOURS—OTHER MISCELLANEOUS AWARDS (National & International)

Ramon Magsaysay Awards 2015

➤ Emergent Leadership—Sanjiv Chaturvedi (India) ➤ Uncategorized—Kommaly Chanthavong (Laos); Ligaya Fernando (Philippines); Anshu Gupta and Sanjiv Chaturvedi (India); Kyaw Thu (Myanmar) ➤ Government Services—None ➤ Public Serives—None ➤ Community Leadership—None ➤ Journalism, Literature and the Creative Communication Arts—None ➤ Peace and International Understanding (PIU)—None

Templeton Awards 2015   Rabbi Lord Jonathan Sacks (67), former Chief Rabbi of the United Hebrew Congregations of the Commonwealth.

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Bonus Chapter: Banking and Financial Institutions in India*

CURRENCY SYSTEM

Historical Background

- First gold coins were introduced during the reign of the Guptas, AD 390–550.
- Rupee was first minted in India during the reign of Sher Shah Suri, around AD 1542. It was a silver coin weighing around 179 gm and it replaced the gold coins.
- In 1873, when the price of silver fell in the world market, the silver coin lost its metallic value. The exchange value of the Indian rupee was ₹ 10 per pound sterling till 1873.
- Paper currency in India was introduced in 1882, by the British government.
- With the establishment of the Reserve Bank of India in 1935, the Indian rupee became an independent currency, although for exchange purposes it continued to be dependent on the pound sterling.
- In 1947, India became a member of the International Monetary Fund and the exchange value of the rupee (₹) came to be fixed by IMF standards.

Decimal System

The Indian currency system was converted into a decimal system by Indian Coinage (Amendment) Act 1955 which was brought into force from 1 April 1957. The old system of rupee, annas and paise (1 rupee = 16 annas and 1 anna = 12 paise) was replaced by the rupee and paise system. The first one-paise coin under the decimal system was issued in March 1962 and the first one rupee coin in July 1962.

Issue and Distribution of Currency

All coins and one rupee notes are issued by the Government of India. Therefore, the one rupee note does not bear the signature of the Governor of the Reserve Bank of India.

Currency Denominations

At present, currency notes of denominations of ₹ 1, 2, 5, 10, 20, 50, 100, 500 and 1000 are in circulation. The current series which began in 1996 is called the *Mahatma Gandhi Series*. The currency notes of ₹ 500, bearing a portrait of Mahatma Gandhi and the Ashoka Pillar emblem were issued by RBI from 3 October 1987. All notes above one rupee denomination are issued by the Reserve Bank of India and, therefore, currency notes above one rupee denomination bear the signature of the Governor of the Reserve Bank of India. These notes are also called *bank notes*. Distribution and administration of all currency is done by the Reserve Bank of India as an agent of the Government of India.

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*MCQs related to this chapter are available in Chapter 12.

Demonetization of Currency

Demonetization refers to the withdrawal of currency from circulation which is done to ambush black market currency and unaccounted money. So far, demonetization has taken place twice. The first demonetization was done in 1946, which called for a declaration of notes of ₹ 100 and above the demonetized all notes of ₹ 500 denomination and above. The second demonetization was done in January 1978, through which currency notes of the higher denominations of ₹ 1000; ₹ 5000 and ₹ 10,000 were demonetized.

Devaluation of Currency

Devaluation refers to reducing the value of the Indian rupee in comparison to the US dollar in the world market. In 1947 India became a member of the International Monetary Fund which necessitated fixing the exchange value of the Indian rupee as per IMF standards. As a result India was obliged to devalue the rupee. So far the following devaluations have taken place. The first devaluation took place in June 1949, when the Indian rupee was devalued by 30.5%. Dr John Mathai was the Finance Minister. In the second devaluation in June 1966, the Indian rupee was further devalued by 57%. Sachindra Chaudhury was the Finance Minister. In the third devaluations on 1 July 1991, the Indian rupee was devalued by 9% and devalued for the fourth time by 11% on 3 July 1991, bringing the total devaluation to 20%. This was during the tenure of Dr Manmohan Singh as Finance Minister. Since 20 August 1994, the rupee has been made a freely convertible currency on current account.

BANKING SYSTEM

Development of Banking System in India

The first bank in India, managed by Indians, was the Oudh Commercial Bank, founded in 1881. It was a bank of limited liability. However, many institutions undertook banking business under the British regime as agency houses carrying on banking along with their trading business. The second Indian bank to be established was the Punjab National Bank in 1884. With the beginning of the Swadeshi Movement in 1906, a number of commercial banks surfaced. In 1921, three presidency banks operating in India were amalgamated into the Imperial Bank of India following serious financial troubles. In the 1940s, a need for regulating and controlling commercial banks was felt and in January 1946, the first banking Act the Banking Companies (Inspection Ordinance) Act was introduced, which was followed by another, then Banking Companies (Restriction of Branches) Act in February 1946. The Banking Companies Act was amended in 1949 and its name changed to the Banking Regulation Act.

In 1993, new private sector banks were allowed to be set-up in the Indian banking system as the government recognized the need to introduce greater competition which

In order to amend the Banking Regulation Act 1949, the Banking Companies (Acquisition and Transfer of Undertakings) Act 1970/1980 and other certain Acts, such as the RBI Act 1934; Indian Stamps Act 1899 and the Indian Contract Act 1872; the government has enacted the Banking Laws (Amendment) Act 2012. This law seeks to strengthen the regulatory and supervisory powers of RBI and it increase the access of the banks to capital market to raise capital required for expansion of baking business. The Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest Act 2002 has facilitated NPA (Non Performing Assets) management by banks more effectively.

can play an important role in ushering in a more efficient and competitive economy. However, a new bank had to satisfy the following requirements:

1. It should be registered as a public limited company.
2. The minimum paid-up capital should be more than ₹ 100 crore.
3. It should list its shares in the stock exchange.
4. The headquarters of the bank should preferably be located where no other banks have headquarters representations.
5. The bank should be subject to the prudential norms in respect of banking operations, accounting and other policies as laid down by the RBI.
6. It should achieve a minimum capital adequacy of 8% from the very beginning.

In December 1997, another high-level committee, under the chairmanship of M. Narasimham was constituted by the Government of India to review the implementation of the financial system reforms recommended in 1991. The committee was also required to analyse the contemporary situation and propose reforms necessary in the years ahead to make the banking system stronger and better equipped to compete effectively in the international economic environment. The committee submitted its report in April 1998.

Composition of Banking System

The banking system in India consists of commercial banks both in public and private sector, Regional Rural Banks (RRBs) and Co-operative banks. There were 171 Scheduled Commercial Banks as of June 30, 2009. Out of this 113 banks in public sector, there are 19 nationalized banks, 7 banks in SBI group and one in IDBI Bank Ltd and rest are RRBs.

RESERVE BANK OF INDIA

The basic elements of the Indian financial system were established during the British rule (1757 to 1947). The national currency, the rupee, had long been used domestically before independence and even circulated abroad, for example, in the Persian Gulf region. Foreign banks, mainly British and some from such other parts of the empire as Hong Kong, provided banking and other services. This colonial banking system, however, was geared to foreign trade and short-term loans. Banking was concentrated in the major port cities.

Creation

The Reserve Bank of India came into existence on 1 April 1935, as a privately owned bank with only 5% shares of the Government of India and a share capital of ₹ 5 crore (the share capital is still ₹ 5 crore) in accordance with the provision of the Reserve Bank of India Act 1934. The bank was originally constituted as a shareholder's institution on the model of leading foreign central banks of the time. The bank's share capital of ₹ 5 crore was divided into 5 lakh fully paid-up shares of ₹ 100 each. The entire share capital was, in the beginning, owned by private shareholders with the exception of 2, 200 shares, which were allotted to the Central government. It was in February 1947, that the decision to nationalize the bank was taken and in terms of the Reserve Bank of India (Transfer to Public Ownership). Act 1948, the entire share capital was deemed to be transferred to the Central government. From 1 January 1949, RBI became a state-owned institution. The Act of 1948, empowered the Central government to issue such directions to the bank as it might consider necessary in the public interest.

Organization of Banks

The general superintendence and direction of the bank's affairs are vested in the Central Board of Directors, which comprises:

1. A Governor and not more than four Deputy Governors appointed by the Central government.
2. Four Directors nominated by the Central government—one from each of the four Local Boards.
3. Ten Directors nominated by the Central government.
4. One government official nominated by the Central government.

The Governor is the Chairman of the Board and the Chief Executive of the Bank.

Governors

1. The First Governor Sir Obsborne Arkall Smith (1935 to 1937)
2. The First Indian Governor C. D. Deshmukh (1943 to 1949)

The Governor and Deputy Governors hold office for a period not exceeding 5 years. They are eligible for re-appointment. The Directors hold office for 4 years. The Board has delegated some of its functions by means of statutory regulation to the Committee of Central Board. The committee meets once a week. It consists of the Governor, Deputy Governors and Directors representing the area in which the meeting is held.

For each of the regional areas of the country specified in the First Schedule of the Act there is a Local Board with headquarters at Mumbai, Kolkata, Chennai and New Delhi. Local Boards consist of five members, each appointed by the Central government. They are appointed for a period of 4 years. The functions of the Local Boards are to advise the Central Board on such matters as may be generally or specifically referred to them.

INTERNAL ORGANIZATION AND MANAGEMENT

The Governor, as the Chairman of the Central Board of Directors and its Chief Executive, has the powers of general superintendence and direction of the affairs and business of the bank and may exercise all powers, as may be exercised by the bank. The Governor is assisted, at present, in the performance of his duties by three Deputy Governors and three Executive Directors.

Departments in the Bank

1. Department of Administration and Personnel Management
2. Department of Banking Operations
3. Department of Currency Management
4. Department of Economic Analysis and Policy
5. Department of Expenditure and Budgetary Control
6. Department of External Investment and Operations
7. Department of Financial Companies
8. Department of Government and Bank Accounts
9. Department of Information Technology
10. Department of Statistical Analysis and Computer Sciences
11. Department of Supervision
12. Exchange Control Department

13. Financial Institutions Cell
14. Human Resource Development Department
15. Industrial and Export Credit Department
16. Inspection Department
17. Internal Debt Management Cell
18. Legal Department
19. Premises Department
20. Rural Planning and Credit Department
21. Secretary's Department
22. Urban Bank's Department

The data relating to major items of financial liabilities and assets form the core of banking statistics. Historically, RBI has been collecting detailed information from the commercial banks covering various aspects of their deposits, credits and investments. This includes data on priority sector advances, credit to exporters, asset quality, etc. The banking system includes the Reserve Bank of India, Commercial banks (including regional rural banks) and Co-operative banks.

Reserve Money Aggregates
The reserve money aggregates are compiled exclusively on the basis of the weekly balance sheet of RBI. RBI compiles data on its assets and liabilities of Issue and Banking Departments and publishes the same in Weekly Statistical Supplement (WSS) as also in the Monthly RBI Bulletin; the audited balance sheet is published in its Annual Report. Data relating to RBI balance sheet and hence, the reserve money aggregates are adequate.

Functions

The main functions of RBI are broadly the same as those of other central banks all over the world. These are as follows:

1. The RBI regulates the issue of bank notes above one rupee denominations. The Government of India issues one rupee notes and coins of all denominations below one rupee. The Reserve Bank of India undertakes distribution of all notes and coins on behalf of the government.
2. It acts as the banker of the Government of India and the state governments, commercial banks and state co-operative banks.
3. It formulates and administers the monetary policy.
4. It maintains the exchange value of rupee.
5. It represents India at the International Monetary Fund (IMF).
6. It promotes the growth of the economy within the framework of the general economic policy of the government.

No personal accounts are maintained and operated in the Reserve Bank of India. The other functions the RBI of a secondary nature are as follows:

1. Provision of rural credit.
2. Collection and publication of monetary and financial information.
3. Issue of paper currency.
4. Control over bank credit.

5. Acting as the lender of last resort to commercial banks.

6. Maintenance of external value of the rupee

Imperial Bank of India

Before the nationalization of RBI, its functions were performed by the Imperial Bank of India. It was created in January 1921 by the amalgamation of three presidency banks—(1) Bank of Bengal, (2) Bank of Bombay and (3) Bank of Madras. After nationalization in 1955, the Imperial Bank of India was named the State Bank of India.

Scheduled Banks

All banks which are included in the Second Schedule to the Reserve Bank of India Act 1934 are Scheduled Banks. These banks comprise Scheduled Commercial Banks and Scheduled Co-operative Banks. Scheduled Commercial Banks in India are categorised into five different groups according to their ownership and/or nature of operation. These bank groups are (1) State Bank of India and its Associates, (2) Nationalised Banks, (3) Private Sector Banks, (4) Foreign Banks and (5) Regional Rural Banks. In the bank group-wise classification, IDBI Bank Ltd is included in Nationalised Banks. Scheduled Co-operative Banks consist of Scheduled State Co-operative Banks and Scheduled Urban Co-operative Banks.

The Reserve Bank of India maintains a schedule of banks which undertake to maintain a minimum percentage of their liability with the Reserve Bank of India and a paid-up capital of ₹ 5 lakh. The banks covered under this schedule are called *scheduled bank*s.

Public Sector Banks

State Bank of India

Commercial Banks

The major items of liabilities and assets pertaining to commercial banks are used in compilation of all monetary aggregates except reserve money aggregates. As per Section 42(2) of the RBI Act commercial banks are statutorily required to provide major items of the liabilities and the assets on a fortnightly basis, which form the basis for compilation of monetary aggregates.

Since the format of the Section 42(2) is governed by statutory provision, the coverage of Section 42(2) return was expanded by providing an additional annexe to the main format to capture, on the assets side, banks' investment in capital market instruments such as shares and debentures of corporates, commercial paper and foreign currency assets, while on the liabilities side, items such as paid-up capital, reserves, certificates of deposits and maturity structure of time deposits were included.

It is the largest public sector bank of India created after the nationalization of the Imperial Bank of India in 1955. It is now the largest commercial bank in India and, in terms of branches (10,836), largest in the world.

Functions   The State Bank of India provides long-term credit and acts as the agent of the Reserve Bank of India in the country. It advances loans and deals in foreign exchange and other banking operations of the government.

Subsidiaries of State Bank of India   Apart from the main State Bank of India, there are five subsidiaries:

1. State Bank of Bikaner and Jaipur
2. State Bank of Hyderabad
3. State Bank of Mysore
4. State Bank of Patiala
5. State Bank of Travancore

State Bank of Saurashtra and State Bank of Indore, two of the associate banks of State Bank of India (SBI) were merged into SBI in the year 2008 and 2010 respectively.

Nationalization of Banks

Objective: To use financial institutions as an instrument for promoting economic and social development in a more purposeful manner. To overcome the monopoly of SBI over financial resources, the Government of India nationalized 20 commercial banks during the tenure of Prime Minister Indira Gandhi.

First nationalization: On 19 July 1969, the first nationalization of banks took place whereby the following 14 banks were nationalized:

1. Bank of India
2. Union Bank of India
3. Bank of Baroda
4. Bank of Maharashtra
5. Punjab National Bank
6. Indian Bank
7. Indian Overseas Bank
8. Central Bank of India
9. Canara Bank
10. Syndicate Bank
11. United Commercial Bank
12. Allahabad Bank
13. United Bank of India
14. Dena Bank

Second nationalization: On 15 April 1980, the second nationalization took place whereby the following six banks were nationalized:

1. Andhra Bank
2. Corporation Bank
3. New Bank of India
4. Oriental Bank of Commerce
5. Punjab and Sind Bank
6. Vijaya Bank

Bhartiya Mahila Bank Limited   The bank was inaugurated on 19 November 2013 with a view to promote gender equality and economic empowerment of women. It is India's first women's bank that was created with infused capital of ₹1000 crore by the Government of India.

In October 1993, the New Bank of India was merged with the Punjab National Bank. IDBI Bank Ltd became the next PSB in 2006. In 2013, Bhartiya Mahila Bank Limited became the 20th Public Sector Bank. Therefore, at present there are only 20 nationalized banks in the country besides the RBI.

Micro Units Development Refinance Agency (MUDRA) Bank
In Union Budget 2015-16 the Government of India has announced setting up of MUDRA Bank, with a corpus of ₹20,000 crores, and credit guarantee corpus of ₹3,000 crores to be created. It will fund the unfunded entrepreneurs. In lending it will give, priority to SC/ST enterprises. MUDRA Bank will be responsible for refinancing all Micro-finance Institutions which are in the business of lending to such small entities of business through a Pradhan Mantri Mudra Yojana.

Regional Rural Banks
The Regional Rural Banks (RRBs) were established in 1975 to supplement the efforts of Co-operative and commercial banks in different states with equity participation from commercial banks, Central government and state governments. RRBs have been sponsored by public sector banks and are akin to commercial banks in their method of operations and set-up, but the area of activity and loan operations are restricted to specified areas and target-groups. As the RRBs are scheduled commercial banks, they report their major items of liabilities and assets on a fortnightly basis as a part of the Section 42(2) return, which forms the base for compilation of monetary aggregates.

Co-operative Banks
Co-operative banking is an integral part of the banking system in India. The various segments of Co-operative banks are Primary Co-operative Banks, State Co-operative Banks, District Central Co-operative Banks, Primary Agricultural Credit Societies, State Co-operative Agriculture and Rural Development Banks and Primary Co-operative Agriculture and Rural Development Banks. Co-operative banks include scheduled and non-scheduled Co-operative banks. Data on scheduled Co-operative banks are available in the fortnightly returns while data in respect of non-scheduled Co-operative banks are available in the monthly returns filed by them with RBI. These data are used for the compilation of monetary aggregates. Detailed data relating to the operation of the Co-operative banking sector are compiled primarily by NABARD and RBI. Primary (Urban) Co-operative Banks send their returns to RBI while other Co-operative banks submit their returns to NABARD. Firm data for the financial year are made available with a time lag of 18–20 months. The NABARD releases detailed information on Co-operative banks through its publications. RBI publishes assets and liabilities and financial performance of scheduled primary, State and Central Co-operative banks in the Report on Trend and Progress of Banking in India.

NBFCs
A characteristic feature of the non-banking financial companies (NBFCs) is their wide reach in deposit mobilization. The main advantages of these companies lie in their lower transaction costs, quick decision-making ability, customer orientation and prompt provision of services. NBFCs are classified into the following categories based on their principal business: Equipment Leasing Company (ELC), Hire–Purchase Financing Company (HPFC), Loan Company (LC), Investment Company (IC), Mutual Benefit Financial Company (Nidhi), Mutual Benefit Company (Un-notified Nidhi), Miscellaneous Non-Banking Company (Chit Fund Company), Residuary Non-Banking Company (RNBC) and Housing Finance Company (HFC). In the present regulatory framework, the entire gamut of regulation and supervision of the activities of NBFCs has been redefined, in terms of both the thrust as well as the focus. Consequently, NBFCs are classified into three categories for the purposes of regulation, namely (1) those accepting public deposits, (2) those which do not accept public deposits and (3) core investment companies which hold at least 90% of their assets as investments in the securities of their group, holding or subsidiary companies and are not trading in such securities. The companies which

accept public deposits are required to comply with all the prudential norms of income recognition, asset classification, accounting standards, provisioning for bad and doubtful debts, capital adequacy and credit or investment concentration norms, etc. The NBFCs not accepting public deposits are regulated in a limited manner. Prudential norms like income recognition, asset classification, uniform accounting year and accounting standards that disclose the status of their financial health have been made applicable to them. The core investment companies have been exempted from all the provisions of directions.

Other Important Banks and Financial Institutions

1. *Industrial Credit and Investment Corporation of India Limited*: The Industrial Credit and Investment Corporation of India Limited (ICICI) was established in 1955 as a public limited company to encourage and assist the industrial units of the nation. It aimed to provide assistance in the creation, expansion and modernization of industrial enterprises, encouraging and promoting participation of private capital in such enterprises. It was also focused to promote industrial development and help in the development of capital markets.

2. *Small Industries Development Bank of India*: The Small Industries Development Bank of India (SIDBI) was established on 2 April 1990, as a wholly-owned subsidiary of Industries Development Bank of India (IDBI) under the Small Industries Development Bank of India Act 1989. It is the principal financial institution for promoting, financing and assisting in the development of industries falling under the small-scale sector.

3. *Indian Banks Abroad*: In over 23 countries, nine Indian banks operate through 97 branches (including offshore branches and mobile agencies). The branches are located at all the major international trade centres including—London, Singapore, Amsterdam, Bahrain, New York, Hong Kong, Tokyo, Frankfurt and Paris. These branches provide services in international banking including financing of foreign trade. The largest number of branches are in UK (21), followed by the Fiji Islands (9), USA (8), Singapore (6), Mauritius (7), Sri Lanka (6), Hong Kong (7), UAE (6) and Japan (4). Apart from these branches, Indian commercial banks have also opened representative offices in USA, Brazil, Indonesia, Iran, Egypt, Russia, Italy, Zimbabwe, China, Uzbekistan, Philippines and Vietnam. These commercial banks also have wholly owned subsidiaries and joint ventures in—USA, Canada, Zambia, Nigeria, Uganda, Bhutan, Nepal, Kenya and Mauritius. All of these enterprises cater to the needs of Indian exporters and importers and to that extent, they form an integral part of the domestic banking system of the country of their location.

4. *National Bank of Agriculture and Rural Development*: The National Bank of Agriculture and Rural Development (NABARD) was set-up by a government notification issued on 12 July 1982 and was inaugurated on 5 November. Its primary objective is to promote agriculture and rural development through credit facilities to the farmers.

5. *Export-Import Bank of India*: The Export-Import Bank of India (EXIM) was set-up on 1 January 1982. Among other things, it grants deferred payment credit of medium- and

long-term duration for exports and renders financial assistance/guarantees to Indian exporters to operate in the international market.

6. *Industrial Development Bank of India*: The IDBI, established in 1964, is an apex institution for industrial finance.

7. *Regional Rural Banks*: The Regional Rural Banks (RRBs) were brought into existence by a Presidential Ordinance in September 1975 and the first regional rural bank in the country, called *Prathama Gramin Bank*, sponsored by the Syndicate Bank, was set-up in October 1975 at Moradabad (UP). At present, the largest number of regional rural banks are in Uttar Pradesh.

8. *Lead Bank Scheme*: The Nariman Committee recommended the Lead Bank Scheme in 1969. Under this scheme, each bank is assigned the major role of assisting in the development of banking and credit in the district allocated to it—by undertaking surveys to assess the credit gap in a particular district and determining the number of new branches required to meet the requirement of the area with the co-operation of other banks.

Functions

 (i) To survey the number of industrial and commercial units and forms in the district to determine the potential of banking.
 (ii) To examine the facilities for the marketing of agricultural and industrial products and linking credit with marketing.
(iii) To assists other primary leading agencies.
(iv) To maintain contact with the government and quasi-government agencies.

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New Banks in Private Sectors

In 1993, in recognition of the need to introduce greater competition, new private sector banks were allowed to be set up in India. These new banks had to satisfy certain requirements. On 19 November 2000, the government of India relaxed entry level for the

private sector by reducing the government holding in nationalized banks from 51% to 33%. Further, revised guidelines for entry of new banks in private sector were issued on January 3rd 2001. The applications for setting up new banks received within the stipulated period were scrutinised by RBI and 'on-principle' approvals were issued to two new entities on 7 February 2002, and one of which 'Kotak Mahindra Bank' on satisfactory completion of other formalities, was granted banking licence on 6 February 2003. The bank commenced its operation w.e.f. 22 March 2003, and subsequently, it has been included in the second schedule to the Reserve Bank of India Act, 1934 on 12 April 2003. On satisfactory completion of all formalities, licence was granted to 'Yes Bank Ltd,' on 24 May 2004. In April 2015, the ING Vyasa Bank was merged into Kotak Mahindra Bank Limited.

List of Private Sector Banks

1. City Union Bank Ltd
2. Development Credit Bank Ltd
3. Tamil Nadu Mercantile Bank Ltd
4. The Bank of Rajasthan Ltd
5. The Catholic Syrian Bank Ltd
6. The Dhanalakshmi Bank Ltd
7. The Federal Bank Ltd
8. The Jammu and Kashmir Bank Ltd
9. The Karnataka Bank Ltd
10. The Karur Vysya Bank Ltd
11. The Lakshmi Vilas Bank Ltd
12. The Nanital Bank Ltd
13. The Ratnakar Bank Ltd
14. The South Indian Bank Ltd
15. HDFC Bank
16. ICICI Bank
17. IndusInd Bank Ltd
18. Kotak Mahindra Bank
19. Axis Bank
20. YES Bank Ltd

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Banking Sector Reforms in India

The banking sector reforms in India, initiated in 1992, has provided in the first phase the necessary platform to the banking sector to operate on the basis of operational flexibility and functional autonomy, thereby enhancing efficiency, productivity and profitability. The reforms brought about structural changes in the banking sector, eased external constraints in their working, introduced transparency in reporting procedures and increased the competitive element in the market through restructuring and recapitalization of banks. The salient features of these reforms are as follows:

- *Phasing out of statutory pre-emption*: The Statutory Liquidity Ratio (SLR) requirement has been brought down from 38.5% to 25% and Cash Reserve Ratio (CRR) requirement from 7.50% to 5.75%.

- *Deregulation of interest rates*: All lending rates except for lending to small borrowers and a part of export finance have been deregulated. Interest on all deposits, except savings deposits are determined by banks.

- *Capital adequacy*: Capital-to-Risk Assets Ratio (CRAR) of 9% prescribed with effect from 31 March 2000.

- *Other prudential norms*: Income recognition, asset classification and provisioning norms have been made applicable. The provisioning norms are more prudent, objective, transparent, uniform and designed to avoid subjectivity.

- *Debt recovery tribunals*: Twenty-two Debt Recovery Tribunals (DRTs) and five Debt Recovery Appellate Tribunals (DRATs) have already been set-up; seven more DRTs will be set-up during the current financial year. Comprehensive amendments have been made in various Acts to make the provisions for adjudication, enforcement and recovery more effective.

- *Transparency in financial statements*: Banks have been advised to disclose certain key parameters such as CRAR, percentage of NPAs, provisions for NPAs, net value of invest ment, Return on Assets, profit per employee and interest income as a percentage of working funds.

- *Entry of new private sector banks*: Nine new private sector banks have been set-up with a view to inducing greater competition and for improving the operational efficiency of the banking system.

- *Functional autonomy*: The minimum prescribed government equity was brought to 51%. Nine nationalized banks raised ₹ 2855 crore from the market during 1994 to 2001. Bank boards have been given more powers in operational matters such as rationalization of branches, credit delivery and recruitment of staff.

- *Hiving off of regulatory and supervisory control*: A board for financial supervision was set-up under the RBI in 1994, bifurcating the regulatory and supervisory functions.

India has made significant progress in the payments system by introducing modern payment media—smart/credit cards, electronic funds transfer, debit/credit clearing, e-banking and so on. RBI will soon put in place a Real Time Gross Settlement System (RTGS) to facilitate efficient fund management and mitigate settlement risks.

Indian banking has made significant progress in recent years. The prudential norms, accounting and disclosure standards, risk management practices and the like are keeping pace with global standards. The financial soundness and enduring supervisory practices as evident in the level of compliance with the Basle Committee's Core Principles for Effective Banking Supervision have made India's banking system resilient to global shocks. The need for further refinements in the regulatory and supervisory practices has been recognized and steps are being taken by RBI to move towards the goal in a phased manner without destabilizing the system. The success of the second phase of reforms will depend primarily on the organizational effectiveness of banks, for which the initiatives will have to come from the banks themselves. Imaginative corporate planning combined with organizational restructuring is a necessary prerequisite to achieve desired results. Banks need to address urgently the task of organizational and financial restructuring for achieving greater efficiency.

Reforms in the Rural and Co-operative Banking Sector

- All public sector banks, private sector banks and foreign banks as a group have achieved the overall target of the priority sector for the last 3 years.
- NABARD has sanctioned and disbursed under rural development project.
- The estimated share of commercial banks, co-operatives and RRBs in the production credit amounted to 38%, 55% and 7% respectively.

List of Important Regional Rural Banks (RRBs)

1. Allahabad Up Gramin Bank
2. Andhra Pradesh Grameena Vikas Bank
3. Andhra Pragathi Grameena Bank
4. Arunachal Pradesh Rural Bank
5. Aryavart Gramin Bank
6. Assam Gramin Vikash Bank
7. Baitarani Gramya Bank
8. Ballia-Etawah Gramin Bank
9. Bangiya Gramin Vikash Bank
10. Baroda Gujarat Gramin Bank
11. Baroda Rajasthan Gramin Bank
12. Baroda Uttar Pradesh Gramin Bank
13. Bihar Kshetriya Gramin Bank
14. Cauvery Kalpatharu Grameena Bank
15. Chaitanya Godavari Grameena Bank
16. Chhattisgarh Gramin Bank
17. Chickmagalur-Kodagu Grameena Bank
18. Deccan Grameena Bank
19. Dena Gujarat Gramin Bank
20. Durg Rajnandgaon Gramin Bank
21. Ellaquai Dehati Bank
22. Gurgaon Gramin Bank
23. Hadoti Kshetriya Gramin Bank
24. Haryana Gramin Bank
25. Himachal Gramin Bank
26. Jaipur Thar Gramin Bank
27. Jhabua-Dhar Kshetriya Gramin Bank
28. Jharkhand Gramin Bank
29. J & K Grameen Bank
30. Kalinga Gramya Bank
31. Karnataka Vikas Grameena Bank
32. Kashi Gomti Samyut Gramin Bank
33. Krishna Grameena Bank
34. Kshetriya Kisan Gramin Bank, Mainpuri
35. Langpi Dehangi Rural Bank
36. Madhya Bharat Gramin Bank
37. Madhya Bihar Gramin Bank
38. Mahakaushal Kshetriya Gramin Bank
39. Maharashtra Gramin Bank
40. Malwa Gramin Bank
41. Manipur Rural Bank
42. Marwar Ganganagar Bikaner Gramin Bank
43. Megalaya Rural Bank
44. Mewar Aanchalik Gramin Bank
45. Mizoram Rural Bank
46. Nagaland Rural Bank
47. Nainital Almora Kshetriya Gramin Bank
48. Narmada Malwa Gramin Bank
49. Neelachal Gramya Bank
50. North Malabar Gramin Bank
51. Pallavan Grama Bank
52. Pandyan Grama Bank
53. Parvatiya Gramin Bank
54. Paschim Banga Gramin Bank
55. Pragathi Gramin Bank
56. Prathama Bank
57. Puduvai Bharathiar Grama Bank

58. Punjab Gramin Bank
59. Purvanchal Gramin Bank
60. Rajasthan Gramin Bank
61. Rewa-Sidhi Gramin Bank
62. Rushikulya Gramya Bank
63. Samastipur Kshetriya Gramin Bank
64. Saptagiri Grameena Bank
65. Sarva U.P. Gramin Bank
66. Satpura Narmada Kshetriya Gramin Bank
67. Saurashtra Gramin Bank
68. Sharda Gramin Bank
69. Shreyas Gramin Bank
70. South Malabar Gramin Bank
71. Surguja Kshetriya Gramin Bank
72. Sutlej Gramin Bank
73. Tripura Gramin Bank
74. Utkal Gramya Bank
75. Uttaranchal Gramin Bank
76. Uttar Banga Kshetriya Gramin Bank
77. Uttar Bihar Gramin Bank
78. Vananchal Gramin Bank
79. Vidharbha Kshetriya Gramin Bank
80. Vidisha-Bhopal Kshetriya Gramin Bank
81. Visveshvaraya Grameena Bank
82. Wainganga Krishna Gramin Bank

Foreign Banks in India

RBI has been issuing licenses to various foreign banks to operate in India. More than 50 foreign and multinational banks had operated in India in past but as on 2015 there were only 27 foreign banks operating in India.

Foreign Banks in India

1. ABN-AMRO Bank N.V. (now merged with RBS)
2. Abu Dhabi Comm. Bank Ltd
3. American Express Bank Ltd
4. Arab Bangladesh Bank Limited (now known as AB Bank Limited)
5. Antwerp Diamond Bank NV
6. Bank of America NA
7. Bank of Bahrain and Kuwait B.S.C.
8. Bank of Ceylon
9. Barclays Bank PLC
10. BNP Paribas
11. Chinatrust Comm. Bank
12. Citibank N.A.
13. Deutsche Bank AG
14. Development Bank of Singapore Ltd. (also known as DBS Bank Ltd.)
15. HSBC Ltd
16. JSC VTB Bank
17. JPMorgan Chase Bank (The Chase Manhattan Bank)
18. K.B.C. Bank NA
19. Krung Thai Bank Public Co. Ltd
20. Mashreqbank PSC Bank
21. Mizuho Corporate Bank Ltd (The Fuji Bank Ltd)
22. Oman International Bank S.A.O.G.
23. Shinhan Bank
24. Societe Generale
25. Sonali Bank
26. Standard Chartered Bank
27. State Bank of Mauritius Ltd
28. The Bank of Tokya-Mitsubishi UFJ Ltd.
29. UBS AG

Monetary and Credit Policy

The monetary policy is conducted by rule and/or discretion: By rule, if policy makers reveal in advance policy behaviour such as how it will respond to the changing market situations and by discretion, if policy makers enjoy the freedom to size up the situation case by case and choose the most appropriate policy to deal with the changing situations. It has been customary for RBI to announce a set of measures, both of a short-term and structural nature, in two biannual statements on monetary and credit policy released in April and October each year. Keeping in view the significant changes in the frame-work for financial markets, the government has decided, with effect from the current financial year, to give more importance to the structural measures in monetary and credit policy for the current year. Short-term measures such as the bank rate, Cash Reserve Ratio, Repo Rates and so on, will be included in the first half of the statement only if they coincide the timing of its release. The second statement of the year, the October statement, covers the mid-term review of the monetary and credit developments.

Narasimham Committee Report on Banking Sector Reforms

The Narasimham Committee on banking sector reforms has made a series of sweeping recommendations which could be used as a launching pad to take Indian banking into the next century. The committee's report, presented to Finance Minister Yashwant Sinha, on 23 April 1998, covered an entire gamut of issues, ranging from bank mergers and the creation of global-sized banks to bank closures, recasting bank boards and revamping banking legislations.

Making a case for a stronger banking system in the country, especially in the context of capital convertibility, the committee stated that Capital Adequacy Requirement (CAR) ratio will result in large inflows and outflows with attendant implications for exchange rate management and domestic liquidity. Among other things, the committee recommended the merger of strong banks, as this would have a 'multiplier effect' on industry. However, it also advised against the merge of strong banks with weak banks as it would have a negative impact.

The other recommendations of the Narasimham committee include the following:

- Free bank boards from day to day management.
- Let some large banks have a global character.
- Try narrow banking to rehabilitate weak banks.
- Confine small, local banks to states or a cluster of districts.
- Re-examine whether real autonomy is consistent with public ownership.
- Review functions of boards and managements.
- Refresh capital adequacy prescription.
- Update the RBI Act Banking Regulation Act Nationalization Act and SBI Act.
- Put into place appropriate system for asset, liability and risk management.

Securitization, Reconstruction of Financial Assets and Enforcement of Security Interest Act 2002

The enactment of the Act marks a watershed in the process of on-going economic reforms. This Act enables the setting up of asset management companies for addressing the problems of non-performing assets of banks and financial institutions. The important provisions of the Act are listed below. Under the Act an asset management company is authorized to acquire assets of any bank or financial institution, by issuing a debenture, or bond, or any other security for consideration agreed upon with such company and the bank or the financial institution. In case of non-performing debts, a secured creditor is entitled to serve a notice to the borrower to discharge his liabilities within 60 days. Failing to discharge the liabilities in the stipulated time will entitle the secured creditor to take possession of secured assets, take over the management of the assets and to appoint any person to manage the secured assets. Borrowers can prefer an appeal with the Debts Recovery Tribunal after depositing 75% of the amount claimed by the secured creditor.

INSURANCE

Introduction

The first insurance company in India was established in September 1870 at Mumbai. As a part of the financial sector reforms, a Committee on Reforms in Insurance Sector (CRIS), headed by R. N. Malhotra, former Governor of RBI, was constituted in 1993. The main thrust of the committee's recommendations were: open up the insurance sector, improve the service standards of Indian insurance majors and extend insurance coverage to a larger section of the Indian population to inject a greater degree of competition. The Insurance Regulatory Development Authority (IRDA) Bill was passed in both the Houses of Parliament in the year 1999 and IRDA came into existence as a regulator for the insurance business in India. The Act also provides protection to the interests of the holder of the insurance policy and aims to regulate, promote and ensure the orderly growth of the insurance industry. It also seeks to amend the Life Insurance Act 1956; General Insurance Business (Nationalization) Act 1972 and consequential provisions in the Insurance Act 1938, with a view to open up the Indian insurance industry to the private sector for further expansion of insurance business and to realize the untapped potential in the Indian insurance market. In order to provide better insurance coverage to citizens and also to augment the flow of long-term resources for financing infrastructure, the Insurance Regulatory and Development Authority was constituted with effect from 19 April 2000. The Reserve Bank of India has also issued guidelines for the entry of NBFCs and banks into the insurance business in May 2000 and August 2000, respectively. Statistical information currently available on insurance is scattered and inadequate. With the entry of private insurance companies, the sources of information will be multiplied. It is, therefore, necessary that a single source of information, which can disseminate information to users is put in place. In this context, a Committee on Insurance Statistics was constituted by the National Statistical Commission with H. Ansari, Member, IRDA, as Chairman to examine the information required for the insurance sector. The committee reviewed the current status of the statistical system in the insurance sector, identified the data gaps and weaknesses in the existing data col-

lection mechanism and recommended measures to correct deficiencies by revamping the system.

Life Insurance Corporation (LIC)

Established: 1 September 1956
Head office: Mumbai
Zonal offices: 77 (Mumbai, Kolkata, Delhi, Chennai, Kanpur, Hyderabad and Bhopal)
LIC operates through 101 divisional offices including one salary savings scheme division at Mumbai and 2048 branches. As on 31 March 2004, LIC had 10,98,910 agents spread all over country. The corporation also transacts business abroad and has offices in Fiji, Mauritius and UK.

Public Sector Insurance Companies

1. Life Insurance Corporation (LIC)
2. National Insurance Company Limited
3. Oriental Insurance Company Limited
4. United India Insurance Company Limited
5. New India Assurance Company Limited
6. General Insurance Corporation of India Limited (National re-Insurer).
7. Agricultural Insurance Corporation of India Limited (Company floated by Non Life Public Sector insurance companies along with NABARD).

General Insurance Corporation (GIC)

Established: 1 January 1973

Before the government took over, there were 107 insurance companies (both Indian and foreign) operating in India. By a presidential proclamation issued on 13 May 1970, the government took over control of the general insurance. With effect from 1 January 1973 the erstwhile 107 Indian and foreign insurers which were operating in the country prior to nationalization, were grouped into four operating companies namely; (1) National Insurance Company Limited; (2) New India Assurance Company Limited; (3) Oriental Insurance Company Limited; (4) United Insurance Company Limited. All these four of GIC operated all over the country competing with one another and underwriting various classes of general insurance business except for aviation insurance of national airlines and crop insurance which is handled by the GIC. However, GIC has been formally delinked from its erstwhile subsidiary companies w.e.f. 3 November 2000. The GIC having been notified as Indian insurer has also ceased to carry on Direct Insurance Business and Crop Insurance. In its exclusive role as a reinsurance company, GIC's business volume is growing up and it has also opened two representative offices at London and Moscow to expand its foreign reinsurance business.

Social Security Group Scheme

In 1989 to 1990, the Social Security Fund came into being, administered by LIC, to meet the requirements of the weaker and vulnerable sections of the society. Under the scheme, people

in the age group of 18 to 60 years are covered for a sum of ₹ 5000 in case of natural death and ₹ 25000 in case of death by accident. Under the Social Security Group Scheme, the following are the major sub-schemes: (i) Landless Agricultural Labourers Group Insurance Scheme (LALGI); (ii) Integrated Rural Development Programme (IRDP) and (iii) Rural Group Life Insurance Scheme (RGLIS).

Insurance Statistics

Insurance is a means by which the problem of risk in business or life of an individual person is covered. The two main classes of insurance are: (i) General insurance, which covers all forms of insurance other than life and is usually written on an annual basis and (ii) Life insurance, which is generally on a long-term basis against risk of death. Insurance statistics can be grouped under the following categories: (a) Life Insurance Statistics, (b) Non-life (General) Insurance Statistics, (c) Reinsurance Statistics, (d) Pension and Superannuation Statistics, (e) Health Insurance Statistics, (f) Crop Insurance Statistics, (g) Other Insurance Statistics like ESI, Postal Insurance, Army Insurance, etc.

Insurance Regulatory Authority

Considering an insurance regulatory apparatus essential for proper monitoring and control of the insurance industry, the government formulated an interim Insurance Regulatory Authority (IRA) on the recommendations of the Malhotra Committee. The interim IRA will function subject to the overall directions and guidelines of the government. IRA will be headed by a chairperson who will be appointed as the Controller of Insurance for the purpose of the Insurance Act 1938. The other members, not more than seven in number, of which more than three shall serve full time, shall be nominated by the Central government, IRDA.

The Insurance Regulatory Development Authority (IRDA) Bill

The bill was passed in 1999 and IRDA came into existence as a Regulator for the insurance business in India. The Act provides protection to the interests of holder of insurance policy and aim to regulate, promote and ensure orderly growth of the insurance industry. It also seeks to amend the Life Insurance Act 1956, General Insurance Business (Nationalization) Act 1972 and consequential provisions in the Insurance Act 1938, with a view to open up the Indian insurance industry to the private sector for further expansion of insurance business and to realize the untapped potential in the Indian insurance market. In order to provide better insurance coverage to citizens and also to augment the flow of long-term resources for financing infrastructure, the IRDA was constituted with effect from 19 April 2000. The RBI also issued guidelines for the entry of NBFCs and Banks into the insurance business in May 2000 and August 2000, respectively. The IRDA on the advice of the Insurance Advisory Committee framed 15 regulations under IRDA Act to be followed by all insurers. It has also prescribed a number of returns to monitor various provisions of these regulations and the insurers in the life and general insurance business are required to statutorily submit these returns to the IRDA as per the periodicity and time frame specified.

Opportunities in Insurance Sector in India

Insurance sector in India holds vast untapped potentials in:

- Life insurance products
- Life covers
- Household insurance policies
- Overseas mediclaim
- Travel insurance policies
- Huge pull of skilled professionals to venture of new product through R&D
- Large branch net work facility by Life Insurance Corporation of India (LIC) & General Insurance Corporation of India (GIC)

FDI in Insurance Sector

FDI up to 26% in the Insurance sector is allowed under the automatic route. This will be subject to the condition that Companies bringing in FDI shall obtain necessary license from the Insurance Regulatory & Development Authority (IRDA) for undertaking insurance activities.

Insurance Sector: An Overview

A growing economy, low insurance penetration in terms of premium percentage to the GDP, as well as increasing affordability on account of higher disposable incomes and savings, increasing urbanization and increasing awareness, are some of the factors that continue to power the growth of insurance sector in India. During the year 2009–10, there were 44 insurance companies operating in India; of which 22 were in the life insurance business and the remaining 21 were in general insurance business and one national reinsurer. Of these 44 companies, eight are in the public sector. The remaining 36 are private sector companies.

Highpoints

- The insurance industry in India has changed rapidly in the challenging economic environment throughout the world.
- In the current scenario, Indian insurance companies have become competitive in nature and are providing appropriate distribution channels to get the maximum benefit and serve customers in manifold ways.
- Indian Insurance industry has big opportunity to expand, given the large population and untapped potential.
- The insurance market in India has witnessed dynamic changes including entry of a number of global insurers.
- Most of the private insurance companies are joint ventures with recognized foreign institutions across the globe.
- Saturation of markets in many developed economies has made the Indian market even more attractive for global insurance majors.
- The Insurance Regulatory and Development Authority (IRDA) regulate and develop the insurance sector in India through calibrated policy initiatives.

Health Insurance

- The health insurance business in India has witnessed increased focus and attention from all stakeholders; not only from insurers and IRDA, but also from healthcare providers and other entities associated with the ecosystem.
- This increasing attention and awareness was due to rising healthcare costs.
- Recent detariffing of the general insurance business forced the insurance companies to focus on health insurance and other personal lines of business.
- Rationalization of premium rates in respect of individual mediclaim policies which were unrevised for many years and upward revision of rates in all group health policies have also contributed to growth in premiums.
- Availability of products for senior citizens and children helped in popularizing health insurance.
- It is also emerging as a significant line of business for life insurance companies.
- Many life insurance companies now have products in health insurance.
- The Central and state governments have recently initiated large scale health insurance programmes in association with insurance companies to protect the vulnerable groups.

Major Private Sector Insurance Companies

Life Insurance

- HDFC Standard Life Insurance Co. Ltd
- ICICI Prudential Life Insurance Co. Ltd
- Tata AIG Life Insurance Co. Ltd

Health Insurance

In India, the total spending on health care in 2015 was a mere 4.2% of GDP. The few Indians who avail of some kind of health schemes are covered under:

- CGHS (Central Government Health Scheme),
- ESIS (Employees State Insurance Scheme),
- Health schemes offered by the Railways to their employees,
- Health schemes offered by Defence Services to their employees,
- Health schemes offered by the State Government and allied administrative bodies,
- Health schemes offered to employees by Multinational Companies and other employers and
- Health Insurance schemes.

Bancassurance

Bancassurance is the simplest way of distribution of insurance products through a bank distribution channel by selling insurance products and services by leveraging the vast customer base of a bank and fulfil the insurance needs. It takes the various forms depending upon the demography, economic and legislative climate of the country. For insurance company it acts as a tool for increasing their market penetration and premium turnover and for customer it acts as a bonanza in terms of reduced price, high quality products and delivery to doorsteps.

- SBI Life Insurance Co. Ltd
- Max New York Life Insurance Co. Ltd
- Om Kotak Mahindra Life Insurance Co. Ltd
- Allianz Bajaj Life Insurance Co. Ltd
- ING Vysya Life Insurance Co. Ltd
- Aviva Life Insurance Co. Ltd
- Sahara India Insurance Co. Ltd
- Met Life India Insurance Co. Ltd
- AMP SANMAR Assurance Co. Ltd

General Insurance

- IFFCO Tokyo General Insurance Co. Ltd
- Royal Sundram Alliance Insurance Co. Ltd
- HDFC Chubb General Insurance Co. Ltd
- TATA AIG General Insurance Co. Ltd
- ICICI lombard General Insurance Co. Ltd
- Cholamandalam General Insurance Co. Ltd
- Bajaj Allianz General Insurance Co. Ltd
- Reliance General Insurance Co. Ltd
- Export Credit Guarantee Corporation (ECGC) Ltd

Subsidiary Companies

There are four subsidiary companies of General Insurance Corporation, *viz.*:

1. National Insurance Co. Limited, Kolkata.
2. The New India Assurance Co. Limited, Mumbai.
3. The Oriental Fire and General Insurance Co. Limited, New Delhi.
4. United India Fire and General Insurance Co. Limited, Chennai.

Investment

Unit Trust of India

The purpose of establishment of the Unit Trust of India (UTI) was to encourage and mobilize the saving funds of small investors through the sale of 'Units' to channelize these funds into corporate securities. UTI is a major investor in government securities and money market instruments. The following are the salient features of UTI:

Crop Insurance

Large-scale crop failures occur every year in one part of the country or the other due to natural calamities such as drought, flood, etc. The farmers in such areas not only lose their crop for the current year but are left with no money to invest in the future crop. In order to reduce the hardship of such farmers, the Government of India thought it fit to introduce Crop Insurance Schemes since 1973. The data on crop insurance have to be consolidated and published for analysis and policy formulation.

- UTI has an investor base of about 50 million investor accounts.
- It has a wide distribution network of 51 branches all over country.
- Its asset portfolio exceeds ₹55,550 crore, with portfolio exposure in various companies covering all profitable companies in public, private, joint venture and financial sectors.
- It has an array of 72 different innovative savings plans/funds.
- The first offshore fund, 'The Indian Fund, was launched by UTI in July 1986, which was listed on the London Stock Exchange. Another offshore fund was launched in August 1988, which was listed on the New York Stock Exchange.

Global Depository Receipts/Foreign Currency Convertible Bonds

In 1992, the Indian corporate sector was allowed to access global capital markets through the issue of shares under Global Depository Receipts (GDRs) and Foreign Currency Convertible Bonds (FCCBs). Under these schemes, the companies with a proven track record were allowed to access international markets. Comprehensive guidelines for Euro issues were announced in June 1996 which provided for greater flexibility to Indian companies to access the global market through GDR and FCCB issues. Indian corporates have successfully launched Euro issues in the international markets, raising about US $ 8.1 billion. Initially, individual proposals for ADR/GDR issues required prior approval o the government w.e.f. 19 January 2000, such prior approval of government has been dispensed with where the ADRs/GDRs are issued against rest underlying shares.

Recent Initiative

With a view to further liberalizing the capital account transactions Foreign Currency Convertible Bond (FCCB) up to the value of US $ 500 million has been put under the automatic route and beyond US $ 500 million is under the RBI route.

Portfolio Investment from Foreign Institutional Investors

In September 1992, the government launched a scheme for attracting portfolio investment from Foreign Institutional Investors (FIIs). FIIs along with other institutions like mutual funds, pension funds, investment trusts, asset management companies, nominee companies and incorporated/ institutional portfolio managers and their associates were among the beneficiaries of the scheme that the government launched. Under this scheme, all the above mentioned were allowed to invest in all the securities traded in the primary and secondary markets. FIIs are permitted under this scheme to invest in government securities as well as treasury bills. Among the other benefits to FIIs under this scheme is that they have also been allowed to take exchange cover for the portion of their investment exposure. The number of FIIs registered with SEBI till 31 October 1997, was 471 and the net FII investment flow into the country by then amounted to about US $ 9 billion.

Non-resident Indian Investments

To promote Non-resident Indian (NRI) investments, the government has envisaged many attractive schemes. Some of these are given below:

- Investment up to 100% equity, with full benefits of repatriation of capital invested and income accruing thereon in high priority industries.
- Investment through stock exchanges under the Portfolio Investment Scheme with an investment ceiling of 5% of paid-up capital of invested company in the case of individual

NRI and a collective ceiling of 10% for all NRIs/OCBs (Overseas Corporate Bodies). For NRIs, RBI has set-up a special Working Group which looks into various schemes and incentives available to NRIs.

Mutual Funds

Mutual Funds signify the institutional segment of capital markets. As in the mature markets, mutual funds in emerging markets have been among the fastest growing institutional investors.

Recent Policy Developments

(1) *Development of trading of government securities, through order driven screen-bases system*   Trading in government securities through a nationwide, anonymous, order driven, screen based trading system of the stock exchanges has been launched on 16 January 2003.

(2) *T+2 Rolling Settlement*   The stock exchanges were directed to implement it by April 2003.

(3) *Launch of interest rate derivatives on stock exchanges*   With a view to realizing the advantages of an exchange-traded mechanism, trading in interest rate derivatives on stock exchanges was launched on 24 June 2003.

(4) *Demutualization and Corporation of the Stock Exchanges*   A Bill proposing necessary legislative amendments to the Securities Contracts corporatization of stock exchanges in the country was introduced in the Lok Sabha in August 2003. Since then it has been referred to the Standing Committee on Finance for examination. The Bill is expected to be reintroduced in the newly constituted 14th Lok Sabha.

(5) *Amendments to the Securities Contracts (Regulation) Rules, 1957*   In order to allow banks to participate in trading carried out vide GOI Gazette notification dated 28 August 2003.

(6) *Regulation of private placement of deft by listed companies*   SEBI has, vide its circular dated 30 September 2003 prescribed certain conditions for issuance, listing and trading of privately placed debt securities by listed companies.

Pension Reforms

The Government of India on 23 August 2003 approved the proposal to implement the budget announcement of 2003 to 2004 relating to introduction of a new restructured defined contribution pension system for the new entrant to Central Government service, except to Armed Forces, in the first stage, replacing the existing system of defined benefit pension system. The new system will also be available, on a voluntary basis, to all persons including self-employed professionals and others in the unorganized sector. However, mandatory programmes under the Employees Provident Fund Organization (EPFO) and other special provident funds would continue to operate as per the existing system under the Employee Provident Fund and Miscellaneous Provisions Act 1952 and other special Acts governing these funds.

Insurance Ombudsmen

Efficient customer service in the insurance sector is among the priority objectives of the government. It includes the expeditious and redressal of public grievances relating to insurance claim settlement. In 1998 the government introduced the system of Ombudsman in the insurance sector as a major step towards improvement in this area. Insurance Ombudsmen

are currently located in 12 cities with each of these empowered to redress customer grievances in respect of insurance contracts on personal lines where the insured amount is less than ₹20 lakhs.

Pension Fund Regulatory and Development Authority (PFRDA)

The government approved the basic features of the new pension sytem and setting up of an Pension Fund Regulatory And Development Authority (PFRDA). The functions of PFRDA are: (1) To deal with all matters relating to promotion and orderly growth of pension market; (2) To propose comprehensive legislation for the purpose indicated above and (3) To carry out such other functions as may be delegated to the Authority for the purposes indicated in (1) and (2) above.

New Pension System (NPS)

NPS, regulated by PFRDA (Pension Fund Regulatory and Development Authority), is a milestone in the development of a sustainable and efficient voluntary defined contribution pension in India. It has following broad objectives: (1) To provide old age pension (2) Reasonable market based returns ones the long term; (3) Extending old age security coverage to all citizens. NPS offers the following important features to help some for retirements. The pensioner under this scheme will be alloted an unique Permanent Retirement Account Number (PRAN) which will remain the same for entire life and one will be able to use this account number from any location in India.

Main Features and Architecture of the New Pension System

- The new pension system would be based on defined contributions. It will use the existing network of bank branches and post offices etc., to collect contributions. There will be seamless transfer of accumulations in case of change of employment and/or location. It will also offer a basket of investment choices and fund managers. The new pension system will be voluntary.
- The system would, however, be mandatory for new recruits to the Central Government service (except the armed forces). The monthly contribution would be 10% of the salary and DA to be paid by the employee and matched by the Central Government. However, there will be no contribution from the Government in respect of individuals who are not Government employees. The contributions and returns thereon would be deposited in a non-withdrawable pension account. The existing provisions of defined benefit pension and GPF would not be available to the new recruits in the central Government service.
- In addition to the above pension account, each individual can have a voluntary tier-II withdrawable account at his option. Government will make no contribution into this account. These assets would be managed in the same manner as the pension. The accumulations in this account can be withdrawn anytime without assigning any reason.
- Individuals can normally exit at or after age 60 years from the pension system. At exit, the individual would be required to invest at least 40% of pension wealth to purchase an annuity. In case of Government employees, the annuity should provide for pension for the lifetime of the employee and his dependent parents and his spouse at the time of retirement. The individual would receive a lump-sum of the remaining pension wealth, which she would be free to utilize in any manner. Individuals would have the flexibility to leave the pension system prior to age 60. However, in this case, the mandatory annuitisation would be 80% of the pension wealth.

- There will be one or more Central Record Keeping Agency (CRA), Several Pension Fund Managers (PFMs) to choose from which will offer different categories of schemes.
- The participating entities (PFMs, CRA etc.) would give out easily understood information about past performance and regular NAVs, so that the individual would able to make informed choices about which scheme to choose.

The individual would receive a lumpsum of the remaining pension wealth, which he/she would be free to utilize in any manner. Individuals would have the flexibility to leave the pension system prior to age 60. However, in this case, the mandatory would be 80% of the pension wealth.

Scope of the NPS

The option of joining the new system would also be available to the state governments and as when they decide, the new system would be capable of accommodating the new participants. Mandatory programmes under the Employee Provident Fund Organization (EPFO) and other special provident funds would continue to operate as per the existing system. However, individuals under these programmes could voluntarily choose to additionally participate in this scheme.

Status of Implementation

A Resolution was issued on 10 October 2003 to operationalize the decision of the government to introduce a new pension system on defined contribution basis. A notification was issued on 22 December 2003 outlining the major features of the new pension system. The NPS became operative from 1 January 2004. The scheme is applicable to all new entrants to Central government. In terms of the resolution, an interim pension Fund Regulatory and Development Authority (PFRDA) has been constituted which started functioning from 1 January 2004. Till the CRA and PFMs are in place, as an interim arrangement, the *Central Pension Accounting Office* will be acting as the interim CRA. All contributions under NPS are currently going to the public account and earning a return equal to GPF rate.

Social Security Scheme - Aam Aadmi BimaYojana (AABY)

AABY, a Social Security Scheme for rural landless household was launched on 2nd October, 2007. Under this scheme the Below Poverty Line (BPL) and marginally above poverty line citizens are covered. This is targeted towards providing insurance facilities to the landless agricultural families, those involved in 46 other trades, including *beedi* workers, carpenters, cobblers, fishermen, weavers, persons with disability employed in different sectors, sweepers, drivers, anganwadi teachers and members of self-help groups, would be extended the insurance benefits under the scheme. The head of the family or one earning member in the family of such a household is covered under the scheme. The premium of ₹200/- per person per annum is shared equally by the central government and the state government. The member to be covered should be aged between 18 and 59 years. Besides providing a life cover of ₹30,000 for natural death and ₹37,500 if the person covered under the insurance becomes partially disabled, also, two children in his family will be paid ₹100 a month as scholarship.

Swavalamban Scheme

In 2010, the government of India launched the Swavalamban initiative that is managed by the interim Pension Fund Regulatory and Development Authority. It is for NPS subscribers, with a minimum contribution of ₹1000 and a maximum contribution of ₹12,000 per annum during a financial year. The initiative aims to encourage voluntary savings for those from the unorganised sector towards for their retirement.

Atal Pension Yojana

In the 2015–16 budget, the Govenment of India announced a new scheme called Atal Pension Yojana (APY) administered by the Pension Fund Regulatory and Development Authority (PFRDA) through the NPS architecture. APY is applicable to all citizen of India aged between 18–40 years and all bank account holders may join APY. Under this scheme the government is to co-contribute 50% of the subscriber's contribution or ₹1000 per annum, whichever is lower. Government co-contribution is available for those who are not covered under any statutory social security schemes and for not income tax payers.

Insurance Regulatory and Development Authority

Insurance sector has been opened up with the establishment of Insurance Regulatory and Development Authority (IRDA) in April 2000. Functioning from Hyderabad, Andhra Pradesh, IRDA at present, consists of a Chairman, 3 whole-time and 4-part time members. The major function of IRDA include:

  (i) Licensing of insurers and insurance intermediaries;
 (ii) Financial and regulatory supervision;
(iii) Regulation of premium rates; and
(iv) Protection of interest of policy holders.

Since its constitution, it has granted registration to 21 new insurance companies which comprise 13 life insurance and 8 general insurance companies in private sector. With a view to develop the insurance sector and protect the interest of the policyholders, the authority has also issued regulations. Cooperatives and brokers have been allowed in the insurance sector with the enactment of Insurance (Amendment) Act, 2002.

Bifurcation of UTI

The Unit Trust of India (Transfer of Understanding and repeal) Act 2002, enacted in December 2002 provided, inter-alia, that erstwhile Unit Trust of India shall be bifurcated and the 'specified undertaking', viz., UTI-I, comprising of US-64, Assured Return Scheme and Development Reserve Fund (appearing in the Schedule-I to the Act), will be transferred and vest in a government appointment Administrator and the 'undertaking', viz. UTI-II, comprising of Net Asset Value (NAV) based schemes (appearing in the Schedule-II to the Act), will vest in a specified company from 1 February 2003. UTI-I has been named as 'Administrator of the Specified Undertaking of the Unit Trust of India'. For UTI-II, the State Bank of India, Punjab National Bank, Bank of Baroda and the Life Insurance Corporation of India have set-up a mutual fund, named UTI Mutual Fund, UTI Trustee Company and the UTI Asset Management Company as per SEBI (Mutual Fund) Regulations. UTI Trustee Company has been notified as the specified company.

Stock Exchanges

Stock Markets in India

India has a rapidly expanding stock market that is, in 1993, listed around 5000 companies in 14 stock exchanges, although only the stocks of about 400 of these companies were actively traded. Financial institutions and government bodies controlled an estimated 45% of all listed capital. Today, there are 22 stock exchanges operating in the country. Of these, 20 stock exchanges are regional and operate in their allocation areas. The remaining two, the National Stock Exchange (NSE) and Over-the-Counter Exchange of India (OTCEI) are for nationwide trading. The network of stock exchanges provides an organized market for transaction of shares and other securities. In April 1992, the Bombay stock Market, the nation's largest, with a market capital of US $ 65.1 billion, collapsed, in part because of the revelations about financial malpractice amounting to US $ 2 billion. Afterwards, the Securities and Exchange Board of India (SEBI), the government's capital market regulator, implemented reforms designed to strengthen investor confidence in the stock market. In the mid-1990s, foreign institutional investors took greater interest than ever before in the Indian stock markets, investing around US $ 2 billion in FY 1993 alone.

Securities and Exchange Board of India

In April 1988, a non-statutory body, the Securities and Exchange Board of India (SEBI) was constituted by the government to deal with matters of development and regulation pertaining to the securities market and to protect investors from fraudulent dealings. However, in 1992, SEBI was given the statutory powers through a promulgated ordinance which was replaced by an Act of Parliament in April 1992. As per this Act SEBI has power over corporate in the issuance of capital, transfer of securities and imposition of monetary penalties on capital market intermediaries and participants who violate the issued guidelines.

Mints and Presses

There are four government mints situated at Mumbai, Kolkata, Hyderabad and Noida. The main functions of government mints are: (1) minting of coins to meet the domestic requirements, (2) gold and silver assaying and (3) medal production.

There are five presses whose functions are as follows:

- *India Security Press (Nashik Road)*: It consists of two units—a Stamp Press which prints postal stationery, postal and non-postal stamps, judicial and non-judicial stamps, RBI/ SBI cheques, Bonds, National Savings Certificates, Indira Vikas Patra, Kisan Vikas Patra, Postal Orders, Passports, Promissory Notes and other security documents and the Central Stamp Depot which takes care of the delivery of all the finished products to the respective indentors.
- *Bank Note Press (Dewas)*: It consists of two units—the ink factory which manufactures security inks and a main press for printing bank notes of the denomination of 20, 50, 100 and 500 rupees.
- *Currency Note Press (Nashik Road)*: It prints bank notes of the denomination of 10, 50, 100 and 1000 rupees.
- *Security Printing Press (Hyderabad)*: This press prints postal stationery to meet the demand of the southern states and Central Excise stamps for the use of the whole country. Also printed here are inland letter cards, postcards, competition, postcards and embossed envelopes to supplement the production of the India Security Press.
- *Security paper mills (Hoshangabad)*: This paper mill manufactures the special paper used for printing bank notes and non-judicial stamp paper of higher denominations.

DEPOSITS

Deposits can be classified into demand deposits and time deposits.

Demand Deposits

These are mainly two types: (1) Saving deposits and (2) Current deposits

Saving Deposits

As saving accounts are meant to encourage savings habit, organizations whose purpose is profit are not allowed to open such accounts. Interest is paid on a half-yearly basis in these accounts. A minimum balance is stipulated by each bank. A balance amount above the minimum stipulated amount is eligible for a 3.5% interest rate in India at present.

Current Deposits

Since this account is to meet the transaction needs of the customer, there is no restriction on the number of transaction in the account of, in the type of customers eligible to open these accounts. Account holders are not entitled to any interest from the bank.

Time Deposits

These are also called as *fixed deposits* or *terms deposits*. These are repayable after the expiry of a specified period varying from 7 days to 120 months.

NEGOTIABLE INSTRUMENTS

Negotiation

Implies transfer be endorsement if payable to the order or by delivery if bearer.

Instrument

Implies a documentary means of transferring ownership.

Negotiable instruments are the principal instruments for making payment and discharging business obligations. The major negotiable instruments are bill of exchange and cheque payable either to order or bearer. For example, when a cheque is transferred to any person, the cheque (instrument) is said to be negotiated.

Section 13 of the Negotiable Instruments Act 1881

Defines a negotiable instrument to be 'a promissory note, bill of exchange or cheque, payable either to order or to bearer'.

Bill of Exchange

An instrument in writing, containing an unconditional order, signed by the maker, directing a person to pay a certain sum of money to a certain person or to the order of that certain person or to the bearer of the instrument.

Cheque

The characteristic features of a cheque can be specified as follows:
- As per the Negotiable Instrument Act a cheque is a bill of exchange.
- It is always drawn on a bank and is payable on demand.
- It has three parties:

(1) *Drawer* A person who draws the cheque on a bank.

(2) *Drawee* A bank on whom the cheque is drawn.

(3) *Payee* A person to whom the payment is to be made by the bank.

- A cheque can be payable either to order or to bearer.
- When a cheque is crossed, the banker shall not pay the amount over the counter.
- When a payee accepts a cheque he can claim the money from the drawer.
- A customer has the right to 'stop payment' before the due date, after he issues the cheque.

Difference Between Cheque and Bill of Exchange

Every cheque is a bill of exchange. However, every bill of exchange is not necessarily a cheque. The essential differences are as follows:

- A bill of exchange need not necessarily be drawn on a banker.
- A bill of exchange may be payable on demand or payable on a future date.
- A bill of exchange payable on a future date is called *usance bill*.

NRI ACCOUNTS

The present menu of bank account for Non-Resident Indian (NRIs) has three categories:

1. NRE—Non-resident (external) rupee account.
2. NRO—Non-resident (ordinary) rupee account.
3. FCNR(B)—Foreign currency non-resident (banks) accounts.

These accounts can be distinguished as follows:

- While NRO and NRE accounts can be kept in the form of current, saving or term deposit accounts, FCNR (B) deposit can be kept only in the form of term deposits, for periods ranging from 6 months to 3 years.
- Remittances from abroad can be credited to any of these accounts. But earnings of NRIs on the property held by them in India, which are non-repatriable, can be credited only to NRO accounts.
- Money from an NRO account is non-repatriable, but NRE and FCNR deposits are repatriable.
- The entire interest earned on NRO accounts is eligible for repatriation. Persons of Indian nationality who have been NRIs for period of not less than 1 year and have returned to Indian are eligible to open a RFC (Resident Foreign Currency) account.
- An NRO account may be jointly held with residents.
- NRE and FCNR (B) accounts cannot be jointly held with residents. But resident power of attorney is permitted for local payments and investments in India.
- Balances held in NRE/FCNR accounts are exempted from wealth tax and interest earned is exempted from income tax. There are no tax exemptions on interest earned on NRO accounts.

MANDATES AND POWER OF ATTORNEY

An account holder can appoint a third person to act on his behalf to do certain acts like drawing cheques or instructing bank to debit the account for various purposes like issuance of drafts.

Mandates

The following are the salient features of mandates: (1) It is an unstamped letter signed by the customer, authorizing a person to operate the account on his behalf. (2) Signature of the mandatory should be obtained in the letter of mandate. (3) A letter of mandate is generally issued for a short and temporary period.

Power of Attorney

The following are the salient features of power of attorney: (1) It is a stamped document and generally executed in the presence of a notary/magistrate of a court. (2) Two types of powers are granted—special and general powers of attorney. Special power of attorney is often for a single transaction and general power of attorney confers an agent very extensive powers.

Lien

Lien is the right of the creditor to retain possession of the goods and securities owned by the debtor until the debt due from the latter is paid. General lien gives a right to posses the goods, banker's lien adds to it, the right of sale in case of default by the latter. Therefore, it is called an *implied pledge*.

DIFFERENT LAWS: CUSTOMER/GROUPS

Joint Hindu Family

A Hindu undivided family (HUF) or joint family possesses ancestral properties and carries on an ancestral business. The ownership of such property passes on to the member of the family according to Hindu Law. In the case of a joint Hindu family governed by the *Mitakshara* school of Hindu Law, every male member of a family acquires an interest in the joint property by birth.

Societies

Voluntary societies committed to promotion of art, science, literature or to charitable purpose may be incorporated under the following acts: (1) The Societies Registration Act 1860; (2) The Companies Act 1956 and (3) The Co-operative Societies Act.

- A society gets the legal recognition as entity separate from its members only after its incorporation under one of these Acts.
- A registered society is governed by the provision of the act under which it is registered. It may have its own constitution, character, memorandum of association, rules and by-laws to carry on its activities.

Trusts

According to the Indian Trusts Act 1882, a trust is an obligation annexed to the ownership of the property, arising out of a confidence reposed by the owner, or declared and accepted by the owner for the benefit of the author, or of the author and the owner.

- **Author**—The person who reposes the confidence.
- **Trustee**—The person of whom the confidence is reposed.
- **Beneficiary**—The person for whose benefit the trust is formed.
- **Trust deed**—The document by means of which the trust is formed.

Joint Stock Company

A joint stock company is an artificial entity with perpetual section succession brought into existence under the provision of the Companies Act. Legally, a company is considered as an entity separate from its member and hence possesses all powers to enter into a valid contract. A joint stock company has to submit the following important documents while giving an application to open a bank account:

- Certificate of incorporation and certificate of business
- Memorandum of association
- Articles of association
- Board resolution

Sole Proprietor

An individual running a business or commercial activity under a name other than his/her own is known as a *sole proprietor*.

Partnership

Is defined as relation between two or more persons who have agreed to share the profit of business run by all or any of them acting for all.

Bankers will have to take precautions while opening an account in the name of a partnership firm. These precautions can be specified as:

- Partnership letter or mandate: a letter signed by all partners and contains the details such as (i) Name of all partners and (ii) Nature of business.
- Limitation on the number of partners: Minimum two and Maximum for banking business–10; others–20.

BANK–CUSTOMER RELATIONSHIP

- A customer's deposit is a debt given to a bank for the bank's use, repayable on demand. The bank becomes the customer's debtor and the customer becomes the unsecured creditor with no claim over the bank's assets as security.
- When the customer takes a loan, he/she becomes the bank's debtor. As the bank normally obtains security for the loan it gives, the bank becomes a secured creditor for the customer.
- When the customer deposits or other valuables with the bank for safe custody, the bank becomes the trustee of these assets. The customer remains the owner.
- When the bank buys or sells securities on behalf of the customer or pays the utility bills of the customer, it acts as the customer's agent. Such services are rendered for the convenience of the customer.
- So what is the relationship between the banker and customer when a cheque is sent for collection to another banker? The answer is Trustee.

Rights of a Banker

The important rights of a banker are:

- *Right of General Lien*   The right of a general lien is follows: (1) Line is the right of a creditor to retain the goods and securities owned by his debtor until the debt is repaid.

(2) This right has some important features and conditions. When a lien applies to a specific debt, it is known as a *particular lien*. When a tailor retains the clothes stitched by him till his tailoring charges are paid, the tailor is exercising a particular lien. A general lien applies to all amounts due from the debtor.

- *Right of Setoff*   The right of a set-off is as follows: (1) Under this right, the bank may use the credit balance in another account, when both accounts belong to the same customer. The accounts may be held in different branches. (2) Normally, the bank takes a letter in advance from the customer authorizing the set-off without prior notice to the customer. The main condition of right of set-off is 'same name, same right'. Both the accounts must be held in the same name and in the same capacity. This is to avoid misuse of funds belonging to someone also but standing in the name of the customer.

- *Right to Appropriation (Who and How)*   The right to appropriation is as follows:
  At times a customer takes several loans from the bank. When the banker receives the payment from the customer, against which loan should deposit be appropriated? Who is the deciding authority on this? According to the Indian Contract Act the right of appropriation vests with the debtor. Alternatively, the payment may be made under circumstances clearly implying the debt as the creditor can exercise the right.

- *Right to Charge Interest and Levy Charges*   As a creditor, the bank has the implied right to charge interest on loans given to customers. Periodically, the customer account is debited with the interest due. The banks may also levy charge to meet incidental expenses incurred on a current account.

Obligations of a Banker

The banker is essentially a debtor or creditor to the customer. However, such a relationship imposes certain obligation on the bankers.

Honour Cheques

The following points are related to honour cheques: (1) There must be sufficient funds, (2) They must be properly applicable to a cheque and (3) They must be properly presented in proper time.

Wrong Dishonour of Cheque

This may happen due to following causes: (1) The mistake in posting that reduces the correct balance to the correct balance to the customer's credit. (2) Fraud committed by employee and (3) Honouring a post-dated cheque.

The banker is responsible not only for the monitory loss but also for the injury to the customer's reputation. The latter is more important to a customer.

Maintain Confidentiality

A customer account reflects his/her true financial position. This information is very sensitive and may directly reflect on the customer's reputation. Therefore, the banker should—(1) not disclose any information regarding the account to a third party; (2) Ensure no such information regarding the account books; (3) Prevent such disclosure even after the account is closed. The exceptions are as follows: (i) When required by the law and (ii) Practice and usage among bankers.

'Premature Closure'

A bank may allow premature encashment of a fixed deposit at the request of customer. In this case, the banker's obligations are as follows: (1) Ensure that the customer has the information about the bank's penal interest rates for the premature withdrawals of term deposits, if the bank charges such an interes and (2) Inform the customer while opening the account whether the bank disallows premature withdrawals of large deposit held by entities other than individuals and HUF.

Act in Good Faith Without Negligence

The banker collects numerous cheques on behalf of the customers and cannot verify the validity of each instrument. The Negotiable Instrument Act protection to the banker can be specified as follows: (1) The cheque must be crossed before it is deposited; (2) The cheque must be received as an agent of the customer whose account is to be credited with the amount of the cheque; (3) Payment is received in good faith and without negligence.

Examples of negligence of bankers are as follows: (i) Opening an account without proper instruction; (ii) Overlooking irregularity of endorsement (e.g., spelling, signature) and (iii) Collecting 'account payee' cheques for another person.

Deceased Depositor

The key points to be considered regarding depositors are as follows: (1) If depositor dies, the banker is obliged to pay the amount to the credit of a deposit account to the nominee survivor or claimant. (2) If death occurs before maturity of the deposit the interest is payable at the rate applicable to the deposit up to the actual date of payment. If death occurs before maturity, the rate claimants may be paid at the saving rate of interest prevalent on maturity date for the period from maturity to the payment date. (3) A succession certificate is not mandatory; however, the bank may obtain an indemnity bond. Where there is a dispute among legal heirs who are unable to provide a unanimous indemnity bond, the bank should obtain the succession certificates and (4) If there are doubts about the claimants, the claimants, the bank should insist on succession certificates.

Payment to Nominee

The payment to the nominee is made in the following conditions: (1) Nomination may be made in the name of individuals. (2) In case of a joint account, there can only be one nominee and the nominee may receive the dues only after the death of all the depositors and (3) Nomination may be altered at any time in the prescribed manner.

Closure of Accounts

The banker must comply with a written directive from the customer to does his/her account. The customer must be asked to return unused cheques. Other possible occasions on which a bank can close the accounts are on receiving notice of a customer's insanity or death or when the customer becomes insolvent.

WHY BANKS FOCUS ON RETAIL BUSINESS

Financial Disintermediation

Traditionally, banks have been catering to demands of economic developments; finance for manufacturing activities had a greater priority. Reliance of commercial banks was on

blue-chip companies for deployment of funds. A scenario has emerged wherein there is a lack of demand for credit from large corporate, primarily due to two reasons: (1) Near demise of working capital requirements due to enhancement in activities like productivity and increased sales realization and (2) Corporate have their own avenues, e.g., tapping public deposits and issuance of shares and debentures.

Advent of Economic Liberalization

Privatization and globalization has opened the gate for a lot of new players in the banking sector, which has resulted in competition with each other for market share. The confluence of increased purchasing power, consumerism and competition with the banks for market share has resulted in a retail chase. The identity of banks has changed from those known for their roles in development of business/economy to the ones helping in the development of the family.

Instant Solution in the Banking Business

Retail banking has the potential to provide decent returns for banks with an extended clientele base in an era of thinning margins and non-performing advances. Retail banking is based on the principle 'banking for the people, by the people and of the people'.

EMERGING ISSUES IN HANDLING RETAIL BANKING

Know Your Customer (KYC)

A concept which is easier said than practiced. Each branch should set-up data ware-house wherein meaningful data on customers, their preferences, spending patterns, etc., can be mined.

Technology Issues

Retail banking calls for huge investments in technology, e.g., providing anytime, anywhere convenience to vast number of customers and delivery channels through Asynchronous Transfer Modes (ATMs), which requires a huge investment by the banks.

Product Innovation

All new products may not become successful. Products should be introduced to create value, not amusement. The days of selling products on the shelves are gone in the banking sector.

Pricing of Products

The banking sector is witnessing a pricing war with each bank wanting to have a larger slice of the market share. The much needed transparency in pricing is also missing with many hidden charges. For example, 'minimum amount due' and 'total amount due' in the credit card application from and processing charged are not advertised.

Issues Related to Human Resources

Motivating the front line staff by projecting them as sales managers of products rather than as clerks at work. Changing the image of the bank from a transaction provider to a solution provider.

Low-cost and No-cost Deposits

Bank managers are in need of more savings bank and current accounts so that their cost of liability would be less. Three AAAs (anytime, anywhere and anyhow banking) is the

need of the hour. With the advent of ATMs, 'banking' has become a reality. Satellites and telecom networks across the world have made 'anywhere banking' possible. Now, it is the turn of 'anyhow banking'.

CLEARING AND SETTLEMENT PROCESS FOR CHEQUES

Clearing Process

1. The clearing process begins with the deposit of a cheque in a bank.
2. The cheque (along with other cheques) is delivered to the bank/branch where it is drawn.
3. The cheque is passed for payment if the funds are available and the banker is satisfied about the genuineness of the instrument.
4. The cheques that are unpaid are returned to the presenting bank through another clearing called the *Return Clearing*.
5. The realisation of the funds occurs after the completion of return clearing and by the absence of an unpaid cheque.

Settlement of Funds

1. The settlement of funds in clearing occurs at several levels.
2. The aggregate amount or value of cheques presented by a bank on other banks represents the claim by that bank on other banks.
3. Similar claims are made by all the banks on every other bank in the clearing.
4. A net settlement is arrived at the clearing house and the debit or credit position of the bank is determined.
5. These are booked in their current accounts maintained by the settling bank.
6. This represents the inter-bank settlement.
7. The settlement of funds between the service branch and the branch concerned represents the transfer of funds to the branch level.
8. The payment process is completed only when the funds are debited from the drawer's account and credited to the payee's account.
9. This occurs after the completion of the return clearing mentioned earlier.

Short Notes on Banking Ombudsman Scheme 2006

About Banking Ombudsman Scheme

The Banking Ombudsman Scheme enables an expeditious and inexpensive forum to bank customers for resolution of complaints relating to certain services rendered by banks. The Banking Ombudsman Scheme is introduced under Section 35 A of the Banking Regulation Act 1949 by RBI with effect from 1995.

Who Is a Banking Ombudsman?

The Banking Ombudsman is a senior official appointed by the Reserve Bank of India to redress customer complaints against deficiency in certain banking services.

Number and Location of Appointed Banking Ombudsmen

As on date, fifteen Banking Ombudsmen have been appointed with their offices located mostly in state capitals. The addresses and contact details of the Banking Ombudsman offices have been provided in the annex.

Banks Covered Under the Banking Ombudsman Scheme, 2006

All Scheduled Commercial Banks, Regional Rural Banks and Scheduled Primary Co-operative Banks are covered under the Scheme.

Grounds of the Complaints

The Banking Ombudsman can receive and consider any complaint relating to the following deficiency in banking services (including internet banking):

- Non-payment or inordinate delay in the payment or collection of cheques, drafts, bills, etc.
- Non-acceptance, without sufficient cause, of small denomination notes tendered for any purpose and for charging of commission in respect thereof.
- Non-acceptance, without sufficient cause, of coins tendered and for charging of commission in respect thereof.
- Non-payment or delay in payment of inward remittances.
- Failure to issue or delay in issue of drafts, pay orders or bankers' cheques.
- Non-adherence to prescribed working hours.
- Failure to provide or delay in providing a banking facility (other than loans and advances) promised in writing by a bank or its direct selling agents.
- Delays, non-credit of proceeds to parties accounts, non-payment of deposit or non-observance of the Reserve Bank directives, if any, applicable to rate of interest on deposits in any savings, current or other account maintained with a bank.
- Complaints from non-resident Indians having accounts in India in relation to their remittances from abroad, deposits and other bank-related matters.
- Refusal to open deposit accounts without any valid reason for refusal.
- Levying, of charges without adequate prior notice to the customer.
- Non-adherence by the bank or its subsidiaries to the instructions of Reserve Bank on ATM/Debit card operations or credit card operations.
- Non-disbursement or delay in disbursement of pension (to the extent the grievance can be attributed to the action on the part of the bank concerned, but not with regard to its employees).
- Refusal to accept or delay in accepting payment towards taxes, as required by Reserve Bank/Government.
- Refusal to issue or delay in issuing, or failure to service or delay in servicing or redemption of Government securities.
- Forced closure of deposit accounts without due notice or without sufficient reason.
- Refusal to close or delay in closing the accounts.
- Non-adherence to the fair practices code as adopted by the bank or non-adherence to the provisions of the Code of Banks Commitments to Customers issued by Banking Codes and Standards Board of India and as adopted by the bank.
- Non-observance of Reserve Bank guidelines on engagement of recovery agents by banks
- Any other matter relating to the violation of the directives issued by the Reserve Bank in relation to banking or other services.

A customer can also lodge a complaint on the following grounds of deficiency in service with respect to loans and advances:

- Non-observance of Reserve Bank Directives on interest rates.
- Delays in sanction, disbursement or non-observance of prescribed time schedule for disposal of loan applications.
- Non-acceptance of application for loans without furnishing valid reasons to the applicant.
- Non-adherence to the provisions of the fair practices code for lenders as adopted by the bank or Code of Bank's Commitment to Customers, as the case may be.
- Non-observance of any other direction or instruction of the Reserve Bank as may be specified by the Reserve Bank for this purpose from time to time.
- The Banking Ombudsman may also deal with such other matter as may be specified by the Reserve Bank from time to time.

When Can One File a Complaint?

One can file a complaint before the Banking Ombudsman if the reply is not received from the bank within a period of one month after the bank concerned has received one's representation, or the bank rejects the complaint, or if the complainant is not satisfied with the reply given by the bank.

When Will One's Complaint Not Be Considered by the Ombudsman?

One's complaint will not be considered if: (1) One has not approached his bank for redressal of his grievance first. (2) One has not made the complaint within one year from the date one has received the reply of the bank or if no reply is received if it is more than one year and one month from the date of representation to the bank. (3) The subject matter of the complaint is pending for disposal/has already been dealt with at any other forum like court of law, consumer court etc. (4) Frivolous or vexatious. (5) The institution complained against is not covered under the scheme. (6) The subject matter of the complaint is not within the ambit of the Banking Ombudsman and (7) If the complaint is for the same subject matter that was settled through the office of the Banking Ombudsman in any previous proceedings.

Can the Banking Ombudsman Reject a Complaint at Any Stage?

Yes. The Banking Ombudsman may reject a complaint at any stage if it appears to him that a complaint made to him is:

- Not on the grounds of complaint referred to above.
- Compensation sought from the Banking Ombudsman is beyond ₹ 10 lakh.
- Requires consideration of elaborate documentary and oral evidence and the proceedings before the Banking Ombudsman are not appropriate for adjudication of such complaint
- Without any sufficient cause.
- That it is not pursued by the complainant with reasonable diligence.
- In the opinion of the Banking Ombudsman there is no loss or damage or inconvenience caused to the complainant.

Short Notes on Banking Ombudsman Scheme 2006

Non-Banking Financial Company (NBFC)

A Non-Banking Financial Company (NBFC) is a company registered under the Companies Act 1956 and is engaged in the business of loans and advances, acquisition of shares/stock/bonds/debentures/securities issued by Government or local authority or other securities of like marketable nature, leasing, hire-purchase, insurance business, chit business but does not include any institution whose principal business is that of agriculture activity, industrial activity, sale/purchase/construction of immovable property. A non-banking institution which is a company and which has its principal business of receiving deposits under any scheme or arrangement or any other manner, or lending in any manner is also a non-banking financial company (Residuary non-banking company).

Difference Between Banks and NBFCs

NBFCs are doing functions akin to that of banks; however, there are a few differences: (1) an NBFC cannot accept demand deposits; (2) an NBFC is not a part of the payment and settlement system and as such an NBFC cannot issue cheques drawn on itself and (3) deposit insurance facility of Deposit Insurance and Credit Guarantee Corporation is not available for NBFC depositors unlike in case of banks.

Every NBFC Should Be Registered with RBI

In terms of Section 45-IA of the RBI Act 1934, it is mandatory that every NBFC should be registered with RBI to commence or carry on any business of non-banking financial institution as defined in clause (a) of Section 45 I of the RBI Act 1934. However, to obviate dual regulation, certain categories of NBFCs which are regulated by other regulators are exempted from the requirement of registration with RBI viz. Venture Capital Fund/Merchant Banking companies/Stock broking companies registered with SEBI, Insurance Company holding a valid Certificate of Registration issued by IRDA. Nidhi companies as notified under Section 620A of the Companies Act 1956, Chit companies as defined in clause (b) of Section 2 of the Chit Funds Act 1982 or Housing Finance Companies regulated by National Housing Bank.

Different Types of NBFCs Registered with RBI

Originally, NBFCs registered with RBI were classified as (1) equipment leasing company, (2) hire-purchase company, (3) loan company and (4) investment company. However, with effect from December 6 2006 the above NBFCs registered with RBI have been reclassified as (i) Asset Finance Company (AFC), (ii) Investment Company (I), (iii) Loan Company (LC). *AFC* would be defined as any company which is a financial institution carrying on as its principal business the financing of physical assets supporting productive/economic activity, such as automobiles, tractors, lathe machines, generator sets, earth moving and material handling equipments, moving on own power and general purpose industrial machines. Principal business for this purpose is defined as aggregate of financing real/physical assets supporting economic activity and income arising therefrom is not less than 60% of its total assets and total income respectively. The above type of companies may be further classified into those accepting deposits or those not accepting deposits.

Updated on 10 February 2009, the Requirements/procedure for Registration with RBI

A company incorporated under the Companies Act 1956 and desirous of commencing business of non-banking financial institution as defined under Section 45 I(a) of the RBI Act 1934 should have a minimum net owned fund of ₹ 25 lakh (raised to ₹ 200 lakh w.e.f 21 April 1999). The company is required to submit its application online by accessing RBI's secured website https://secweb.rbi.org.in/COSMOS/rbilogin.do (the applicant companies do not need to log on to the COSMOS application and hence user ids for these companies are not required). The company has to click on 'CLICK' for Company Registration on the login page. A window showing the Excel application forms available for download would be displayed. The company can then download suitable application form (i.e., NBFC or SC/RC) from the above website, key in the data and upload the application form. The company may note to indicate the name of the correct Regional Office in the field 'C-8' of the 'Annx-Identification Particulars' worksheet of the Excel application form. The company would then get a Company Application Reference Number for the CoR application filed on-line. Thereafter, the company has to submit the hard copy of the application form (indicating the Company Application Reference Number of its on-line application), along with the supporting documents, to the concerned Regional Office. The company can then check the status of the application based on the acknowledgement number. The Bank would issue Certificate of Registration after satisfying itself that the conditions as enumerated in Section 45-IA of the RBI Act 1934 are satisfied.

Can All NBFCs Accept Deposits and What Are the Requirements for Accepting Public Deposits?

All NBFCs are not entitled to accept public deposits. Only those NBFCs holding a valid Certificate of Registration with authorisation to accept Public Deposits can accept/hold public deposits. NBFCs authorised to accept/hold public deposits besides having minimum stipulated Net Owned Fund (NOF) should also comply with the directions such as investing part of the funds in liquid assets, maintain reserves, rating, etc. issued by the Bank.

Short Notes on RBI's Role as Banker to Government

RBI's Role with Regard to Conduct of Government's Banking Transaction

In terms of Section 20 of the RBI Act 1934, RBI has the obligation to undertake the receipts and payments of the Central Government and to carry out the exchange, remittance and other banking operations, including the management of the public debt of the Union. Further, as per Section 21 of the said Act RBI has the right to transact Government business of the Union in India. State Government transactions are carried out by RBI in terms of the agreement entered into with the State Governments in terms of section 21 A of the Act. As of now, such agreements exist between RBI and all the State Governments except Government of Sikkim.

How Does RBI Discharge its Statutory Obligation of Being 'Banker to Government'?

Reserve Bank of India maintains the Principal Accounts of Central as well as State Governments at its Central Accounts Section, Nagpur. It has put in place a well structured

arrangement for revenue collection as well as payments on behalf of Government across the country. A network comprising the Public Accounts Departments of RBI and branches of Agency Banks appointed under Section 45 of the RBI Act carry out the Govt. transactions. At present all the public sector banks and three private sector banks viz. ICICI Bank Ltd, HDFC Bank Ltd and Axis Bank Ltd act as RBI's agents. Only authorised branches of Agency banks can conduct Govt. business.

How Payment into Government Account Is Made?

All monies for credit to Government account like taxes or other remittances can be made by filling the prescribed challans of the Government/Department concerned. These challans along with the requisite amount (by way of cash, cheque or DD) are required to be tendered with the authorised bank branches.

Remedy If the Cheque Issued by Government Is Misplaced or Lost in Transit

The payee of the cheque has to approach the cheque issuing authority and apply for a duplicate cheque explaining the circumstances under which the original cheque was lost or misplaced. After satisfying himself, the drawer may issue a letter to the payee bank requesting it to record STOP payment against the lost cheque. The bank thereafter checks whether the cheque is already paid. If not paid, it records 'STOP PAYMENT' order till the expiry of the validity of the cheque and issues a 'NON-PAYMENT CERTIFICATE'.

Are Agency Banks Compensated for Conduct of Central/State Government Business?

The accredited banks are paid remuneration by RBI for conduct of State/Central Government transactions. Such remuneration is called *Agency Commission*. The rates of agency commission applicable at present (from 1 July 2005) are as under:

On-line Tax Accounting System (OLTAS) for Direct Taxes

It is a system introduced in April 2004 for collection, accounting and reporting of the receipts and payments of Direct Taxes on-line through a network of bank branches.

New Procedure for Payment of Direct Taxes at Banks

The authorised bank branches accept Direct Taxes by cash or cheque/demand draft drawn on the same branch or on other banks/branches with Single Challan. The bank immediately returns the tear off portion of the challan duly stamped with a unique '*Challan Identification Number (CIN)*' when the payment is made in cash. In the case of challans presented with cheque/demand draft drawn on other banks/branches, tear-off portion of the challan will be released to the tax-payer only after the realisation of the cheque/demand draft but tax shall be deemed to have been paid on the date of tender.

How Does the New System Benefit the Taxpayer?

The new system is of immense benefit to the common taxpayer. Now a single copy simplified Challan has to be filled-up replacing the earlier quadruplicate Challan. Secondly, it would be possible to obtain an acknowledgement for taxes paid at your own bank branch immediately. Further, the acknowledgement counterfoil with the rubber stamp containing the 'Challan Identification Number (CIN)' assures that the payment is properly accounted for. The Tax payer can view the details of tax paid by him by logging on to the website

(http://tinnsdl.com) and typing the unique CIN given by the bank. Taxpayer is no longer required to attach copies/acknowledgement of challan with the Return. He should only mention the CIN details in the Income-tax Returns.

Short Notes on KYC (Know Your Customer) Guidelines

What Is KYC?

KYC is an acronym for 'Know Your Customer', a term used for customer identification process. It involves making reasonable efforts to determine true identity and beneficial ownership of accounts, source of funds, the nature of customer's business, reasonableness of operations in the account in relation to the customer's business, etc. which in turn helps the banks to manage their risks prudently. The objective of the KYC guidelines is to prevent banks being used, intentionally or unintentionally by criminal elements for money laundering. KYC has two components—Identity and Address. While identity remains the same, the address may change and hence the banks are required to periodically update their records.

Is There Any Legal Backing for Verifying Identity of Clients?

Yes. Reserve Bank of India has issued guidelines to banks under Section 35A of the Banking Regulation Act 1949 and Rule 7 of prevention of money-laundering (maintenance of records of the nature and value of transactions, the procedure and manner of maintaining and time for furnishing information and verification and maintenance of records of the identity of the clients of the banking companies, financial institutions and intermediaries) Rules, 2005. any contravention thereof or non-compliance shall attract penalties under banking regulation act.

Information Given by Me to the Bank Under KYC Is Treated as Confidential?

Yes. The information collected from the customer for the purpose of opening of account is treated as confidential and details thereof are not divulged for cross selling or any other similar purposes.

Whether KYC Is Applicable for Credit Cards/Debit Cards/Smart Cards?

Yes. Application of full KYC procedure is necessary before issuing Credit Cards/Debit Cards/Smart Cards and also in respect of add-on/supplementary cards. *If anybody refuses to give KYC information to the bank* where the bank is unable to apply appropriate KYC measures due to non-furnishing of information and/or non-co-operation by the customer, the bank can consider closing the account or terminating the banking/business relationship after issuing due notice to the customer explaining the reasons for taking such a decision.

Short Notes on Recent Amendments Carried to Various Financial Sector Laws

- Various Acts during the last decade to highlight the dynamic nature of legislation.
- Reserve Bank of India Act 1934 was amended in 2006 to provide legality to certain OTC derivative transactions and also to give explicit regulatory powers to Reserve Bank over derivatives and money market instruments.
- The Banking Regulation Act 1949 was amended in 2007 for removing the lower limit prescribed in maintenance of Statutory Liquidity Ratio (SLR) by banks and conferring

wide powers on RBI in stipulating the SLR requirements for banks and to control liquidity in the market.

- The State Bank of India Act 1955 was amended in 2007 for enabling transfer of ownership from RBI to Government of India and again in 2010 to provide for enhancement of capital, issue of preference shares, raise capital by public issue or preferential allotment or private placement or rights issue and to issue bonus shares to the existing shareholders, etc.

- The State Bank of India (Subsidiary Banks) Act 1959 was amended in 2007 to facilitate enhancement of capital, raise resources from the market and raise capital through rights issue.

- The Banking Companies (Acquisition and Transfer of Undertakings) Acts, 1970 and 1980 were amended in 2006 to enable nationalised banks to issue preference shares in accordance with the guidelines framed by the Reserve Bank and to raise capital by preferential allotment or private placement or public issue, with the approval of the Reserve Bank.

- The Negotiable Instruments Act 1881 was amended in 2002 to introduce the concepts of 'electronic cheque' and 'cheque truncation' by expanding the definition of 'cheque'.

- The Securities Contracts (Regulation) Amendment Act 2007 was passed with a view to providing a legal framework for enabling listing and trading of securitised debt instruments, including mortgage backed debt.

- The Government Securities Act 2006 was enacted to consolidate and amend the laws relating to Government securities and its management by the RBI. The Act simplifies the procedure for settlement of claims of legal representatives, provides for admissibility of computerised information as evidence, contains provisions for effectively dealing with misuse of Subsidiary General Ledger (SGL) accounts and facilitates pledging and hypothecation of Government securities.

- The Payment and Settlement Systems Act 2007 was enacted empowering the Reserve Bank to regulate and supervise payment and settlement systems of the country and provides a legal basis for multilateral netting and settlement finality.

- The Prevention of Money-Laundering Act 2002 was enacted as a follow up to UN General Assembly resolution in 1998, calling for adoption of national anti-money laundering legislations and programmes by member states. The Act provides for preventing money laundering and connected activities, enables confiscation of proceeds of crime, setting-up of agencies and mechanisms for co-ordinating measures for combating money laundering, etc.

- The Foreign Contribution (Regulation) Act (FCRA), 2010 was enacted by repealing the erstwhile Foreign Contribution Regulation Act 1976 mainly to rectify several deficiencies found in the previous Act. The new Act covers the electronic media and organizations, other than political parties, apart from entities in the prohibited list in FCRA, 1976.

- The Credit Information Companies (Regulation) Act 2005 empowers the Reserve Bank to regulate the Credit Information Companies (CIC) and to facilitate efficient distribution of credit and matters concerned or incidental to it.

IMPORTANT RATIOS AND THEIR DEFINITIONS

Definitions of the concepts used in the ratios are as follows:

(1) Cash in cash-deposit ratio includes cash in hand and balances with RBI.

(2) Investments in investment-deposit ratio represent total investments including investments in non-approved securities.

(3) Net interest income is defined as the total interest earned less total interest paid.

(4) Intermediation cost is defined as total operating expenses.

(5) Wage bills are defined as Payments to and Provisions for Employees (PPE).

(6) Operating profit is defined as total earnings less total expenses, excluding provisions and contingencies.

(7) Burden is defined as the total non-interest expenses less total non-interest income.

Items like capital, reserves, deposits, borrowings, advances, investments and assets/liabilities used to compute various financial earnings/expenses ratios are averages for the two relevant years.

Definitions of the ratios are as follows:

 (i) Cash-Deposit ratio = (Cash in hand + Balances with RBI)/ Deposits.

 (ii) Ratio of secured advances to total advances = (Advances secured by tangible assets + Advances covered by bank or Govt. guarantees)/Advances.

(iii) Ratio of interest income to total assets = Interest earned/Total assets.

(iv) Net interest margin = Net Interest Income/Total Assets.

 (v) Ratio of non-interest income to total assets = Other income/Total assets.

(vi) Ratio of intermediation cost to total assets = Operating expenses/Total assets.

(vii) Ratio of wage bill to intermediation costs (Operating Expenses) = PPE/Operating Expenses.

(viii) Ratio of wage bill to total expenses = PPE/Total expenses.

(ix) Ratio of wage bill to total income = PPE/Total income.

 (x) Ratio of burden to total assets = (Operating expenses – Other income)/Total assets.

(xi) Ratio of burden to interest income = (Operating expenses – Other income)/Interest income.

(xii) Ratio of operating profits to total assets = Operating profit/Total assets.

(xiii) Return on assets for a bank group is obtained as weighted average of return on assets of individual banks in the group, weights being the proportion of total assets of the bank as percentage to total assets of all banks in the corresponding bank group.

(xiv) Return on Equity = Net Profit/(Capital + Reserves and Surplus).

(xv) Cost of Deposits = IPD/Deposits.

(xvi) Cost of Borrowings = IPB/Borrowings.

(xvii) Cost of Funds = (IPD + IPB)/(Deposits + Borrowings).

(xviii) Return on Advances = IEA/Advances.

(xix) Return on Investments = IEI/Investments.

 (xx) Return on Advances adjusted to Cost of Funds = Return on Advances – Cost of Funds.

(xxi) Return on Investment adjusted to Cost of Funds = Return on Investments – Cost of Funds.

Wherever appropriate, denominators in the ratios use averages of 'current year' and 'previous year'. For instance, ratio of net interest margin to total assets for the year 2014–15 uses denominator as average total assets for the years 2013–14 and 2014–15.

Abbreviations used in the above definitions are as follows.

PPE = Payments to and Provisions for Employees

IPD = Interest Paid on Deposits.

IPB = Interest Paid on Borrowings from RBI and other agencies.

IEA = Interest Earned on Advances and bills.

IEI = Interest Earned on Investments.

PRICE INDICES THAT QUANTIFY INFLATION

The Wholesale Price Index (WPI), compiled by the Ministry of Industry, has the most comprehensive coverage of commodities, ranging from consumer goods, consumer durables, basic raw material and intermediate and capital goods. The WPI base year 1981 to 1982 reflects changes in the price level of 447 commodities covering all traded items in the country. A Working Group has been formulated by the Ministry of Industry to revise the current series of WPI as a large number of structural and other changes has taken place in the economy since 1981 to 1982. Another index, the Rural Retail Price Index (RRPI), has been proposed by the Department of Statistics as there is no direct way of determining rural consumer patterns.

The WPI is a general index and quantifies inflation at the wholesale level. However, the CPI is specialized index and measures changes in retail prices. Since retail price affects different socio-economic groups differently, the CPI is calculated separately for (1) industrial workers CPI-IW, base year 1982; (2) urban non-manual employment CPI-UNME, base year 1984 to 1985 and (3) agricultural labourers CPI-AL, base 1960 to 1961. CPI is compiled by the Ministry of Labour.

RATE OF INFLATION

The cause of inflation lies in the official policies which cause monetary and fiscal indiscipline. Budget compression reduces demand as well as supply. Hence, the incentive structure should be used judiciously to see that the incentive to speculate does not out-do the incentives for production. Before devising appropriate anti-inflationary policies it is important for the government to understand the demand and supply gaps. However, despite increases in energy costs and other pressures from the world economy, for most of the period since independence India has not experienced severe inflation. The underlying average rate of inflation, however, has tended to rise. Consumer prices rose at an annual average of 2.1% in the 1950s, 6.3% in the 1960s, 7.8% in the 1970s and 8.5% in the 1980s. Three factors lay behind India's relative price stability. First, government intervention, either direct or indirect, to keep the price of certain staples, including wheat, rice, cloth and sugar, stable. Second, monetary regulation, which has restricted growth in money supply. Third, low overall influence of the labour unions on wages because of the weakness of the unions in India's labour surplus economy.

CHAKRAVARTHY COMMITTEE (1982–1985)

RBI formulated the Chakravarthy Committee (1982–1985) which reviewed the monetary system and suggested measures for improving its effectiveness by emphasising a proper framework for the regulation of RBI through coordination between the government and RBI. It also recommended the regulation of M3 in terms of range and necessary support to an appropriate interest rate policy. It asked for greater freedom for banks to determine their lending rates.

CAUSES OF INFLATION

- Mismatch among money supply, production and prices.
- Deficit financing of huge public outlays by the government which leaves big financial gaps.
- Black money and parallel economy which attacks money policies and encourages over-funding of businesses.
- Increasing governmental expenditures.
- Growing population adds to the inflationary pressures.
- Administered prices with upward revisions to prices of the inputs for industry adds to inflation.
- The government mobilizes additional resources through indirect taxes; this gives traders the opportunity to increase prices.
- Fluctuations in industrial and agricultural productions.
- Fluctuations in rate of savings and procurement prices.
- Infrastructural and forex bottlenecks.

REMEDIAL MEASURES TO CONTROL INFLATION

Short-term Measures

- Increase in supply of essential commodities.
- Increase in money supply and control of deficit financing by government.
- Improve Public Distribution System to distribute essential commodities to masses through wide network at fair prices.

Long-term Measures

- Build-up buffer stocks of essential commodities.
- Bring more and more taxpayers within the tax bracket to widen the taxation base.
- Rationalize public expenditure and plan proper allocation of investment.
- Increase in the production of food-grains and other articles of mass consumption.
- Restructure infrastructural sectors.
- Conservative monetary policy to bring price and fiscal stability in the country.

Consequences of Inflation

- People reduce their cash holdings during inflationary times which brings real cash balances.
- People change their financial assets to physical assets.
- Fiscal planning becomes difficult for government and individuals.
- Uncertainties during inflationary period dampens investments and saving.
- Income redistributes as entrepreneurs and salaried class lose, while speculators and real-estate and gold holders tend to gain more.
- Capacity of the economic system to perform profitably reduces.

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