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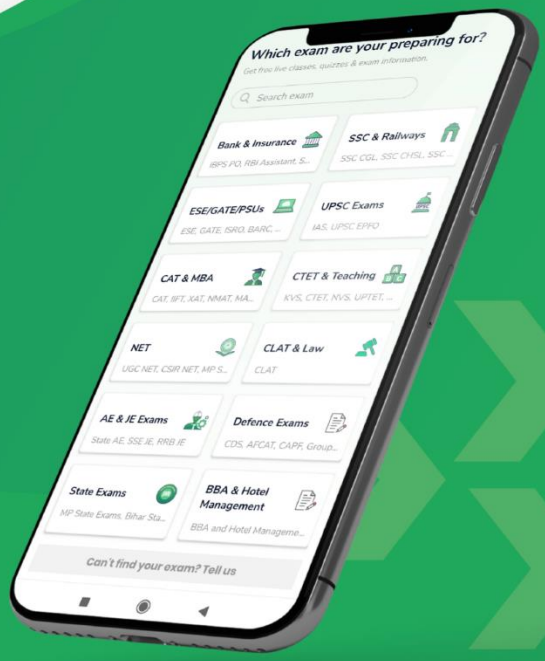

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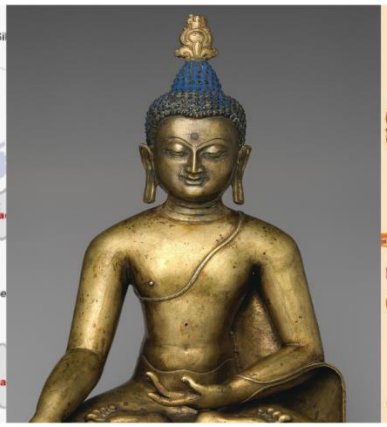
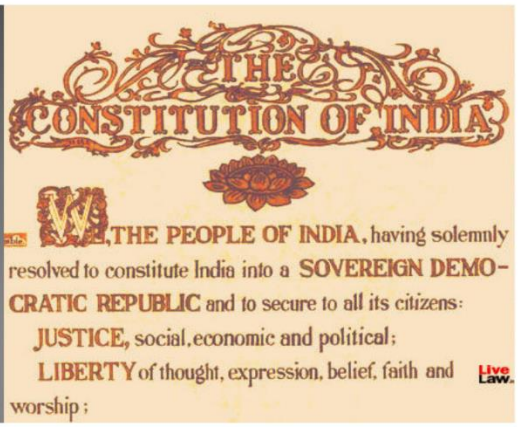
A Complete Guide for BPSC Exams





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Content

HISTORY OF BIHAR

Ancient History of Bihar

STONE AGE SITES

- Palaeolithic sites have been discovered in Munger and Nalanda.
- Mesolithic sites have been discovered from Hazaribagh, Ranchi, Singhbhum and Santhal Pargana (all in Jharkhand)
- Neolithic(2500 - 1500 B.C.) artefacts have been discovered from Chirand(Saran) and Chechar(Vaishali)
- Chalcolithic Age items have been discovered from Chirand(Saran), Chechar(Vaishali), Champa(Bhagalpur) and Taradih(Gaya)

MAHAJANAPADAS

- In the Later Vedic Age, a number of small kingdoms emerged. 16 monarchies and republics known as Mahajanapadas stretched across Indo-Gangetic plains. They are:

1. Kasi	2. Kamboja
3. Kosala	4. Gandhara
5. Anga	6. Avanti
7. Magadha	8. Assaka
9. Vajji (Vriji)	10. Surasena
11. Malla	12. Matsya
13. Chedi	14. Panchala
15. Vatsa (Vamsa)	16. Kuru

- Three Mahajanapadas were in Bihar namely Magadha, Anga and Vajji.

ANGA Kingdom

- It is mentioned for the first time in Atharvaveda.
- It comprised of present-day Khagaria, Bhagalpur, and Munger.
- It was situated to the north-east of Magadha Empire.
- Champa (in present-day Bhagalpur) was the capital.
    - It was established by king Mahagovind.
    - It was also called Chenanpo (by Hiuen Tsang) and Malini.

VAJJI Kingdom

- It consisted of eight clans.
- Most important clans were - Licchavi, Videha and Jnatrika.
- It was located in Northern India.
- The capital of Vajji was located at Vaishali.
- It was considered the world's first republic.

Licchavi Clan

- It was the most powerful clan among the Vajji confederacy.
- It was situated on the Northern Banks of Ganga and Nepal
- Its capital was located at Vaishali.
- Lord Mahavira was born at Kundagram in Vaishali. His mother was a Licchavi princess (sister of King Chetaka).
- They were later absorbed into the Magadh Empire by Ajatshatru of Haryanka dynasty.
- Later Gupta emperor Chandragupta married Licchavi princess Kumaradevi.

Jnatrika Clan

- Lord Mahavira belonged to this clan. His father was the head of this clan.

Videha Clan

- It is mentioned for the first time in Yajurveda.
- The kingdom was started by Ishkavaku's son Nimi Videh.
- Mithijanak Videh established Mithila.
- Goddess Sita, daughter of King Janak, belonged to this clan.
- Janakpur (now in Nepal) was the capital of this kingdom.

MAGADHA Kingdom

- It is mentioned for the first time in Atharvaveda.
- It extended from the Ganga in the north to Vindhyas in the south, Champa in the east to river Sone on the west.
- Its capital was Girivraja or Rajgir which was surrounded by hills on all sides by five hills.
- Later the capital was shifted to Patliputra.
- The Magadh Kingdom included Koshal, Vatsa, and Avanti.
- It played an important role in the development of Buddhism and Jainism.
- Two of India's greatest empires, Maurya and Gupta, emerged in Magadha.

Pre-Mauryan Dynasties under Magadha Empire

BRIHADRATH Dynasty

- Brihadrath was the earliest known king Magadha. He was the eldest son of Vasu, Kuru king of Chedi.
- His name has been mentioned Rigveda.

- Jarasandha, son of Brihadrath was the most famous king.
- Girivraja (Rajgir) was the capital under Jarasandh.
- Prodyota dynasty succeeded the Brihadrath dynasty in Magadha.

HARYANKA Dynasty - 544 B.C. to 492 B.C.

Bimbisara

- He founded the dynasty. He was a contemporary of Buddha.
- He established his capital at Rajgir.
- He expanded his empire through matrimonial alliances e.g. Kosala
- He was also the first ruler in history to form permanent forces/army.
- He also sent royal physician Jivaka to Ujjain for treating Chanda Pradyota, King of Avanti, and his longtime rival who later became a friend.

Ajatshatru

- He killed his father Bimbisara to become the next ruler.
- Lord Buddha attained Mahaparinirvana and Lord Mahavira also attained Moksha during his reign.
- First Buddhist Council (483 B.C.) was conducted under his patronage at Rajgir.

Udayin

- He also killed his father Ajatshatru to become the next ruler.
- He founded the city Patliputra at the confluence of rivers Ganga and Sone and made it his capital.

SHISHUNAGA Dynasty - 412 B.C. to 344 B.C.

Shishunaga

- He was the founder of the dynasty. He was a viceroy of Banaras.
- During this time Magadha had two capitals - Rajgir and Vaishali
- He finally destroyed the resistance Avanti and brought to end to the 100-year rivalry.

Kalasoka

- He shifted his capital to Patliputra and it continued as the capital of Magadha Empire onwards.
- Second Buddhist Council (383 B.C.) was conducted under his patronage at Vaishali.

NANDA Dynasty - 344 B.C. to 321 B.C.

- Mahapadmananda established the dynasty after killing last Shishunaga ruler Nandivardhana.
- He was also described Mahapadmapati - sovereign of an infinite host or of the immense wealth
- In Mahabodhivamsa, he was called Ugrasen.
- Dhana Nanda was the last ruler of this dynasty and was the contemporary Alexander.

MAURYAN Dynasty - 321 B.C. to 184 B.C.

Chandragupta Maurya

- He founded the dynasty with the help of his mentor Chanakya or Kautilya or Vishnugupt.
- He was born as Mura to a Shudra woman in the court of Nanda.
- In Mudra Rakshasa, he is also referred to as Vrishala.
- As per Buddhist tradition, he belonged to the Moriya Kshatriya clan.
- He fought Seleucus Nikator, a general of Alexander in 305 B.C. He later sent Megasthenese to Mauryan court.
- Megasthenesess wrote Indica describing Mauryan administration. The empire was divided into four provinces, each under one governor. According to him, Mauryan administration in Patliputra was under a council of 30 members divided into 6 committees of 5 members each.
- Patliputra has been referred to as Palibothra in Megasthenesess' Indica.
- Chanakya wrote, "It is considered a treatise on economics, politics, foreign affairs, administration, military, warfare and religion ever produced."

Bindusara

- He was also called by the name Amitrochates by Greek writers, Mudrasar in Vayu Purana and Seemseri in Jaina text Rajvalli Katha.
- Deimachus - Syrian ambassador sent by king Antiochus
- Dionysius - sent by Ptolemy II of Egypt

Ashoka

- He came to power after killing 99 of his brothers sparing only one,
- Kalinga War - 261 B.C. - it is mentioned in Major Edict XIII.

- After the Kalinga war, Ashoka embraced Buddhism under influence of monk Upagupta. He came to be known as
- Bhabru inscription - Ashoka is revealed as king of Magadha
- Third Buddhist Council - 250 B.C. - was convened by Ashoka under the presidentship of Tissa in Patliputra.

SUNGA Dynasty

- Pushyamitra Sunga was the Commander-in-Chief of Mauryan armed forces.
- He overthrew the last Mauryan ruler. It led to the persecution of Buddhists and resurgence of Hinduism.
- Two Ashwamedha Yagyas were held under his reign with Patanjali as the main priest - Ayodhya Inscription of Dhandev
- Agnimitra, son of Pushyamitra was the hero of Kalidasa's drama,

GUPTA Empire

- The most striking difference in the administration of Guptas from Mauryas was that in Mauryas power was centralized while in Guptas power was decentralized.
- Empire was divided into provinces and each province was further divided into districts. Villages were the smallest units.
- Sri Gupta was the founder of the Gupta dynasty.
- Rule of the Guptas is known as Indian Golden Age as rapid strides were made in various fields.
- Aryabhatta stated that earth moved around the sun and rotates on its own axis. His most famous work is
- Varahamihira composed Pancha Siddhanta and Brihat Samhita.
- Kalidasa wrote famous dramas like Malvikagnimitram, Abhigyanashakuntalam and Kumarasambhava
- Mrichakatika by Sudraka, Panchatantra by Vishnu Sharma and Kamasutra by Vatsyasana were also written in this period.

Chandragupta I

- He was the son of Ghatotkacha (son of Sri Gupta).
- He was the first king to use the title Maharajadhiraja.
- His empire included Bengal, Bihar and Uttar Pradesh
- He married Licchavi princess, Kumaradevi. Gold coins were issued to commemorate this event.

Samudragupta

- Prayag inscription by Harisen was dedicated to him. It was discovered by A Tryer. It is written in the Sanskrit language.
- He was called Napoleon of India for his conquests by Vincent Smith.
- He gave permission to Sri Lankan ruler Meghavarnan to construct a monastery at Bodh Gaya.
- He was also known as Kaviraj for his patronizing of art.

Chandragupta II - Vikramaditya

- He killed his brother and married his widow
- He used friendly relations and matrimonial alliances to extend his empire.
- Navaratna present in his court were:

1. Kalidas	2. Shanku	3. Amarasimha
4. Vetalbhatta	5. Vararuchi	6. Panaka
7. Varahamira	8. Dhanwantari	9. Ghatakarpara

- Fa-Hien, a Chinese traveller visited during his reign.

Kumaragupta

- He established the Nalanda University which became a centre of learning.
- He was also known as Mahendraditya.

Skandagupta

- Junagarh Inscription - his governor got restoration of Sudarshana Lake. It was originally constructed by the Mauryas.
- He was the last of the great rulers and after him, the empire began to disintegrate.
- Vishnugupta was the last ruler of the dynasty.

PALA Empire

- They were the followers of Mahayana and tantric school of Buddhism.
- Gopala was the first ruler of the dynasty. He was elected democratically.

- Odantipur (now in Bihar Sharif), a Buddhist Mahavihara was established by Gopala.
- Dharmapala captured Kannauj and took the title of *Uttarapathasvamin* ("Lord of the North").
- Vikramashila University (in Bhagalpur) was established by Dharmapala.
- They also constructed many temples, most important being Sun Temple at Konark.

MEDIEVAL HISTORY OF BIHAR

Bakhtiyar Khilji

- He was one of the generals of Qutubuddin Aibak.
- He destroyed many monasteries and viharas.
- He also established the town Bakhtiyarpur.
- He died in Bihar only. His mausoleum is also built-in Bihar Sharif.
- During the rule of Slave dynasty, most parts of Bihar were under the control of Turks. So there was continuous fighting to gain control.
- Lakhnauti and Tirhut rulers provided major resistance.
- Noohani Dynasty emerged as an important dynasty in Bihar during the rule of Tughlaqs.
- Fulchand, a ruler of Cher Dynasty started the Jagdishpur fair.

SUR dynasty

- It was the most important dynasty of Bihar in the medieval period.
- Bihar saw a period of glory during the rule of Sher Shah Suri.
- The tomb of Sher Shah is built-in Sasaram.
- Battle of Chausa, 1539 A.D. - Sher Shah defeated Humayun and took the title of Sultan-e-Adil.
- He had a very efficient administration.
- His revenue model was later adopted by Akbar.
- He also constructed the present Grand Trunk road.
- Later Akbar annexed Bihar and Bengal and added to his empire.
- Munim Khan was made Governor of Bihar.
- Farrukhsiyar was the first Mughal ruler to be sworn in Patna.
- With the decline of Mughals, Bihar passed into the control of the Nawabs of Bengal.
- After the Battle of Buxar, Bihar passed into the effective control of the British.

Note: Patna was rebuilt and named as Azimabad by subedar Azim-ush-shan who was the grandson of the Mughal Emperor Aurangzeb Azim.

MODERN HISTORY OF BIHAR

The arrival of Europeans:

1. Portuguese - traded in spices for textiles especially cotton
2. British - factory at Alamganj in Patna in 1620 for saltpetre, presently the East India Company factory at Gulzar Bagh is turned into govt. printing press.
3. Dutch - interested in cotton textiles, saltpetre and food grains.
4. Danes - established the factory at Nepali Kothi in Patna.

Battle of Buxar - 22nd October 1764:

- British won the Battle led by Hector Munro against the combined army of Mughals under Shah Alam II; Mir Qasim, the Nawab of Bengal and Shuja-Ud-Daulah, the Nawab of Awadh.
- Two separate Treaties were signed at Allahabad
    - With the Mughals on 12th August 1765
    - With the Nawab of Awadh on 16th August 1765.
- Mughals and the Nawab of Bengal lost the effective control of the province of Bengal constituting present-day West Bengal, Odisha, Bihar, Jharkhand, and Bangladesh.
- The Company got Diwani Rights of these provinces i.e. collection of revenues.
- Nawab of Awadh paid huge reparations and also ceded some of his territories.

Bihar and Bengal Famine 1770 and 1783:

- In 1783 when famine stuck again, the then Governor-General Warren Hastings ordered for the massive dome-shaped granary of Golghar.
- Golghar was built by Captain John Garstin in 1786.

Permanent Settlement of Zamindari System:

- It was introduced in Bengal, Orissa, and districts of Benaras and northern districts of Madras by Lord Cornwallis.
- Its architect was John Shore.
- It declared Zamindars as owners of the land.

- Zamindars could keep 1/11th of the revenue collected and give 10/11th to the British. They were free to fix the rents and exploited the tenants.
- The rise of absentee landlords and moneylenders.
- Later the Bengal Tenancy Act was passed in 1885 to define rights of the tenants.

Revolt of 1857 in Bihar:

- Governor-General - Lord Canning
- Started on 12th June 1857 in Deoghar district (now in Jharkhand) at the headquarters of 32nd Infantry Regiment.
- On 3rd July 1857, the revolt started in Patna under bookseller Pir Ali.
- On 25th July 1857, the revolt started in Darbhanga which marked the beginning of the widespread revolt in Bihar.
- Notable figure: Babu Kuwar Singh of Jagdishpur (currently in Bhojpur district) occupied Arrah and he also defeated the British with Nana Saheb at Azamgarh (UP).

Administration of Bihar by the Company:

- East India Company created a post of Deputy Governor to administer Bihar. Raja Ram Narayan and Shitab Roy were important Deputy Governors after Battle of Buxar.
- Revenue Council of Patna was constituted in 1770 later replaced by Revenue Chief of Bihar in 1781.
- When Delhi became the capital in 1911, province of Bihar and Orissa was carved out from Bengal making Patna its capital.
    - 22nd March 1912 Bihar was constituted.
- Educational institutions by British:
    - Patna College
    - Patna Science College
    - Bihar College of Engineering
    - Prince of Wales Medical College
    - Patna Veterinary College
- of India Act 1935 divided Bihar into two separate provinces of Bihar and Orissa

Home Rule League in Bihar:

- Established in Bankipore (Patna) on 16th December 1916
- President - Mazhar-ul-Haque
- Vice-Presidents - Sarfaraz Hussain Khan and Purnendu Narain Sinha
- Secretaries - Chandravanshi Sahay and Baijnath Narain Singh

Revolutionary Activities:

- Sachindranath Sanyal - established the branch of Anushilan Samiti in Patna in 1913
- Bankimchandra Mitra of B.N. College - managed Anushilan Samiti, formed Hindu Boys Association for teaching Vivekananda's ideas.
- Benaras Conspiracy Case 1915 - Sachindranath Sanyal and Bankimchandra Mitra
- Patna Yuvak Sangh formed in 1927
- Bihar Yuvak Sangh 1928 in Motihari - Gyan Shah
- Patliputta Yuvak Sangh 1929 - formed in Patna by Rambriksha Benipuri and Ambika Kant Singh
- Monthly Magazine YUVAK was started in Patna.
- Female revolutionaries - Kusum Kumari Devi and Gauri Das
- Limitations - religious overemphasis kept Muslims aloof, limited upper-caste involvement and lack of mass involvement made it a subject of govt. suppression

Champaran Satyagraha:

- Raj Kumar Shukla invited Mahatma Gandhi to look into Indigo Planters problem.
- Gandhi's his first Satyagraha in 1917. Other leaders Rajendra Prasad, Anugrah Narayan Singh, Mazhar-ul-Haque, Mahadeo Desai, Narhari Parikh and J B Kriplani.
- European planters were forcing farmers to plant indigo on 3/20th of their lands called Tinkathiya system.
- It forced the British to appoint a committee to make the inquiry. Gandhi was also a member. He convinced the committee to abolish Tinkathiya system and pay the peasants 25% compensation.

Role of Bihar in the freedom movement:

- MOTHERLAND newspaper was started in September 1921 by Mazhar-ul-Haque to propagate Hindu-Muslim unity.
- Non-Cooperation Movement - Gandhiji led picketing of liquor shops in December 1920

    - J P Narayan left Patna College before his examination to participate in the movement.
- All India Congress Session December 1922, Gaya presided by Chittaranjan Das. It saw two factions of the Congress clashonentry to Legislative Council.
    - Pro-changers - C R Das, Motilal Nehru, Vitthalbhai Patel, and Ajmal Khan
    - No-changers - Vallabhbhai Patel, C Rajagopalachari and M A Ansari
    - Pro-changers formed Swaraj Dal with Narayan Prasad as Chairman and Abdul Bari as Secretary
    - A branch of Swaraj Dal was formed in Bihar in 1923 under Srikrishna Singh. However, it was not very effective in Bihar
- The boycott of the Simon Commission was led by Anugrah Narayan Sinha
- Chhapra Jail Strike - as a protest against lathi charge on Rajendra Prasad and Abdul Bari.
- Civil Disobedience movement - Peasants also refused to pay chaukidari tax.
    - Swadeshi Committee was set up in Patna for organizing events.
    - Sacchidanand Sinha, Hasan Imam, Chandravati Devi, Ramsunder Singh
    - Bihpur Satyagraha was carried out around the same time.
- Bihar Socialist Party formed by Ganga Sharan Sinha, Rambriksha Benipuri and Ramanand Mishra in 1931
- Bihar Congress Socialist Party formed in 1934 with J P Narayan as General Secretary and Acharya Narayan Dev as President
- General Elections, 1937 after the GoI act 1935 provided for some provincial autonomy, Congress got the majority in both Legislative Assembly and Legislative Council but refused to form the government.
    - Later Mohammad Yunus became first Prime Minister of Bihar of minority govt.
    - 3 months later on 20 July 1937, Sri Krishna Singh became the premier and formed the cabinet.
    - Ramdayalu Singh as first Speaker of Legislative Council
    - Abdul Bari as first deputy Speaker of Legislative Council.
    - Bihar Tenancy Amendment Act removed problems of Kashtkari Bandobast
- Sheel Bhadra Yajee joined Subhash Chandra Bose to found All India Forward Bloc and was also associated with the
- Quit India Movement - National Flag was unfurled at the Legislative Assembly

Peasant Movement:

- Kisan Sabha organized by MohammadZubair and SrikrishnaSingh in 1922
- Bihar Provincial Kisan Sabha was formed by Swami Sahajanand Saraswati in 1929 against Zamindari attacks.
- Zamindars also formed the United Political Party to suppress peasants
- Bihar Kisan Sabha was formed in 1933
- In 1936, when All India Kisan Sabha was formed at Lucknow, Swami Sahajanand Saraswati was its President.
- Peasant movement was an important side effect of the independence movement aimed at overthrowing the feudal zamindari system. It was led by Swami Sahajanand Saraswati
- HUNKAR - Hindi weekly of the peasant movement in Bihar by Pandit Yamuna Karjee and Rahul Sanskrityayan in 1940

TRIBAL MOVEMENT:

REVOLT	LEADERS	PERIOD	REGION
Ho and Munda	Raja Parhat	The 1820s	Chhotanagpur
Kol	Budhu Bhagat	1831	Chhotanagpur
Bhumij	Ganga Narayan	1832	Singbhum and Birbhum
Santhal	Sidhu and Kanhu	1855	Rajmahal Hills
Munda	Birsa Munda	1899	Chhotanagpur
Tana Bhagat	Jatra Bhagat	1914	Chhotanagpur

- Revolts were mainly against British annexation of land or their revenue policy or occupation by outsiders or for forest rights.

They were localized, unorganized and very violent.

- Santhal Pargana was created by the British to pacify the Santhal uprising. Kanhu was arrested in 1866.
- Munda Revolt - Forest Regulation Act 1865 empowered the British govt. to declare any forest land as Government Forest and make rules for it. Under Birsa Munda, it was a socio-religious movement (Ulgulan) with agrarian and political content. Birsa was captured on 3rd March 1900.
- Tana Bhagat Movement - mainly a religious movement with the adoption of Hindu practices.

Post-Independence history:

- First President of India Dr Rajendra Prasad was from Bihar
- First Governor of Bihar - Jairamdas Daulatram
- First Chief Minister of Bihar - Dr Krishna Singh
- On 15 November 2000, the modern state of Jharkhand was carved out from southern Bihar.

GEOGRAPHY OF BIHAR

- Longitudinal extent - 83°19' E to 88°7' E
- Latitudinal extent - 24°20' N to 27°3' N
- Distance from east to west - 483 km
- Distance from north to south - 345 km
- Bihar has boundaries with the states of UP, Jharkhand and West Bengal. It also borders Nepal in the north.
- Length of Nepal border - 601 km
- 7 Districts that border Nepal in the west to east direction - West Champaran, East Champaran, Sitamarhi, Madhubani, Supaul, Araria, and Kishanganj
- 8 Districts that border UP in north to south direction - West Champaran, Gopalganj, Siwan, Saran, Bhojpur, Buxar, Kaimur, and Rohtas
- 8 Districts that border Jharkhand in the west to east direction - Rohtas, Aurangabad, Gaya, Nawada, Jamui, Banka, Bhagalpur, and Katihar
- 3 Districts that border WB in the north to south direction - Kishanganj, Purnia, and Katihar
- Ganga, Ghaghara and Gandak form boundary with UP in some parts
- Sone river forms a boundary with Jharkhand in Rohtas district

Geological Structure of Bihar

- Younger rocks to the north, older rocks to the south
- North-west is Terai, Central is Gangetic plain and south is a plateau region
- Bihar plain is the youngest to be formed
- **Dharwar** rocks - South-eastern Bihar - Jamui, Nawada, Munger districts
- **Vindhyan** rocks - South-western Bihar - Kaimur, Rohtas districts
- **Plateau** region - extends as a narrow belt from Kaimur district to Banka district

Climate of Bihar

- Continental Monsoon type climate
- The northern part is cooler compared to the southern part
- Eastern part receives 200 cm of rainfall while the western part receives 100 cm.
- April month has the lowest humidity
- The temperature of the eastern part is reduced due to the impact of the Nor'wester showers.
- **Nor'wester** - tropical cyclonic thunderstorm, extremely helpful for pre-Kharif crops
- Gaya is hottest in May while coldest in January.

Soils of Bihar

- **Piedmont Swamp Soil** - West-Champaran, supports rice, rich in organic matter
- **Terai Soil** - found in the Northern belt bordering Nepal, Champaran to Kishanganj, sugarcane, jute
- **Bhangar** - older alluvial soil -loamy, sticky, rich in lime, good for paddy and sugarcane, Patna and Gaya
- **Khadar** - younger alluvial soil - rich in nitrogen, good for paddy and wheat, Purina, Saharsa, Darbhanga
- **Karail-Kewal** soil - heavy clay, alkaline, from Rohtas to Bhagalpur, brown to yellow
- Tal soil - poor drainage, grey, high yield, from Buxar to Banka
- **Balthar soil** - the presence of iron, red and yellow, less fertile, in the transitional zone between Chhotanagpur plateau and Ganga plain, Kaimur to Rajmahal hills

- **Bal Sundari** - alkaline, Saharsa and Champaran, maize and tobacco

Ganga

- Enters at **Chausa** forming boundary of Bhojpur and Saran
- Northern tributaries - **Ghaghra** in Saran, **Gandak** at Sonepur, **Bagmati** at Munger, **Kosi** at Kursela, **Kali-Kosi** at Manihari
- Southern tributaries - Sone at Maner, Karmanasa at Chausa, Punpun at Fathua
- It has the largest catchment area in Bihar
- **Mahatma Gandhi Setu** - connects Patna in the south to Hajipur in north

Ghaghra / Saryu

- Originates at **Nampa** in Nepal
- Enters Bihar at **Gopalganj**
- Joins Ganga at **Chhapra**

Gandak

- Originates at **Tibet**
- Enters India near **Triveni** in Nepal,
- Forms boundary of Bihar and UP
- Enters Bihar at **West Champaran**
- Joins Ganga at **Sonepur**
- **Triveni Canal** gets water from this river

Burhi Gandak

- Originates at **Someshwar hills** in Chautarwa Chaur of **West Champaran**
- Flows parallel to river Gandak
- Joins Ganga at **Khagaria**

Kosi

- Notoriously known as **Sorrow of Bihar** for its changing of course
- It is made up of seven channels from Nepal known as Sapt Kosi
- Enters Bihar through **Supaul**
- Joins Ganga at **Kursela in Katihar**

Bagmati

- Originates in **Shivpuri range** in Nepal
- Enters Bihar in **Sitamarhi**
- Joins Kosi at **Badlaghat**

Kamla

- Originates in **Mahabharat Range** in Nepal near **Sindhuliagarhi**
- Enters Bihar in **Madhubani**
- **Kamla Barrage** has been constructed
- Joins river Bagmati at **Badlaghat**

Mahananda

- Originates in **Sikkim**
- Enters Bihar in **Kishanganj**
- Joins Ganga at **Nawabganj in Bangladesh**
- In upper course forms an important linguistic boundary between Hindi and Bengali speaking area.

Sone

- Originates in **Amarkantak range in MP**
- Joins Ganga near Maner
- Important tributaries are Rihand and North Koel

Punpun

- Originates in the Hazaribagh plateau
- Joins Ganga near Fatuha
- Causes heavy flood damage to the east of Patna city

Phalgu

- It is also known as **Niranjana**
- It is considered a sacred river and flows past **Gaya**

Waterfalls in Bihar

- **Kakolat waterfall** - in Nawada near Jharkhand border, fall of 160 ft
- **Karkat waterfall** - in the Kaimur hills near the Kaimur Wildlife Sanctuary
- **Manjhar Kund and Dhua Kund** - in Sasaram, utilized for power generation

Hot Springs

- Most of the Hot Springs are concentrated in Rajgir and Munger.
- **Rajgir** - Saptdhara, Surya Kund, Makhdum Kund, Brahma Kund
- **Munger** - Lakshman Kund, Rameshwar Kund, Gaumukh Kund, Sita Kund, Rishi Kund

Flora and Fauna

- Total forest area - 7299 sq. km, 7.75% of total area (1.04% of India's forest) (IFR2017)
- Maximum forest area - Kaimur district
- Minimum forest area - Sheikhpura
- The total area under very dense forest is in West Champaran
- The moist deciduous forest is found in Kishanganj, West Champaran, Kaimur, Gaya etc.
- Dry Deciduous - most abundant in Bihar, Kaimur, Purnia, Raxaul etc.
- **Valmiki National Park** -located in West Champaran, established on **2nd August 1989**

- **Valmiki Tiger Reserve** consists of Valmiki National Park and Valmiki Wildlife Sanctuary
- **Bhimbandh Wildlife Sanctuary** - Munger, south of Ganga, has several hot springs like Sita Kund and Rishi Kund, more famous for birds than land animals, established on **25 June 1976**
- **Kaimur Wildlife Sanctuary** - Kaimur, Bengal Tigers are also found here, several waterfalls like Karkat and Telhar waterfall, the famous lake is **Anupam Lake,** established on **25 July 1979**
- **Gautam Buddha Wildlife Sanctuary** - located in Gaya and Hazaribagh (Jharkhand), previously it was private hunting reserve, established on **14 September 1971**
- **Vikramshila Gangetic Dolphin Sanctuary** - Bhagalpur stretching from Sultanganj to Kahalgaon, only protected area for Gangetic Dolphins, established on **28 August 1990**
- **Sanjay Gandhi Jaivik Udyan** - located in **Patna,** biological park combining a botanical garden with the zoo, established on **8th March 1983**

Miscellaneous

- Total area - **94,163 sq. km** (13th in India)
- Population - **10,40,99,452** (3rd in India)
- Decadal Growth Rate - 25.4%
- Population Density - 1106
- Sex Ratio - 918
- Child Sex Ratio - 935
- Literacy Rate - 61.8%
- Most Populated -Patna
- Least populated - Sheikhpura
- Most Dense - Sheohar (1880)
- Least Dense - Kaimur (488)
- Largest district Area Wise - West Champaran
- Smallest district Area Wise- Sheohar

TOURISM SECTOR

Tourism has been boosted by the establishment of Bihar State Tourism Development Corporation.

- Its main aim is to commercialize all the tourist resources of Bihar.
- Tourist Information Centers, Hospitality services, Heritage Hotels, Wildlife Sanctuary, and National Parks etc. have been developed.

Buddhist Tourism

- Kesaria Stupa is the highest stupa in India measured from the base in East Champaran.
- Vaishali
  - Buddha delivered his last sermon here.
  - 2nd Buddhist Council was convened by King Kalashoka
- Patna
  - Its ancient name is Patliputra.
  - It was the capital of many famous ruling dynasties like Mauryas and Guptas
  - 3rd Buddhist Council was convened by King Ashoka in 250 B.C.
  - Ajatshatru had built up the fort in Patliputra
  - Udayin had set up Patliputra town.
- Bodh Gaya
  - It is the most important Buddhist pilgrimage site
  - It was earlier known as Uruvela
  - On the banks of river Niranjana, Buddha attained his enlightenment and the tree that sheltered him is known as Bodhi Tree
  - Mahabodhi Temple was designated as UNESCO World Heritage Site
  - Buddha statue - a huge Buddha Statue in sitting posture

Jain Tourism

- Vaishali - It is the birthplace of Lord Mahavir Jain
- Pawapuri
  - Lord Mahavira breathed his last here.
  - Jal Mandir - spectacular marble temple in the middle of a lotus pond stands marvelously on a rectangular platform
  - Samosharan Temple - Lord Mahavira delivered his last teaching here

Sikh Tourism

- Patna
  - 10th Sikh Guru Gobind Singh was born here.
  - Sri Harmandir Sahib Takht Gurudwara is located here.

Hindu Religious Sites

- Ahirauli (Buxar)

    - A temple of Devi Ahalya, the wife of Rishi Gautam
    - She was transformed into stone by the curse of her husband and was redeemed only when lord Rama visited the place.
- Singheshwar Sthan in Madhepura is considered the abode of Lord Shiva.
- Sitamarhi
    - Janki Temple is situated here.
    - It is considered as the birthplace of SITA.
- Sita Kund in Munger - after proving her chastity, Sita bathed in the pool which absorbed her heat

Sufi Tourism

- Phulwari Sharif
    - Khankah Muzibia was founded by Hazrat Pir Muzibullah Quadri
    - Sacred hair of beard of Paigamber Hazrat Mohammad is preserved here.
    - A mela is held here every year.
    - Sangi Masjid located here constructed by Humayun
- Bihar Sharif
    - Choti Dargah of Hazrat Makhdum Saiyad Shah Ahmed Charampose
    - Around the tomb of Saint Ibrahim Bayu, 10 smaller tombs are also built.
- Maner Sharif
    - It was also an important center of learning
    - Tomb of Makhdum Daulat and Yahiya Maneri is located here
    - The ceilings have carved inscriptions from Koran

Ecological Sites

- Kakolat Waterfalls - in Nawada district near Jharkhand border which has a fall of 160 ft.
- Kaimur Wildlife Sanctuary - Kaimur, Bengal Tigers are also found here. Other important sites in it are:
    - Karkat waterfall
    - Telhar waterfall
    - Anupam Lake
- Bhimbandh Wildlife Sanctuary - Munger, located south of Ganga. It has several hot springs like Sita Kund and Rishi Kund. It is more famous for birds than land animals.
- Vikramshila Gangetic Dolphin Sanctuary in Bhagalpur, stretching from Sultanganj to Kahalgaon. It is the only protected area for Gangetic Dolphins.

Secular Sites

- Khudabaksh Library, one of the largest libraries of Asia, is located in Central Patna
- Didarganj Yakshini is the most treasured possession of the Patna Museum
- Rajgir - was the ancient capital of the Magadha Empire
- Nalanda hosts the famous ancient University
- Golghar in Patna was built by Captain John Garstin under the order of Lord Warren Hastings.
- Qila-i-Rohtas in Rohtas district built by Sher Shah Suri in 1541
- Eighty Pillared Hall of Magadhan empire in Kumhrar (Patna)
- Mauryan pillars at Lauriya Nandangarh, Rampurva, and Lauriya Areraj

MINERALS AND ENERGY RESOURCES

Minerals

- South Bihar has a greater concentration of minerals than North Bihar
- Prior to the bifurcation, Bihar was one of the leading producers of minerals.
- **Manganese**
    - India is the 5th largest producer and has the 2nd largest reserves in the world.
    - It is used in the Iron and Steel industry for making the alloy.
    - In Bihar, it is found in Patna, Munger and Gaya.
- **Mica**
    - 3 varieties of mica are found in India - Muscovite, Phlogopite, and Biotite.
    - Mica that is found in Bihar and Jharkhand is Muscovite.
    - For its insulating property, it is used abundantly in the electronics industry.
    - Prior to the bifurcation, Bihar was a leader in mica production.
    - It is found in South-east Bihar in the districts of Nawada, Jamui, Banka, Bhagalpur, and Munger.

- In Jharkhand, it is found in Hazaribagh, Koderma, and Giridih.

- **Pyrite**
  - It is the sulfide of iron, chiefly used for making Sulphuric acid.
  - Industries like fertiliser, petroleum, steel etc. use Sulphuric acid.
  - Mainly found in the Sone valley and Vidhyan belt in Rohtas district.
  - Amjhor (Rohtas) has an iron pyrite industry.
- **Limestone**
  - It chiefly consists of Calcium Carbonate.
  - Limestone deposits are of sedimentary origin.
  - Good quality limestone is used in cement industry while low quality is used in iron and building construction industry.
  - In Rohtas and Kaimur, good quality limestones are found.
- **Asbestos**
  - It is fibrous in nature.
  - It can be used in fireproof safes, insulators, insulating mats etc.
  - Asbestos cement is used in making sheets, pipes, and tiles for building purposes.
  - In Bihar, it is mainly found in Munger.
- **Monazite** is found in Gaya and Munger.
- **Quartz**
  - It is found in Munger.
  - It is used in cement and power industries.
- **Uranium**
  - It is found in Gaya.
  - It is used in nuclear reactors.
- **Beryllium**
  - It is used as a moderator in the nuclear reactor.
  - It is found in Gaya district.
- **Bauxite**
  - It is an important ore of aluminium.
  - It is not a specific mineral but a rock consisting mainly of hydrated aluminium oxides.
  - It is found in Rohtas district.
- **Gold**
  - It is found in Munger district.
  - It is auriferous lodes and some of it is found in sands of rivers.
  - It is used for making ornaments and is also used as an international currency.
- **FELDSPAR**
  - It is found along with quartz in Pegmatite rocks.
  - It has applications in ceramic, glass and refractory industries.
  - Feldspar is found in Munger and Bhagalpur district.
- **LEAD**
  - This is obtained from a mineral named Galena.
  - Lead is used in many forms and is obtained from a few places in Bhagalpur

Availability of adequate, reliable, affordable and quality power is necessary for economic growth and to sustain that growth.

- It generates employment thus leading to the elimination of poverty and human development.
- The per capita power consumption of Bihar is 258 kWh much lower than India's 1122 kWh.
- But still, Bihar has faced the power deficit continuously.
- Bihar State Electricity Board was set up in April 1958 under the Electricity Supply Act.
  - It was mandated for the generation, transmission, and distribution in Bihar.
- Power generation in Bihar is primarily based on fossil fuels.
- But to promote renewable energy, Bihar Govt. has created an agency called Bihar Renewable Energy Development Agency (BREDA)
- **<u>Barauni Thermal Power Plant</u>**
  - The only power plant under state sector.
  - It is based on the oil refinery at Barauni.
  - It was established in 1970 with Russian help.
- **Kanti Bijli Utpadan Nigam Limited**

- It is a joint venture of NTPC and Bihar State Power Generation Company Limited.

- **Kosi Hydel Power Station**
  - Constructed on the river Kosi in Supaul
  - It was commissioned in 1970.
  - It was handed over to the Bihar govt. in 16th November 2003
- **New Projects - Thermal**
  - **Nabinagar Power Plant**
    - The project is located in Aurangabad.
    - It will be a coal-based plant.
  - **Pirpainti Power Plant**
    - The project will be constructed at Bhagalpur.
    - It will be constructed by NHPC.
  - **Kajara Power Plant**
    - The project will be constructed at Lakhisarai.
    - It will be constructed by NTPC.
  - **New Projects - Hydel**
    - Chausa Hydel Power Plant in Buxar
    - Mathauli Hydel Power Project in West Champaran
  - Ultra-Mega Power Power Project will be constructed in Banka.

AGRICULTURE

- Bihar is primarily an agricultural state where farming is subsistent in nature.
- Foodgrains are the main crops.
- Gopalganj and Madhepura have the highest net sown area.
- There are three cropping seasons in Bihar.
- Kharif Crops
  - They are also called Bhadai and Aghani crops.
  - They are sown in May-June and harvested in September-October.
  - Important crops - Maize, Paddy and Jute.
- Rabi Crops
  - They are sown in October-November and harvested in March-April.
  - Important crops - Wheat, Gram, Rapeseed and Mustard.
- Zaid Crops
  - They are produced between Rabi and Kharif crop seasons.
  - Important crops - Muskmelon, Watermelon, Gourd etc.
- RICE
  - Main cereal crop of Bihar
  - Two crops are grown - Aus (Summer Crop) and Aman (Winter Crop)
  - Maximum area - Madhubani, Aurangabad and Rohtas
  - Maximum production - Rohtas, Aurangabad and West Champaran
  - Maximum productivity - Arwal, Rohtas and Sheikhpura
- WHEAT
  - The best suited is sandy soil having the capacity to retain moisture.
  - Ganga Diara and Bagmati plains are most important.
  - Maximum area - Rohtas, East Champaran and Aurangabad
  - Maximum production - Rohtas, Kaimur and Siwan
  - Maximum productivity - Jahanabad, Patna and Gaya
- MAIZE
  - Light clay soil is best for maize e.g. Bal Sundari soil
  - Maximum area - Khagaria
  - Maximum production - Katihar, Madhepura and Khagaria
  - Maximum productivity - Katihar
- JUTE
  - Bihar ranks 2nd in jute production after West Bengal
  - It requires alluvial soil with a large amount of rainfall.
  - Major district for jute production - Kishanganj and Purnea
- PULSES
  - Arhar, gram, urad, masoor, moong and khesari are grown.
  - Maximum area - Patna, Aurangabad and Muzaffarpur
  - Maximum production - Patna, Aurangabad and Nalanda

- Maximum productivity - Kaimur
- Bihar is known for its Litchi and Mango production.
- Litchi of Muzaffarpur is famous all over India.

IRRIGATION

- The irrigation potential of Bihar is very high but utilization is very low.
- Proper irrigation helps in raising the agricultural production thus bettering the lives of people.
- Bihar also receives a fair amount of rainfall.
- There is a however uneven distribution of both irrigation facilities and rainfall across various districts.
- Share of irrigation by Canals is 37% and Tubewells is 30% while wells and ponds account for 30%.
- Almost 3/4th of the Canal irrigated area is in South Bihar.
- SONE CANAL
  - Eastern Sone Canal taken out from Barun - irrigates Patna, Jahanabad, Aurangabad and Gaya
  - Western Sone Canal has been taken out from Tihri - irrigate Ara, Buxar and Rohtas
- KOSI CANAL
  - Two canals took out from Hanuman Nagar reservoir
  - Eastern Kosi Canal - irrigates Purnia, Madhepura and Saharsa.
  - Western Kosi Canal - irrigates Darbhanga district.
- GANDAK CANAL
  - Two Canals took out from dam at Valmiki Nagar
  - Saran Canal - irrigates Saran, Gopalganj and Siwan
  - Tirhut Canal - irrigates Muzaffarpur, Vaishali and East Champaran
- TRIVENI CANAL
  - It is taken out from Gandak River at Triveni.
  - It irrigates West Champaran district.
- KAMLA CANAL
  - It is taken out from Kamla River in Darbhanga.
  - It irrigates mainly Madhubani district.

ROADWAYS

- Roadways are the most common means of transport used by people.
- Development of the people cannot be achieved without adequate roads.
- In terms of road length per lakh population, it is just over 200 km compared to the national average of 358 km.
- However in terms of road density of 210 km per 100 sq. km, Bihar is much ahead of other states except Kerala and West Bengal
- The total length of National Highways is 4595 km.
- Longest NH in Bihar is NH-31 of which 393 km is in Bihar.
- East-West Corridor
  - It connects Porbandar to Silchar.
  - It passes through 10 districts.
  - Kishanganj, Katihar, Purnia, Araria, Supaul, Madhepura, Darbhanga, Muzaffarpur, East Champaran and Gopalganj
  - It crosses the Gandak River in Bihar.
  - It consists of NH-27.
- Golden Quadrilateral
  - It passes through 4 districts.
  - Kaimur, Rohtas, Aurangabad and Gaya.
  - It crosses the Sone River in Bihar.
  - It consists of NH-2 which connects Delhi to Kolkata.
- Major NHs :
  - NH-19 - Chhapra to Patna
  - NH-57 - Muzaffarpur to Purnia
  - NH-82 - Gaya to Mokama
  - NH-85 - Chhapra to Gopalganj
  - NH-98 - Patna to Rajhara. AIIMS Patna is on this NH.
- Major Road Bridges :
  - Mahatma Gandhi Setu on Ganga river in Patna
  - Vikramshila Setu on Ganga river in Bhagalpur
- Major Rail-Road Bridges :
  - Rajendra Setu on Ganga river in Mokama
  - Nehru Setu on Sone river in Dehri-i-Koh

- Abdul Bari Bridge on Sone river connecting Koilwar and Bhojpur
- Ganga Rail-Road Bridge on Ganga river connecting Patna and Sonepur

RAILWAYS

- Railways started developing quite early in Bihar by the East India Company in 1860-62.
- Bihar has three railway lines
  - North-Eastern Railway - North Bihar
  - East Central Railway - South Bihar
  - North-East Frontier Railway - North-East Bihar
- Headquarters of the East Central Railway is located in Hajipur in Vaishali district of Bihar.

AIRWAYS

- There are two international airports in Bihar.
  - Jay Prakash Narayan International Airport, Patna
  - Gaya International Airport - It was mainly developed for Buddhist tourism in Gaya.

WATERWAYS

- Waterways are the cheapest means of transport.
- It is environment friendly and fuel-efficient.
- National Waterway-1 that connects Allahabad to Haldia passes through Bihar.
- Bihar Steamer Service is available at Bararighat in Bhagalpur
- Ara Canal is also used for navigation purposes.

INDUSTRIES

- Most of the industries are agro-based.
- First Sugar manufacturing company was set up by the Dutch in 1840.
- Bihar State Milk Cooperative Federation (COMFED)
  - It was established in 1983.
  - SUDHA brand is marketed by COMFED.
- The tea industry in Bihar is mostly concentrated in Kishanganj district.
- Bhagalpur region has great potential for Silk Industry.
- Jute Park is being set up at Maranga in Purnia district.
- The leather industry is concentrated in Muzaffarpur and Mokama. Due to only a few working industries, most of the raw material find a way to Kolkata, Kanpur and Chennai.
- Bihar Industrial Area Development Authority (BIADA)
  - It was constituted under B I A D Act 1974 to promote industrialization in Bihar.
  - It has 4 regional offices in Patna, Darbhanga, Muzaffarpur and Bhagalpur.
- Bharat Wagon and Engineering Company Limited
  - It is a PSU located in Mokama
  - It manufactures rail wagons.
- Barauni Refinery
  - It is located in Begusarai.
  - It was established in 1964 with the help of USSR.
  - It is owned by Indian Oil Corporation.
  - It receives oil from Numaligarh oilfield in Assam.
- Major Industrial locations in Bihar
  - Mokama - Leather, Rail Wagons
  - Digha - Leather, Beer
  - Bihta - Sugar
  - Patna - Cracker, Cotton Textile
  - Bhagalpur - Tussar Silk
  - Munger - Gun, Cigarette
  - Gaya - Sugar, Lac, Cotton Textile, Leather
  - Dumraon - Cotton Textile, Laltern
  - Bihar Sharif - Tobacco
  - Darbhanga - Paper
  - Samastipur - Paper mill, Sugar
  - Katihar - Jute, Matchstick
  - Dalmianagar - Cement
  - Hajipur - Plywood

VEGETATION IN BIHAR

Natural vegetation is the primaeval plant cover unaffected by man either directly or indirectly. Ecologically, a forest is a plant community, predominantly of trees and other woody vegetation, usually with a closed canopy.

RECORDED FOREST AREA

- Most of the forest and wildlife resources are owned by the Government of India and is managed through several departments like the Forest Department. According to India State of Forest Report, 2019, the **total**

Recorded Forest Area is 6,877.41 sq km, which is 7.30% of the total geographical area of the state.

PROTECTED FOREST

- Those forests where the **right to grazing and cultivation are allowed** subject to a few minor constraints are known as the protected forests. The protected forest area of Bihar is 6,183 sq km, i.e., **89.91% of recorded forest area.**

RESERVED FOREST

- Those forests which are **permanently earmarked either to the production of timber or other forest produce** in which right of grazing and cultivation is seldom allowed are known as reserved forests. The Reserved Forest Area of Bihar is 693 sq km, i.e., **10.08% of recorded forest area**.

UNCLASSED FOREST

- Those forests which largely consist of **inaccessible forests or unoccupied wastes** are known as Unclassed forests. The unclassed forest of Bihar is 1 sq km, i.e., **0.01% of recorded forest area**.

FOREST COVER

- According to India State of Forest Report, 2019, the **forest cover of the Bihar is 7,306 sq km**, of which
  - **Very Dense Forest: 333 sq km**,
  - **Moderately Dense Forest**: 3,280 sq km, and
  - **Open Forest**: 3,693 sq km.
- The forest cover of Bihar has **decreased by 3% compared to the 2011 report**. **Bihar's forest cover as a percent of the geographical area stood at 7.8 percent**, which is lesser than that of the national average of 21.7 percent.

TREE COVER

- Tree cover is defined as small tree patches and isolated trees outside the Recovered Forest Area, which are less than one hectare in extent.
- The tree cover of the state has been estimated using—tree Outside Forest (TOF) inventory data collected over a period of six years. The estimated tree cover in the state is 2,003 sq km.

Forest and Tree Cover

Category	**Area (in sq km)**
Tree Cover	2,003 (2.1)
Forest Cover	7,306 (7.8)
Total	9,309 (9.9)

CLASSIFICATION OF FORESTS

Depending on rainfall availability, forests are divided into three types:

1. **MOIST DECIDUOUS FOREST**
   - These forests are found in Kishanganj districts North-East area, Himalayas Terai belt, and Someshwar hills. Here, rainfall is more than 120 cm. Therefore, dense forests are found. Sal is the most abundant tree. They shed their leaves in the summer season. Semai, Champa, Ashok, Ken, Mango, and Jamun, Karanj arc other varieties found.
   - Sal mixed moist deciduous forests (Northern moist Sal bearing forest) are distributed mainly in West Champaran and partly in the valleys of Kaimur, Rohtas, Aurangabad, Gaya, Nalanda, Nawada, Jamui, Banka and Munger.
2. **DRY DECIDUOUS FORESTS**
   - These are the most abundant forest in Bihar. Dry deciduous forests are found in both the plains and the peninsular region in the Southern districts.
   - They are found in the regions with less than 120 cm of rainfall. Not very dense, they are small in height.
   - Amaltas, Shisam, Mahua, Khair, Palas, Amia, Harr, and Bahera are the main varieties. Sal mixed dry deciduous forests (Northern dry mixed deciduous forests) occupy major proportion under natural vegetation cover and predominantly found in Kaimur, Rohtas, Aurangabad, Gaya, Nalanda, Nawada, Jamui, Banka and Munger districts.
   - They are found in the Northern part of Chhotanagpur plateau and Kaimur hills. Besides this, they are also found

in Purnia, Arana, and Raxaul in North-East Bihar.

3. **TERM FORESTS**
    - They are found in adjacent areas of the Nepal border. In hilly areas with more than 160 cm of rainfall, moist deciduous forests are found. Dry Shiwalik Sal forests are mainly distributed in the Shiwalik range in the West Champaran district.
    - Canebreaks (tropical seasonal swamp forests) are predominantly found in the West Champaran district. Sal, Sheesham, Khair, Toon, and Semai are important varieties found here.

BIHAR FOREST POLICY

- Its objective is to increase the forest cover upto 33% of the total geographical area to meet the National Forest Policy target. The State Government has adopted a two-pronged approach which is as follows:
- **FORESTRY DEVELOPMENT**
    - The purpose under forestry development is to increase forest cover from 6,16,446 hectares to 31,03,011 hectares. It aims to increase forest cover on non-cultivable land. Around 1000 sq km of land has been selected for this purpose.
    - Fallow land, school, and college, private institutions have been selected under the afforestation programme.
- **REHABILITATION AND CONSERVATION**
    - In order to arrest the decline in bio-diversity, rehabilitation and conservation have been given due importance in State Forest Policy.
    - Important ways have been adopted, such as:
        - **REGENERATION OF DEGRADED FOREST AREA:** In areas where forest density has declined below 40%, non-governmental organizations, citizens, international institutes have been involved for forest regeneration. Forest protection and management committees have been created on the village level. For keeping public involvement intact, the proceeds from this forest are distributed.
        - **SOCIAL FORESTRY:** In degraded areas, reforestation by private and community participation is promoted.

GENERAL INFORMATION

Information	Data
Date of Formation	22nd March 1912
Capital of the state	Patna
Latitude of the State	24°20' N to 27°3' N
Longitude of the State	83°19' E to 88°17' E
Total Geographical Area of the State	94,163 sq km
High Court of the State	Patna
Language of the State	Hindi and Urdu
Length (North to South)	345 km
Length (East to West)	483 km
Height above Sea Level (Average)	173 ft
Annual Rainfall	1158 mm

Administration

Information	Data
Districts	38
Division	9
Sub-division	101
Blocks	534
Panchayats	8406
Zila Parishad	38
Lok Sabha Seats	40
Rajya Sabha Seats	16

Demography

Information	Data
Population	10,40,99,452
* Male	5,42,78,157
* Female	4,98,21,295
Sex Ratio	918

Sex Ratio (0-6 years)	935
SC Population	1,65,67,325
* Male	86,06,253
* Female	79,61,072
SC Population (%)	15.9
ST Population	13,36,573
* Male	6,82,516
* Female	6,54,057

ST Population (%)	1.3
Total Literacy Population	5,25,04,553
* Male	3,16,08,023
* Female	2,08,96,530
Literacy rate (%)	61.8
Male Literacy Rate (%)	71.2
Female Literacy Rate (%)	51.5

INDUSTRIES IN BIHAR

Important Industries of Bihar and their Location

Industry	Location
Sugar	Motihari, Bihta, Gaya Narkatiyaganj, Gopalganj, Hatwa, Motipur, Saran, Bhojpur, Siwan, Darbhanga, Muzaffarpur, Dalmianagar, Meerganj
Cotton textile	Gaya, Phulwari Sharif, Dumraon, Mokama, patna, Barauni, Dalminangar
Cement	Banjari Dalmianagar
Paper	Samastipur, Darbhanga, Patna, Barauni, Dalminanagar
Plywood	Hajipur
Jute	Katihar, Samastipur, Champaran, Darbhanga, Saharsa, Purnia
Match Industry	Katihar
Blanket Industry	Gaya, Purnia, Aurangabad, Motihari
Handicraft	Madhubani, Bhagalpur, Bihar Sharif, Gaya, Patna, Munger
Utensils	Siwan, Bihta

Industrial Towns of Bihar

Town	Industries	Town	Industries
Mokama	Shoe Factory, the wagon of a goods train	Hathwa	Vanaspati
Digha	Leather and beer industry	Kanti	Thermal power
Bihta	Sugar industry	Narayanpur	Medicine
Patna	Cracker, vermillion	Riga	Sugar
Bhagalpur	Tusar silk, handicraft	Bagaha	Paper
Munger	Gun, cigarette	Mehsi	Button
Bihar Sharif	Tobacco	Darbhanga	Paper
Dumraon	Cotton textile, laltern	Lohat	Sugar
Gaya	Sugar, lac, cotton textile, leather	Samastipur	Paper Mill, Sugar
Obra	Carpet, Woollen cloth	Katihar	Jute
Tandwa	Blanket	Jamalpur	Rail engine repair

LIST OF NATIONAL PARKS AND WILDLIFE SANCTUARIES IN BIHAR

National Park/Sanctuary	District	Year of Notification	Area (in sq km)
Valmiki National Park	West Champaran	1989	335.6
Valmiki Vanya Prani Sanctuary	West Champaran	1976	880.78
Bhimbandh Sanctuary	Munger	1976	681.99
Pant Vanya Prani Sanctuary	Nalanda	1978	36.84
Kaimur Sanctuary	Rohtas	1979	1342
Gautam Buddha Bird Sanctuary	Gaya	1971	259.5
Udaypur Vanya Prani Sanctuary	West Champaran	1978	8.87
Nagi Dam Bird Sanctuary	Jamui	1987	7.91
Nakti Dam Bird Sanctuary	Jamui	1987	3.32
Vikramshila Gangetic Dolphin Sanctuary	Bhagalpur	1990	50 km
Kanwar Jheel Bird Sanctuary	Begusarai	1989	63.11
Baralia Jheel Salim Ali Jubba Sahni Bird Sanctuary	Vaishali	1997	1.96
Kusheshwar Asthan Bird Sanctuary	Darbhanga	1994	29.17

FIRST IN BIHAR: PERSONALITIES, EVENTS, STRUCTURE AND STATE SYMBOLS

Personalities	Name
First Governor during British India	James David Sifton
First Governor	Jairamdas Daulatram
First Muslim Governor	Zakir Hussain
First Chief Minister	Dr Krishna Singh
First Female Chief Minister	Rabri Devi
First Harijan Chief Minister	Bhola Paswan Shastri
First Muslim Chief Minister	Abdul Ghafur
First Education Minister	Sir Ganesh Dutt
First Speaker of Legislative Assembly	Ramdayalu Singh
First Open University	Nalanda Open University
First Poet	Vidhyapathi
First Non-Congress Chief Minister	Mahamaya Prasad Sinha

First Democratic election of Bihar	held in March 1937. **Mohammad Yunus** formed the Govt and became first Premier (April- July 1937) of Bihar province.
First Chief Justice of Patna High Court before Independence	Sir Justice Edward Maynard Des Champs Chamier
First Indian Chief Justice of Patna High Court after independence	Pandit Lakshmi Kant Jha
First Female Chief Justice of Patna High Court after Independence	Justice Rekha Doshit
First Gyanpeeth Award Winner	Ramdhari Singh Dinkar
First Hindi Newspaper	Sarvhitaishi
First English Newspaper	Searchlight
First Bhojpuri Film	Hey Ganga Maiya Tohe Piyari Chadhayibo (1963)
First Maithili Film	Kanyadaan (1965)
First Hindi Film	Kal Hamara Hai
First Magadhi film	Bhaiyaa, (1961)
First Doordarshan Centre	Muzzafarpur
First International Cricket Stadium in Bihar	Moin-ul-Haq Stadium (Previously Known as Rajendra Nagar Stadium)
First Tiger Reserve	Valmiki National Park, a tiger reserve and Wildlife Sanctuary (Located in Champaran District)
The First Republic of the World	Vaishali (Bihar)
First ancient University of Bihar	Nalanda University
The First University of Bihar during British Raj	Patna University
First European to enter in Bihar	Portuguese

State Symbols:

State Tree: Peepal

Peepal is the state tree of Bihar. The scientific name of the Peepal tree is Ficus religiosa or sacred. It is found in the sub-continent of India. Peepal tree is considered sacred by the followers of Hinduism, Jainism and Buddhism. Gautam Buddha attained enlightenment (bodhi) while meditating underneath a Ficus religiosa. The site is in present-day Bodh Gaya in Bihar, India.

State Flower: Marigold

Marigold the state flower of Bihar. The scientific name of Marigold is Tagetes erecta, Blooms naturally occur in golden, orange, yellow. Marigold is extensively used flower in the state.

State Bird: Home Sparrow

Home Sparrow is the state bird of Bihar. The scientific name of House Sparrow is Passer domestics. Generally, sparrows are small, plump, brown-grey birds with short tails. Many species nest on buildings, trees and the house. Sparrows are among the most familiar of all wild birds. They are primarily seed-eaters, though they also consume small insects.

State Animal: OX

State Animal of Bihar is Ox also known as a bullock. Mainly, used for ploughing, for transport (pulling carts, hauling wagons and even riding), for threshing grain carts, hauling wagons and even riding), for threshing grain by trampling and for powering machines that grind grain or supply irrigation among other purposes.

State Fish: Mangur

IMPORTANT TRIBAL REVOLTS IN BIHAR: NAME; PEOPLE ASSOCIATED; YEAR; NATURE/OBJECTIVE

Name of the Revolt	People Associated	Year	Nature and Objective
Ho and Munda	Raja Parhat	1820, 1827, 1899, 1900, 1860-1920	Against Britishers new land revenue policy
Kol	Budhu Bhagat	1831-32	Against transfer of land to outsiders
Bhumij	Ganga Narayan	1832-33	Against land revenue policy of Britishers
Santhal	Sidhu-Kanhu	1855-56	Against moneylenders, contractors etc.
Sapha Hor Revolt	Baba Bhagirath Manjhi, Lal Hembram & Paica Murmu	**1870**	Against restriction on religious sentiment
Munda	Birsa Munda	1899-1900	Against alienation of tribal land
Tana Bhagat	Jatra Bhagat	1914	Against landlord and contractors

BIHAR BUDGET 2020-21: HIGHLIGHTS

- The Finance Minister, Mr. Sushil Kumar Modi, presented the Budget for Bihar for the financial year 2020-21 on February 25, 2020.
- Sushil Modi has presented the budget of Bihar 11 times as a Finance Minister.

Constitutional Provision of Budget for State and Key terms Used in Budget

- As per Article 202 of the Constitution of India the Governor of a State shall, cause to be laid before the House or Houses of the Legislature of the State a Statement of the estimated receipts and expenditure of the State for a financial year.
- This estimated statement of receipt and expenditure for a financial year named in the Constitution as the "**Annual Financial Statement**" is commonly known as "Budget".

Revenue – Receipt & Expenditure

Revenue Receipt:

- The receipts received which cannot be recovered by the government.
- It comprises income amassed by the Government through taxes and non-tax sources like interest, dividends on investments.

Revenue Expenditure:

- Expenditure incurred by the Union Government for purposes other than for the creation of physical or financial assets.
- It includes those expenditures incurred for the usual functioning of the government departments, grants given to state governments and interest payments on the debt of the Union Government etc.

Capital – Receipt & Expenditure

Capital Receipt:

- Receipts which generate liability or decrease the financial assets of the government.
- It includes borrowings from the Reserve Bank of India and commercial banks and other financial institutions.
- It also consists of loans received from foreign governments and international organization and repayment of loans granted by the Union government.

Capital Expenditure:

- Spending incurred by the government which results in the formation of physical or financial possessions of the Union government or decrease in financial liabilities of the Union Government.
- It contains expenditure on procuring land, equipment, infrastructure, expenditure in shares.
- It also includes mortgages by the Union government to Public Sector Undertakings, state and union territories.

Direct Tax

- Taxes which are imposed directly on individual and company.
- It comprises income tax and corporation tax.

Indirect Tax

- Taxes which are imposed on goods and services.
- It comprises taxes like service tax, excise taxes, and customs duties.

Fiscal Policy

- Fiscal policy is the means by which a government adjusts its expenditure levels and tax rates to monitor and influence a country's economy.

Revenue Deficit

- It is the additional expenditure of government over revenue receipts

Fiscal Deficit

- It is the difference between the total expenditure of the government and its total receipts, not including the borrowing.

Primary Deficit

- Fiscal deficit – interest payments= Primary Deficit

Non-Tax Revenue

- Government revenue not generated from taxes.

Gross Domestic Product (GDP)

- Monetary value of all finished goods and services made within a country during a specific period

Overview of the Budget

- The Gross State Domestic Product of Bihar for 2020-21 (at current prices) is projected to be Rs 6, 85,797 crore.
- This is 11.1% higher than the revised estimate for 2019-20. GSDP for 2019-20 (at current prices) is estimated to be 19.6% higher than that in 2018-19.
- Total expenditure for 2020-21 is estimated to be Rs 2, 11,761 crore, a 2.8% decrease over the revised estimates of 2019-20.
- In 2019-20, total expenditure is estimated to increase by 8.6% (Rs 17,259 crore) from the budget estimates.
- Total receipts (excluding borrowings) for 2020-21 are estimated to be Rs 1, 84,352 crore, an increase of 21.5% as compared to the revised estimate of 2019-20.
- In 2019-20, total receipts (excluding borrowings) are estimated to fall short of the budgeted estimate by Rs 25,415 crore (14.3% of the budgeted estimate).
- Revenue surplus for 2020-21 is targeted at Rs 19,173 crore or 2.8% of the Gross State Domestic Product (GSDP).
- **Fiscal deficit is targeted at Rs 20,374 crore (2.97% of GSDP)**.
- In 2019-20, Bihar is estimated to observe a revenue deficit (3% of GSDP) as against a budget target of revenue surplus (3.8% of GSDP).
- Fiscal deficit is estimated to rise from the budgeted 2.8% of GSDP to 9.5% of GSDP at the revised stage.

Grants to Local Bodies

- The state government provides grants to local bodies.
- In 2020-21, Bihar has assigned Rs 15,211 crore as establishment and committed expenditure for local bodies, a decrease of 8.3% over the revised estimates of 2019-20.
- This expenditure head includes Finance Commission grants of Rs 7,434 crore.

Highest allocation

- In 2020-21, the highest increase in allocations was observed in Water Supply, Sanitation, Housing and Urban Development (8%), police (6%), and irrigation and flood control (6%) sectors over the revised estimates of the previous year.
- Significant decrease in allocation was observed in Energy (48%) and transports (19%) sectors.
- **Per capita Gross State Domestic Product**
    - The per capita GSDP of Bihar in 2018-19 (at constant prices) was Rs 33,629, 9% higher than the corresponding figure in 2017-18.
    - In 2017-18, the per capita GSDP of Bihar was the lowest among all states.
- **Unemployment:** According to the Periodic Labour Force Survey (July 2017-June 2018), the unemployment rate in Bihar was 7.2%, which is higher than that at the all-India level (6.1%).

New Scheme / Policy in Budget 2020-2021

- **Green Budget:**
    - The state government will present a Green Budget which will indicate the state's spending on programmes related to environment conservation and climate change.
    - The Jal Jeevan Hariyaali Yojana is estimated to be one of the major schemes under the Green Budget.
    - In 2020-21, Rs 3,051 crore will be spent on: (i) rejuvenation of water bodies, (ii) rainwater harvesting, (iii) solar energy and energy efficiency, (iv) drip irrigation, and (v) tree plantation.

- **Upgradation of various hospitals:**
    - 12 district hospitals will be upgraded as model hospitals.
    - The Indira Gandhi Institute of Medical Sciences (IGIMS), Patna will be upgraded into a super speciality hospital with an increase in the number of beds from 1,032 to 2,732.
    - The Patna Medical College and Hospital (PMCH) will be upgraded into a world-class hospital by 2025.
- **Agriculture and Rural Development**
    - Krishi Yantra Banks will be established at Panchayat level.
    - In 2021, organic certification will be done in 21,000 acres of land.
    - Under the third phase of the Pradhan Mantri Gram Sadak Yojana, 6,162 km of roads will be upgraded.

- **Per capita GSDP:** The per capita GSDP of Bihar in 2017-18 (at current prices) was Rs. 42,242. This is 12.7% higher than the figure for 2016-17 (Rs. 37,478)

The main department wise annual plan outcome (2020-21)

S. No	Name of the Department	Expenditure (in Crore)	Percentage (%)
1.	Education Department	2126.24	20.20
2.	Rural Development department	16014.88	15.21
3.	Rural work department	961900.00	9.14
4.	Social Welfare Department	799763.00	7.60
5.	Health Department	561000.00	5.33
6.	Road Construction Department	558100.00	5.30
7.	Public health Engineering	535100.00	5.08
8.	Panchayati Raj Department	243452.00	2.31
9.	Agriculture Department	239508.00	2.28
10.	SC and ST Welfare Department	170005.00	1.62
11.	Science and Technology	94000.00	0.89
12.	Other Department	234560.59	22.29

Expenditure in Education Sector

- The state government has made the highest allocation of Rs 35,191.05 crore or in percentage 20.20 to the education department.

Provision for expenditure in the health sector:

- The work of construction of 11 new medical college hospitals and a new dental college will be started. This includes medical colleges to be established in Chhapra, Purnia, Samastipur, Begusarai, Sitamarhi, Jhanjharpur, Siwan, Buxar, Bhojpur and Jamui.
- A dental college will also be started in Nalanda.
- The government will provide 310 types of medicines free of cost to patients with cancer and diabetes medicines under the free drug delivery scheme.
- Also, surgical items will also be made available free of cost.

For agriculture in the budget:

- The diesel subsidy of Rs 350 per acre per irrigation has been increased to Rs 500 per acre in the year 2018-19.
- Also, for the promotion of organic farming in the year 2019-20, the grant of 6,000 will be increased to 8,000 per farmer.
- This region also connects to about 70 percent of the population of Bihar.

Amount for Patna Metro:

- The proposal for construction on two routes of Patna Metro Rail Project has been sent to the Center by the Urban Development and Housing Department.
- A provision of Rs 17887.56 crore has been made for this project in the budget for the financial year 2019-20.

Electricity in all houses:

- The Bihar state government said that the government has done the work of providing electricity to all the houses of the state before the prescribed limit.
- The work of providing electricity to all the houses in 39,000 villages of the state was done before the deadline of December 2018 and Bihar has become the eighth state to do so.

Comparison of states' expenditure on key sectors with Other States

Education:

- Bihar has allocated 19.3% of its total budget for education in 2020-21. This is higher than the average expenditure (15.9%) allocated for education by states (using 2019-20 BE).

Health:

- Bihar has allocated 5.2% of its total budget on health, which is marginally lower than the average allocation for health by states (5.3%).

Agriculture:

- The state has allocated 3.5% of its total expenditure towards agriculture and allied activities which is significantly lower than the average allocated by states (7.1%).

Rural development:

- Bihar has allocated 12.8% of its expenditure on rural development.
- This is significantly higher than the average allocation for rural development by states (6.2%).

Water Supply and Sanitation:

- Bihar has allocated 4% of its expenditure on water supply and sanitation.
- This is significantly higher than the average allocation for water supply and sanitation by states (2.4%).

Housing:

- Bihar has allocated 4.6% of its total expenditure on housing, which is higher than the average allocation for housing by states (1.4%).

Roads and bridges:

- Bihar has allocated 3.7% of its total expenditure on roads and bridges, which is lower than the average expenditure of 29 states (4.2%).

Police:

- Bihar has allocated 4.9% of its total expenditure on police, which is higher than the average allocation for police by states (4.1%).

Expenditure in 2020-21

- Capital expenditure for 2020-21 is proposed to be Rs 47,010 crore, which is a decrease of 1.9% over the revised estimates of 2019-20.
- Capital expenditure includes expenditure affecting the assets and liabilities of the state, such as:
    a. capital outlay, i.e. expenditure which leads to the creation of assets (such as bridges and hospitals), and
    b. repayment and grant of loans by the state government.
- Bihar's capital outlay for 2020-21 is estimated to be Rs 38,745 crore, which is 0.2% higher than the revised estimates of 2019-20.
- The revised estimates for capital outlay are 5.7% higher as compared to the budget estimate for the year 2019-20.
- Revenue expenditure for 2020-21 is proposed to be Rs 1, 64,751 crore, which is a decrease of 3% over revised estimates of 2019-20.
- This expenditure includes the payment of salaries, interest, and subsidies.

Receipts in 2020-21

- The total revenue receipts for 2020-21 are estimated to be Rs 1, 83,924 crore, an increase of 21.5% over the revised estimates of 2019-20.
- Of this, Rs 39,989 core (22%) will be raised by the state through its own resources, and Rs 1,43,935 core (78%) will come from the centre in the form of grants (28% of revenue receipts) and the state's share in central taxes (50% of revenue receipts).

Devolution:

- In 2020-21, receipts from the state's share in central taxes are estimated to increase by 43.8% over the revised estimates of 2019-20.
- However, as per the revised estimates of 2019-20, the receipts from the state's share in central taxes are estimated to decrease by 28.9% as compared to the budget stage.

Reason

- This may be due to a 19% cut in the union budget for devolution to states, from Rs 8,09,133 crore at the budget stage to Rs 6,56,046 crore at the revised stage.
- Bihar's share in the centre's tax revenue will increase from 4.06% during the 2015-20 periods to 4.13% for 2020-21 (an increase of 2%) as per the recommendations of the 15th Finance Commission.

Tax Revenue:

- Total own tax revenue of Bihar is estimated to be Rs 34,750 crore in 2020-21, an increase of 1.9% over the revised estimates of the previous year.
- The own tax to GSDP ratio is targeted at 5.1% in 2020-21, which is lower than the revised estimates for 2019-20 (5.5%).

This implies that the growth of tax collections is estimated to be slower than the growth of the economy.

HISTORY
ANCIENT INDIA

Chronology of Important Events in Indian History

Year	Event	Importance
2 Million BC to 10,00 BC 2 Million BC to 50,000 BC 50,000 BC to 40,000 BC 40,000 BC to 10,000 BC	Palaeolithic Period Lower Palaeolithic Middle Palaeolithic Upper Palaeolithic	Fire was discovered Tools made of limestones were used. They are found in Chotanagpur plateau and Kurnool district
From 10,000 BC	The Mesolithic Age	Hunters and Herders Microlith tools were used
7000 BC	The Neolithic age	Food producers Use of polished tools
Pre-Harappan Phase – 3000 BC	Chalcolithic Age	Use of Copper – first metal
2500 BC	Harappan Phase	Bronze age civilization, development of Urban culture
1500 BC-1000 BC	Early Vedic period	Rig Veda period
1000BC-500BC	Later Vedic period	Growth of 2nd Urban phase with the establishment of Mahajanapadhas
600 BC – 325 BC	Mahajanapadhas	16 kingdoms with certain republics established
544 BC – 412 BC	Haryanka Dynasty	Bimbisara, Ajatshatru and Udayin
412 BC – 342 BC	Shisunaga Dynasty	Shisunaga and Kalashoka
344BC – 323 BC	Nanda Dynasty	Mahapadmananda
563 BC	Birth of Gautama Buddha	Buddhism established
540 BC	Birth of Mahavira	24th Tirthankara of Jainism
518 BC	Persian Invasion	Darius
483 BC	1st Buddhist council	Rajgir
383 BC	2nd Buddhist Council	Vaishali
326 BC	Macedonian Invasion	Direct contact between Greek and India
250 BC	3rd Buddhist council	Pataliputra
322 BC – 185 BC 322 BC – 298 BC 298 BC – 273 BC 273 BC – 232 BC 232 BC – 185 BC	Mauryan Period Chandragupta Maurya Bindusara Ashoka Later Mauryans	Political unification of India, Dhamma policy of Ashoka, the growth of art and architecture

185 BC – 73 BC	Sunga Dynasty	Pushyamitra Sunga
73 BC – 28 BC	Kanva dynasty	Vasudeva founded the dynasty
60 BC – 225 AD	Sathavahana dynasty	Capital at Paithan, MH
2nd BC	Indo-Greeks	Menander(165-145AD)
1st BC – 4th AD	The Shakas	Rudradaman (130 AD – 150 AD)
1st BC – 1st AD	The Parthians	St Thomas arrived in India during the reign of Gondophernes
1st AD -4th AD	The Kushans	Kanishka (78 AD – 101 AD)
72 AD	4th Buddhist Council	Kashmir
3rd BC – 3rd AD	Sangam age	Convene of Sangam Commune, Rule of Cheras, Cholas and Pandyas
319 AD – 540 AD 319 – 334 AD 335 – 380 AD 380 – 414 AD 415 – 455 AD 455 – 467 AD	The Gupta Age Chandragupta I Samudragupta Chandragupta II Kumaragupta Skandagupta	319 AD – Gupta Age The golden age of India Development of numerous art and literature. Nagara style of Temple Building
550 AD – 647 AD	Vardhana Dynasty	Harsha (606-647 AD) Kannauj assembly and Prayag assembly held Huan-Tsang visited Harsha's assembly
543 – 755 AD	Chalukyas of Vatapi	Development of Vesera style
575 - 897 AD	Pallavas of Kanchi	Structural temples in Dravida style started to develop

MEDIEVAL INDIA

Early Medieval Period (650 – 1206 AD)

Year	Event	Importance
750 – 1150 AD	Rule of the Palas	Capital at Munger, Bihar
752 – 973 AD	The Rasthrakutas	Capital at Malkhed
730 – 1036 AD	The Pratiharas	Ruled western India
712 AD	First Muslim Invasion	Mahmud Bin Qasim invaded India
850 – 1279 AD	The Cholas	Capital at Tanjore, epitome moment for Dravidian Architecture
998 – 1030 AD	First Turk invasion	Mahmud of Ghazni

1175 – 1206 AD	Second Turk invasion	Mahmud of Ghori
1178 – 1192 AD	Prithviraj Chauhan	First battle of Tarain in 1191 between Prithviraj and Mahmud of Ghori 1192, Second battle of Tarain

The Sultanate Period (1206 – 1526 AD)

The Slave Dynasty		
Year	Event	Importance
1206 – 1210 AD	Qutbuddin Aibak	Known as Lal Bakhsh, began the construction of Qutb Minar
1211 – 1236 AD	Shamsuddin Iltumish	Real founder of Delhi sultanate
1236 – 1240 AD	Razia Sultana	First and only Muslim lady whoever ruled India
1240 – 1266 AD	Weak successors	
1266 – 1287 AD	Ghiyasuddin Balban	Established Diwan-i-Arz

The Khalji Dynasty		
Year	Events	Importance
1290 – 1296 AD	Jalaluddin Khalji	Founder of Khalji dynasty
1296 – 1316 AD	Allaudin Khalji	Did many administrative reforms, introduced the Dagh and Chehra system

The Tuglaq dynasty		
Year	Events	Importance
1320 – 1325 AD	Ghiyasuddin Tuglaq	Founder
1325 – 1351 AD	Mohammed-Bin-Tuglaq	Introduction of administrative reforms and certain ambitious projects
1351 – 1388 AD	Firoz Shah Tuglaq	Built great cities
1398 – 1399 AD	Taimur Invasion	Taimur, the descendant of Chengiz Khan, invaded during the reign of Muhammad Shah Tuglaq

The Sayyid dynasty 1414 – 1451 AD

The Lodhi Dynasty (1451 – 1526 AD)		
Year	Events	Importance
1451 – 1488 AD	Bahlol Lodhi	Founder of Lodhi dynasty
1489 – 1517 AD	Sikander Lodhi	Founded the city of Agra
1517 – 1526 AD	Ibrahim Lodhi	Babur defeated Lodhi in the first battle of Panipat

Vijaynagar and Bahmani Kingdoms

Vijaynagar Kingdom

Year	Events	Importance
1336 – 1485 AD	Sangama Dynasty	Founded by Harihara and Bukka
1485 – 1505 AD	Saluva Dynasty	Saluva Narasimha
1505 – 1570 AD	Tuluva Dynasty	Veer Narashima
1509 – 1529 AD	Krishna Deva Raya	A gifted Scholar, contemporary of Babur
1570 – 1650 AD	Aravidu Dynasty	Founded by Tirumala

Bahmani Kingdom		
Year	Events	Importance
1347 – 1358 AD	Alaudin Hasan Bahman Shah	Founded the Bahmani Kingdom at Gulbarga
1397 – 1422 AD	Tajuddin Firoz Shah	
1422 – 1435 AD	Ahmad Shah Wali	

Mughal Empire

1526 – 1530 AD	Babur	Founder of Mughal empire after the 1st Battle of Panipat
1530 – 1540 AD 1555 – 1556 AD	Humayun	He was defeated by Sher Shah
1540 – 1555 AD	Sur Empire	Sher Shah defeated Humayun and ruled from 1540-45 AD
1556	2nd Battle of Panipat	Akbar Vs. Hemu
1556 – 1605 AD	Akbar	Established Din-i-illahi, expanded Mughal empire
1605 – 1627 AD	Jehangir	Captain William Hawkins and Sir Thomas Roe visited the Mughal court
1628 -1658 AD	Shahjahan	The pinnacle of Mughal empire and art and architecture
1658 – 1707 AD	Aurangazeb	Beginning of the decline of the Mughal empire
1707 – 1857 AD	Later Mughals	Decline and disintegration of the Mughal empire with gaining strength of the British

Maratha State and Maratha Confederacy

Maratha state 1674 – 1720 AD		
Year	Events	Importance
1674 – 1680 AD	Shivaji	Contemporary of Aurangazeb and the biggest challenge for the Mughals in Deccan
1680 – 1689 AD	Sambhaji	
1689 – 1700 AD	Rajaram	
1700 – 1707 AD	Tarabai	
1707 – 1749 AD	Shahu	The rise of Peshwas
1713 – 1720 AD	Balaji Vishwanath	The first Peshwa

Maratha Confederacy 1720 – 1818 AD

1720 – 1740 AD	Baji Rao I	
1740 – 1761 AD	Balaji Baji Rao	

1761 AD	Third battle of Panipat	Defeat of Marathas by Ahmad Shah Abdali
1761 – 1818 AD	Later successors	

Anglo Maratha Wars

1775 – 1782 AD	1st Anglo Maratha War	British were defeated
1803 – 1806 AD	2nd War	Marathas were defeated and they signed the Subsidiary Alliance
1817 – 1818 AD	3rd War	Marathas were decisively defeated

MODERN INDIA

Bengal		
Year	Events	Importance
1717 – 1727 AD	Murshid Quli Khan	Capital of Bengal transferred to Murshidabad
1727 – 1739 AD	Shujauddin	
1739 – 1740 AD	Sarfaraj khan	
1740 – 1756 AD	Alivardi Khan	
1756 – 1757 AD	Sirajuddaulah	Battle of Plassey
1757 – 1760 AD	Mir Jafar	
1760 – 1764 AD	Mir Qasim	Battle of Buxar

Mysore		
Year	Events	Importance
1761 – 1782 AD	Haider Ali	Establishment of Modern Mysore state
1766 – 1769 AD	1st Anglo – Mysore war	Haider Ali defeated the British
1780 – 1784 AD	2nd Anglo – Mysore war	Haider Ali was defeated by Sir Eyrecoot
1782 – 1799 AD	Tippu Sultan	Continued the 2nd war
1790 – 1792 AD	3rd Anglo – Mysore war	Tipu ceded half of his territory
1799	4th Anglo – Mysore war	Tipu Sultan died

Punjab		
1792 – 1839 AD	Maharaja Ranjit Singh	Founder of Sikh rule
1845 – 1846 AD	1st Anglo – Sikh war	Sikhs were defeated
1848 – 1849 AD	2nd Anglo – Sikh war	Dalhousie annexed Punjab

Advent of Europeans in India

1498	Portuguese East India company	Headquarters at Cochin and Goa
1600	English East India company	Madras, Calcutta and Bombay
1602	Dutch East India company	Pulicat, Nagapattinam
1616	Danish East India company	Serampore
1664	French East India company	Pondicherry

Carnatic wars

1746-48	1st Anglo-French war	Treaty of Aix-la-Chapelle
1749-54	2nd Anglo-French war	Treaty of Pondicherry
1758-63	3rd Anglo-French war	Treaty of Paris

Freedom Struggle

1857	First war of Indian independence	Revolt due to socio-religious and economic causes
1885	Formation of Indian National Congress	A O Hume
1885 – 1905	Moderate phase	Dominated by Dadabai Naoroji, Surendranath Banerjea
1905 – 1917	Extremists Phase	Dominated by Lal-Bal-Pal and Aurobindo Ghosh
1905	Bengal Partition	Curzon announced the partition
1905 – 1908	Swadeshi movement	Boycott of foreign products
1906	Muslim league formation	
1906	Calcutta Session of INC	Swaraj as the goal
1907	Surat split	Question on extending the movement to the rest of India
1909	Morley – Minto reforms	The separate electorate for Muslims
1915 – 1916	Home rule movement	BG Tilak and Annie Besant
1916	Lucknow Pact	Pact between Congress and League
1916	Lucknow session	Extremists admitted in Congress

Gandhian Era

Early life		
1893 – 1914	Gandhi in South Africa	Foundation of Natal Indian Congress, Sathyagraha and CDM against British excesses
1915 – 1948	Gandhi in India	
1915	Arrived in Bombay. First two years to tour India and not to participate in any political movement	
1917	Champaran Campaign	Against the Indigo cultivators
1918	Ahmedabad	First hunger strike
1918	Kheda	First non-cooperation movement
1919	Rowlatt Sathyagraha	Against the Rowlatt act and Jallianwala massacre
1920-22	Non-cooperation and Khilafat movement	
1924	Belgaum session	Gandhi elected as Congress president
1930 -34	Civil disobedience movement	Dandi March Gandhi – Irwin Pact 2nd Roundtable conference Resuming the Civil disobedience movement
1940-41	Individual satyagraha	
1942	Quit India movement	Do or die

Important Events during this period

1919	Rowlatt act	Gandhi gave a call for Rowlatt satyagraha
1919	Jallianwala Massacre	
1920-22	Khilafat and Non-cooperation movement	Hindu Muslim unity
1922	Chauri Chaura incident	Gandhi called off NCM
1923	Congress Khilafat Swaraj Party	Enter legislative councils
1927	Simon commission	All white commission to review the 1919 act
1928	Nehru committee report	To determine the principles of the constitution
1929	Jinnah's 14 points	
1929	Lahore session	Purna Swaraj
1930	Civil disobedience movement	Dandi March
1931	Gandhi Irwin Pact	To ask Gandhi to participate in the 2nd RTC
1931	2nd RTC held in London	
1932	Communal award	
1932	Poona Pact	
1935	Government of India act	Provisional autonomy
1937	18 months rule of Congress begins	
1939-45	World War II begins	
1939	Congress ministries resign	
1940	August offer	Linlithgow proposed to seek India's cooperation in the World War

1941	Individual Satyagraha	
1942	Cripps mission	
1942	Quit India movement	
1943	Gandhi's 21 days fast	
1944	C R Formula	
1945	Wavell Plan and Shimla Conference	
1945	INA Trails	
1946	RIN Ratings Mutiny	
1946	Cabinet mission plan	
1946	Formation of Interim government	
1946	Formation of the constituent assembly	
1947	Atlee's announcement	
1947	Mountbatten Plan	
1947	Indian independence act, 1947	

INDUS VALLEY CIVILIZATION

John Marshall, the first scholar to use the term "Indus valley civilization". The civilization flourished between 2500 BC-1750 BC.

Geographical Extent of IVC

1. Extent: The Indus valley civilization extended from Sutkagandor (in Baluchistan) in the West to Alamgirpur (Western UP) in the East; and from Mandu (Jammu) in the North to Daimabad (Ahmednagar, Maharashtra) in the South.

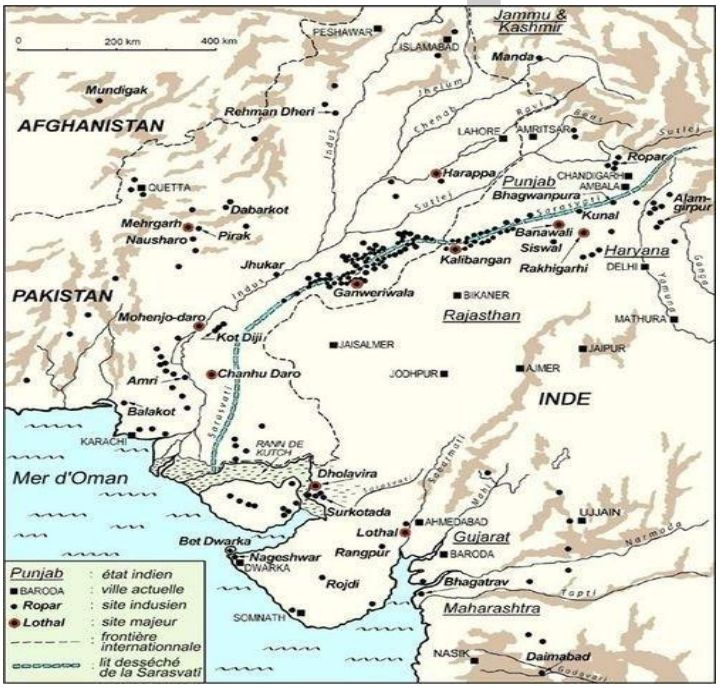


Image source: NCERT

2. Important cities

City	River	Archaeological Importance
Harappa (Pakistan)	Ravi	A row of 6 Granaries, Mother goddess figurines
Mohenjodaro (Pakistan)	Indus	Great Granary, Great bath, Image of Pashupati Mahadeva, Image of Bearded man and Bronze image of a woman dancer
Lothal (Gujarat)	Bhogava	Port city, Double burial, Terracotta horse figurines.
Chanhudaro (Pakistan)	Indus	The city without a citadel
Dholavira (Gujarat)	Indus	City divided into 3 parts.
Kalibangan (Rajasthan)	Ghaggar	Ploughed field
Banawali (Haryana)	Ghaggar	-
Rakhigarhi (Haryana)	-	-
Ropar (Haryana)		
Mitathal (Haryana)	-	-
Bhagatrav (Gujarat)	-	-
Rangpur (Gujarat)	-	-
Sutkagandor (Pakistan)	-	-
Sukotada (Gujarat)	-	-
Kot Diji (Pakistan)		

Town planning and Structure of IVC

- Grid system (Chess-board) of town planning
- Rectangular houses with brick-lined bathrooms and wells together with stairways are found
- Use of Burnt bricks
- Underground drainage system
- Fortified citadel

Agriculture of Indus Valley Civilisation

- Hindon – Cotton – Major trade good – earliest people to produce Cotton.
- Proofs of Rice husk found
- Wheat and Barley were majorly cultivated
- Use of wooden ploughshare. They had no idea about Iron implements.

Domestication of animals

- Ox, Buffalo, Goats, Sheep and Pigs were domesticated
- Asses and camels were used as Beasts of Burden
- Elephants and Rhino were known
- Remains of horse found in Surkotada and evidence of horse in Mohenjo-Daro and Lothal are also found. But the civilization was not horse-centered.

Technology and crafts

- Bronze (Copper + tin) tools widely used
- Stone implements were still in vogue
- Potter's wheel was put to full use
- Bronzesmiths, Goldsmiths, Boat-Making, Brick-laying etc were other occupations commonly found

Trade of Indus Valley Civilisation

- Presence of granaries, weights and measures, seals and uniform script signifies the importance of trade
- The barter system was widely prevalent
- Lothal, Sutkagendor were port cities used for conducting trade
- Trade destinations – Afghanistan, Iran and Central Asia. Contacts with Mesopotamia civilization are also seen

The political organization of IVC

- Cultural homogeneity achieved through a strong central authority
- No temples or religious structures found. Harappa was possibly ruled by Merchants class.
- Weapons are rarely found.

Religious practices of IVC

- Terracotta figure of Mother Goddess.

- Phallu and Yoni worship.
- Pashupati Mahadev seal found with the elephant, tiger, rhino and a bull surrounding him with two deer near his feet.

Tree and animal worship of IVC

- Pipal tree worship was found.
- One-horned Unicorn recognized as Rhino and the humped bull was commonly worshipped.
- Use of Amulets to ward off ghosts and evil spirits.
- The lion was *not* known in Harappan culture.

The Harappan script

- Harappan script Pictographic in nature but not deciphered so far.
- They are recorded on seals and contains only a few words
- Harappan Script is the oldest script in Indian Sub-continent

Weights and Measures

- Use of standardized weights and measures to keep accounts of private property, to indulge in trade and commerce etc.
- Weights are found in multiples of 16.

Harappan Pottery of IVC

- Well-developed Pottery techniques with elaborate designs of trees and circles.
- Redware pottery painted with black designs.

Seals of Indus Valley Civilisation

- Seals were used for the purpose of trade or worship. Images of animals such as Buffalo, bull, tiger etc were found inscribed in the seals

Statue of IVC

- Discovery of Bronze statue of a naked woman and bearded man steatite statue

Terracotta figurines of IVC

- Terracotta – Fire baked earthen clay
- Used as toys or objects of worship
- Massive stone works were not found in Harappa which shows the poorly developed artistic works made of stone

Origin, maturity and end of IVC

- Pre-Harappan Settlements – Lower Sindh, Baluchistan and Kalibangan.
- Mature Harappa – 1900BC – 2550BC.
- Causes for the Decline of Civilization.
- Decreasing fertility due to increasing salinity on the account of the expansion of the nearby desert.
- Sudden subsidence of uplift of land causing floods.
- Earthquakes caused changes in the course of Indus.
- Harappan culture destroyed by invading Aryans.

Post-urban Phase (1900BC – 1200BC)

- Sub-Indus Culture
- Primarily chalcolithic
- Development of Ahar Culture, Malwa Culture and Jorwe Culture at various phases in post-Harappan Civilization.

Early Vedic Period (1500BC-1000BC)

1. Aryans appeared in India around 1500 BC and settled near Eastern Afghanistan, NWFP, Punjab and fringes of western Uttar Pradesh. The whole region is called as the Land of Seven Rivers.
2. The Aryans came into conflict with the indigenous inhabitants Dasyus and the Aryan chief who overpowered them is called as Tarsadasu.
3. Sapta Sindhu mentioned in the Rig Veda. Sindu is the river of *Par Excellence* while The Saraswati or *Naditarana* is the best of rivers in the Rig Veda

Rig Vedic name	Modern Name
Sindu	Indus
Vitasta	Jhelum
Asikani	Chenab
Parushni	Ravi
Vipas	Beas
Sutudri	Sutlej

Later Vedic period (1000 BC - 500 BC)

The history of the later Vedic period is based mainly on the Vedic texts which were compiled *after* the age of Rig Veda.

1. Later Vedic Texts

a. The Veda Samhitas

i. Sama Veda – The book of chants with hymns taken from Rig Veda. This Veda is important for Indian Music.

ii. Yajur Veda – The book consists of sacrificial rituals and formulae.

iii. Atharva Veda – This book consists of charms and spells to ward of evils and diseases

b. The Brahmanas – Consists of the explanatory part of the Vedas. Sacrifices and rituals have also been discussed in great detail.

i. Rig Veda – Aitreya and Kaushitiki Brahmana

- Consists of 1028 hymns divided into 10 mandalas (books).
- In IIIrd Mandala, Gayatri mantra is addressed to solar deity Savitri.
- X Mandala addressed to Purusha Sukta

ii. Yajur Veda – Shatapata and Taittariya

iii. Sama Veda – Panchvisha, Chandogya, Shadvinsh, and Jaiminaya

iv. Atharva Veda - Gopatha

c. The Aranyakas – Concluding portions of Brahmanas, also called as Forest texts are written mainly for the hermits and students living in forests.

d. The Upanishads – Appearing at the end of the Vedic period, they criticized the rituals and laid stress on right belief and Knowledge.

Note- Satyamev Jayate has been taken from Mundaka Upanishad.

2. *Vedic literature –*

Following the Later Vedic age, a lot of Vedic Literature was developed, inspired by the Samhitas which follow the Smriti – Literature which was written in comparison to Shruti – Word of Mouth tradition. Important texts in Smriti tradition are further subdivided into

a. Vedangas

i. Shiksha - Phonetics

ii. KalpaSutras – Rituals

- **Sulva Sutras**
- **Grihya Sutras**
- **Dharma Sutras**

iii. Vyakarna - Grammar

iv. Nirukta - Etymology

v. Chhandha - metrics

vi. Jyotisha - Astronomy

b. Smriti

i. Manu Smriti

ii. Yajnavalkya Smriti

iii. Narada Smriti

iv. Parashara Smriti

v. Brihaspati Smriti

vi. Katyayana Smriti

c. Mahakavyas

i. The Ramayana

ii. The Mahabharata

d. The Puranas

i. 18 Maha Puranas – Dedicated to specific deities such as Brahma, Surya, Agni, Saiva and Vaishnava. They include Bhagavata Purana, Matsya Purana, Garuda Purana etc

ii. 18 Upa Puranas – Lesser known texts

e. The Upvedas

i. Ayurveda - Medicine

ii. Gandharvaveda - Music

iii. Arthaveda - Vishwakarma

iv. Dhanurveda - Archery

f. Shad-Darshanas or Indian Philosophical Schools

i. Samkhya

ii. Yoga

iii. Nyaya

iv. Vaisheshika

v. Mimansa

vi. Vedanta

Buddhism and Jainism

Causes of Origin

1. The Kshatriya reaction against the domination of the priestly class called Brahmanas. Mahavira and Gautama Buddha, both belonged to the Kshatriya clan.
2. Indiscriminate killing of cattle for Vedic sacrifices and for food had led to the destabilization of the new agricultural economy which was dependent on cattle for ploughing the fields. Both Buddhism and Jainism stood against this killing.
3. The growth of cities with the increase in the circulation of Punch Marked coins and trade and commerce had added to the importance of Vaishyas who looked for a new religion to improve their position. Jainism and Buddhism facilitated their needs
4. The new forms of property created social inequalities and the common people wanted to get back to their primitive form of life
5. Growing complexity and degeneration of Vedic religion.

Difference between Jainism and Buddhism and Vedic Religion

1. They did not attach any importance to the existing Varna system
2. They preached the Gospel of non-violence

3. They accepted Vaishyas, including the Moneylenders who were condemned by Brahmanas
4. They preferred simple, puritan and ascetic living

Buddhism

Gautama Buddha and Buddhism

Gautama Buddha was born in 563 BC in the Republican clan of Shakyas in Lumbini near Kapilavastu. His mother was a princess from Kosalan dynasty.

Four Sights of Buddha's life at the age of 29 had moved him to the path of renunciation. They are

- An old man
- A diseased person
- An ascetic
- A dead person

Important events in the life of Buddha

Events	Places	Symbols
Janma	Lumbini	Lotus and Bull
Mahabhinishkramana	-	Horse
Nirvana	Bodh Gaya	Bodhi Tree
Dharmachakra Pravartana	Saranath	Wheel
Mahaparinirvana	Kusinagar	Stupa

Doctrines of Buddhism

- **Four noble truths**

1. Dukha – life is full of sorrow
2. Samyuda – there are causes for the sorrow
3. Nirodha – they can be stopped
4. Nirodha gamini Pratipada – Path leading towards the cessation of sorrow

- **Ashtangika Marga**

1. Right observation
2. Right determination
3. Right exercise
4. Right action
5. Right speech
6. Right memory
7. Right meditation
8. Right livelihood

- **Madhya Marga** – to avoid the excess of both luxury and austerity
- **Triratna –** Buddha, Dharma and Sangha

Special features of Buddhism and the causes of its spread

1. Buddhism does not recognize the existence of god and soul
2. Women were also admitted to the Sangha. Sangha was open to all, irrespective of caste and sex
3. Pali language was used which helped in the spread of Buddhist doctrines among the common people
4. Ashoka embraced Buddhism and spread it to Central Asia, West Asia and Srilanka
5. Buddhist Councils

First Council: The first council was held in the year 483 B.C at Saptaparni caves near Rajgriha in Bihar under the patron of king Ajatshatru, during the first council two Buddhist works of literature were compiled Vinaya and Sutta Pitaka by Upali

Second Council: The second council was held in the year 383 B.C at Vaishali under the patron of king Kalashoka

Third Council: The third council was held in the year 250 B.C at Patliputra under the patron of King Ashoka the Great, during the third council Abhidhamma Pitaka was added and Buddhist holy book Tripitaka was compiled.

Fourth Council: The fourth council was held in the year 78 A.D at Kundalvan in Kashmir under the patron of king Kanishka, during this council Hinayana and Mahayana were divided.

Importance and influence of Buddhism

Literature

1. Tripitaka
    1. Sutta Pitaka – Buddha's sayings
    2. Vinaya Pitaka – Monastic code
    3. Abhidhamma Pitaka – religious discourses of Buddha
2. Milindapanho – a dialogue between Menander and Saint Nagasena
3. Dipavamsha and Mahavamsha – the great chronicles of Sri Lanka
4. Buddhacharita by Ashvagosha

Sects

1. **Hinayana (Lesser Wheel) -** They believe in the real teachings of Gautam Buddha of attaining Nirvana. They do not believe in idol worship and Pali language was used in the Hinayana text

2. **Mahayana (Greater Wheel) -** They believe that Nirvana is attained by the grace of Gautam Buddha and following Boddhisattvas and not by following his teachings. They believe in idol worship and Sanskrit was used in Mahayana text
3. **Vajrayana -** They believe that Nirvana is attained by the help of magical tricks or black magic.

Bodhisattvas

1. Vajrapani
2. Avalokitesvara or Padmapani
3. Manjushri
4. Maitreya (Future Buddha)
5. Kshitigriha
6. Amitabha/Amitayusha

Buddhist architectures

1. **Places of Worship** – Stupas containing the relics of Buddha or Bodhisattvas. Chaityas are the prayer hall while Viharas are the place of residence of monks
2. **Development of Cave architecture** eg. Barabar caves in Gaya
3. **Development of Idol worship and sculptures**
4. **The growth of universities of par excellence** which attracted students from all over the world

Jainism

- Jainism believes in 24 Tirthankaras with Rishabdev being the first and Mahavira, contemporary of Buddha being the 24th Tirthankara.
- The 23rd Tirthankar Parshwanath (Emblem: Snake) was the son of King Ashvasena of Banaras.
- The 24th and the last Tirthankar was Vardhman Mahavira (Emblem: Lion).
- He was born in Kundagram (Distt Muzaffarpur, Bihar) in 599 BC.
- His father Siddhartha was the head of Jnatrika clan. His mother was Trishla, sister of Lichchavi Prince Chetak of Vaishali.
- Mahavira was contemporary to Bimbisara.
- Married to Yashoda, had a daughter named Priyadarsena, whose husband Jamali became his first disciple.
- At 30, after the death of his parents, he became an ascetic.
- In the 13th year of his asceticism (on the 10th of Vaishakha), outside the town of Jrimbhikgrama, he attained the supreme knowledge (Kaivalya).
- From now on he was called Jaina or Jitendriya and Mahavira, and his followers were named Jains.
- He also got the title of Arihant, i.e., worthy. At the age of 72, he attained death at Pava, near Patna, in 527 BC.

Five vows of Jainism

- Ahmisa – non-violence
- Satya – do not speak a lie
- Asteya – do not steal
- Aparigraha – do not acquire property
- Brahmacharya – celibacy

Three main principles

- Ahimsa
- Anekantavada
- Aparigraha

Triratna of Jainism

- Right faith – Samayak Shradha
- Right Knowledge – Samayak Jnan
- Right Conduct – Samayak karma

Five types of knowledge

- Mati jnana
- Shruta jnana
- Avadhi jnana
- Manahparayaya Jnana
- Keval Jnana

Jain council

- **1st Council** at Patliputra under the Patron of Chandragupta Maurya in 300 BC during which the 12 Angas was compiled
- **2nd Council** at Vallabhi in 512 AD during which the final compilation of 12 Angas and 12 Upangas was done

Sects

- **Shwetambars –** Sthulabhadra – People who put on white robes. Those who stayed back in the North during the times of famine
- **Digambar –** Bhadrabahu – Exodus of monks to Deccan and South during the times of Magadhan famine. They have a naked attire

Jain Literature

Jain literature used Prakrit, which is a common language of people than using Sanskrit. In this way, Jainism reached far and wide through people. The important literary works are

- 12 Angas
- 12 Upangas
- 10 Parikramas
- 6 Chhedsutras
- 4 Mulasutras
- 2 Sutra Granthas
- Part of Sangam literature is also attributed to Jain scholars.

Mahajanapadas, Haryanka Dynasty, Shishunaga Dynasty, Nanda Dynasty

- **Magadha (Patna, Gaya and Nalanda districts)** – The first capital was Rajagriha and the later capital was Pataliputra.
- **Anga and Vanga (Munger and Bhagalpur)** – The capital was Champa. It was a prosperous business centre.
- **Malla (Deoria, Basti, Gorakhpur region)** – The capital was Kushinagar. It was the seat of many other smaller kingdoms. Their main religion was Buddhism.
- **Vatsa (Allahabad and Mirzapur)** – The capital was Kaushambi. The most important ruler of this kingdom was King Udayan.
- **Kashi (Benaras)** – The capital was Varanasi. Though many battles were fought against the Kosala kingdom, eventually Kashi was merged with the Kosala kingdom.
- **Kosala (Ayodhya)** – Though its capital was Shravasti which is identical with Sahet-Mahet but Ayodhya was an important town in Kosala. Kosala also included the tribal Republican territory of Sakyas of Kapilvastu.
- **Vajji** (**Muzaffarpur and Vaishali**) – Vajji was the seat of a united republic of eight smaller kingdoms of which Lichchavis, Janatriks and Videhas were also members.
- **Kuru (Thaneswar, Meerut and present-day Delhi**) – The capital city was Indraprastha.
- **Panchala (Western Uttar Pradesh)** – Its capital was at Kampila. Earlier a monarch state, it later became an independent republic. Kannauj was an important town in this kingdom.
- **Matsya kingdom (Alwar, Bharatpur and Jaipur)** – Its capital was Viratanagar.
- **Ashmaka (Between Narmada and Godavari)** – Its capital was at Pertaii and Brahamdatta was its most important ruler.
- **Gandhara (Peshawar and Rawalpindi)** – Its capital Taxila was important as a trade and education centre (Ancient Taxila university) during the later Vedic age.
- **Kamboj (Hazara dist of Pakistan, North-east Kashmir**) – Its capital was Rajapur. Hazara was an important trade and commerce centre of this kingdom.
- **Avanti (Malwa)** – Avanti 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.
- **Chedi (Bundelkhand)** – Shaktimati was the capital of Chedi. Chedi kingdom was spread between Yamuna and Narmada rivers. One of the families from this kingdom later merged into the Kalinga kingdom from this royal family.
- **Shurasena (Brajmandal)** – Its capital was at Mathura and its most famous ruler was Avantiputra.

Sources of Sixteen Mahajanapadas

- Anguttara Nikaya, Mahavastu (Buddhist Literature)
- Bhagavati Sutta (Jain Literature)

Dynasties

Haryanka Dynasty

(1) Bimbisara (544BC-492BC)

1. Haryanka is the name of a new dynasty founded in Magadha by Bimbisara. He was also called Seniya who was the first Indian to have a regular and standing army
2. Bimbisara was a contemporary of Buddha.
3. Pataliputra and Rajagriha were the capitals of the Magadha kingdom. Magadha falls in the Patna region of Bihar.

(2) Ajatashatru (492BC-460BC)

1. He followed a more aggressive policy. Gained control of Kashi and Vajji. Built the fort of Rajgir.
2. He convened the 1st Buddhist council

(3) Udayin (460BC-440BC)

1. He laid the foundation of Pataliputra and shifted the capital from Rajgir to Pataliputra

Shishunaga Dynasty (412BC-344BC)

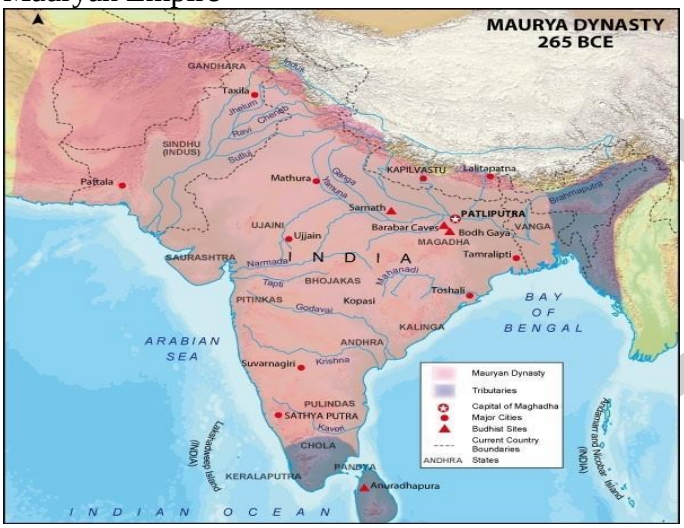
- People elected Shishunga over Nagadasaka (last Haryanka ruler) thereby ending the Haryanka dynasty

- Shishunga was succeeded by Kalashoka who convened the 2nd Buddhist council

Nanda Dynasty (344BCC-323BC)

- Mahapadma Nanda was the founder and the first king of the Nanda dynasty.
- He overthrew the Magadha dynasty and established the new Empire. He was known as Sarvakshatrantak and Ugrasena
- Mahapadma was known as Ekrat – the sole monarch
- Initially, the Nanda Dynasty inherited a large kingdom of Magadha and subsequently, the boundaries of the Nanda Dynasty were expanded in all directions by its rulers.
- Dhana Nanda was the last ruler of the Nanda Dynasty. During his rule, Alexander invaded North-West India by 326 BC

Mauryan Empire



Bindusara (298-273 BC)

He was known to Greeks as Amitrochates and he patronized the Ajivika sect.

Ashoka

1. Ashoka ascended the throne in 273BC and ruled up to 232 BC. He was known as 'Devanampriya Priyadarsi' the beautiful one who was the beloved of Gods.
2. Ashoka fought the Kalinga war in 261 BC. Kalinga is in modern Orissa.
3. Ashokan inscriptions were deciphered by James Princep.
4. After the battle of Kalinga, Ashoka became a Buddhist, being shocked by the horrors of the war, he replaced Bherighosha by *Dhammaghosha*
5. Ashoka was initiated to Buddhism by Upagupta or Nigrodha, a disciple of Buddha
6. For the propagation of Buddhism Ashoka started the institution of Dharmamahamatras.

Ashokan Inscriptions

1. Ashokan inscriptions carried royal orders through which he was able to speak directly to the people. There were rock edicts and pillar edicts which were again divided into major and minor.
2. The 14 Major Rock Edicts of Ashoka tell about the principles of Dharma
3. The Kalinga rock edict explains the principles of administration after Kalinga war. In his Kalinga edict, he mentions ''All men are my children''
4. The Major Rock Edict XII of Ashoka deals with the conquest of Kalinga.
5. The term 'Ashoka' was mentioned only in the Maski Minor rock edict.

Foreign Invasions in India

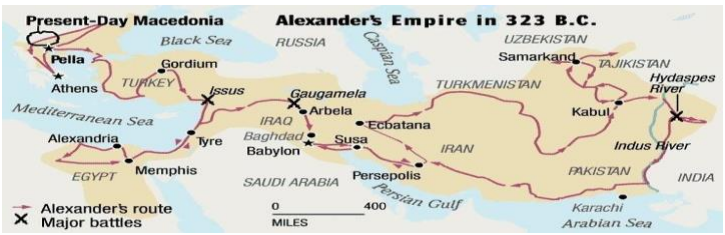
Iranian Invasion – 518 BC

Iranian rules *Darius* penetrated into NW India in 516 BC and annexed Punjab, West of Indus and Sindh. This was 20th province of Iran and contributed 1/3rd of the total revenue of Iran due to fertile lands. *Xerxes*, the successor of Darius, employed a large number of Indians in the war against Greeks.

Alexander's Invasion

He defeated the last king of the line of Darius, Xerxes in 333 BC and 331 BC. After occupying the realm of the Persian king, Alexander crossed the Hindukush mountains in eastern Afghanistan in 327 BC.

After annexing Iran, Alexander moved into India through Khyber Pass. *Ambhi*, the ruler of Taxila readily submitted. He met *Porus* at *Jhelum* where he defeated him in the Battle of Hydaphes but later restored his kingdom to him. Alexander marched till the *Beas* river but his army refused to accompany him. He remained in India from 326-325 B.C after which he was forced to retreat.



Central Asian contacts and their results

The Indo-Greeks

The series of invasions began in 200 BC by the Bactrian Greeks who were pushed by the Scythian tribes.

- *Menander* (165-145 BC) was the most famous ruler who was converted to Buddhism by *Nagasena*. The questions of Menander were compiled as *Milindapanho*.
- Indo-Greeks were the *first* to issue Gold coins in India and they were also the first to issue coins which could be definitely attributed to Kings.
- They introduced the features of *Hellenistic Art* through which *Gandhara style* had developed.

The Shakas (1st BC – 4th AD)

- The Shakas or Scythians replaced Indo-Greeks. There were five branches of Shakas and they controlled a much larger territory.
- Vikrama Samvat started in 57 BC when a king called as Vikramaditya in Ujjain defeated the Shakas.
- Rudradaman I (AD 130-150) was a famous king who ruled over western India. He repaired the Sudarshana lake in Kathiawar.

The Parthians

- They originally belonged to Iran and they replaced the Shakas in the NW India.
- During the times of Gondophernes, St.Thomas is said to have come to India for the propagation of Christianity.

The Kushans

- They were nomadic people of Central Asia who ruled from the Oxus to the Ganges.
- The Kadaphises I and II ruled for 28 years from 50 AD. They were replaced by the Kanishka.
- Peshawar was their first capital and Mathura the second.
- Kanishka started the Shaka era in 78 AD.
- Kanishka patronized Buddhism by holding a Buddhist council in Kashmir where the doctrines of the Mahayana form of Buddhism was finalized.

Impact of the Central Asian Contacts

- Advances in building activities and pottery
- They had a better cavalry
- They identified themselves as an integral part of India
- Satrapy system of Government developed
- They appointed military governors called Strategos
- Mahayana style of Buddhism developed with Gandhara and Mathura schools of Art supporting the Buddhism.

Kushans Empire

Background of Kushans

- Kushans succeeded the Parthian rulers.
- Yue-chi tribe was divided into five clans and they were one among them, also called as Tocharans.
- They were from steppes in north Central Asia and were nomadic.
- First, they occupy Bactria or north Afghanistan. Sakas were displaced there by them.
- Moving southwards gradually, they crossed the Hindu Kush and occupied Gandhara, and replaced Parthians and Greeks in those areas.
- The empire was vastly extending from Oxus and Khorasan in Central Asia to Ganga and Varanasi in Uttar Pradesh.
- Kushanas unified several parts of Central Asia, Iran, Entire Pak, and most part of Northern India bringing under one ruler.

Dynasties of Kushanas

There are 2 dynasties of the Kushan tribe that ruled India.

First:

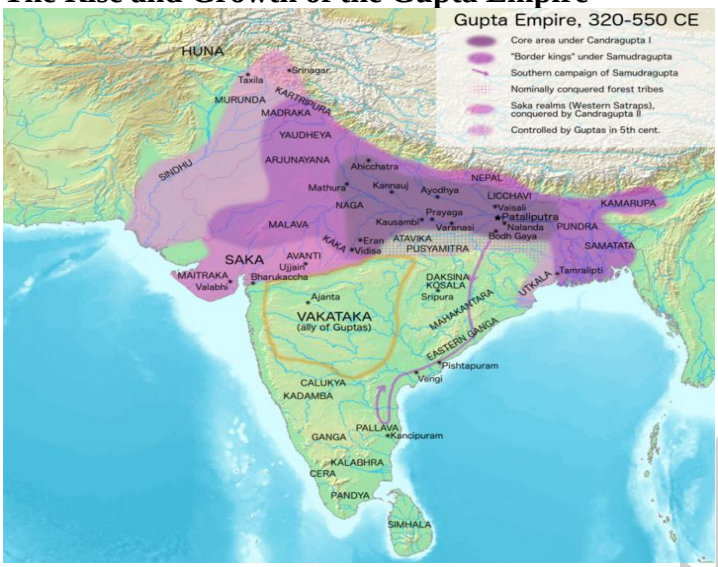
- Founded by Kadphises, House of chiefs.
- Term: 28 years starting from 50 AD
- Two rulers Kadphises I (Kujul Kadphises) and II (Vema Kadphises), ruled under this dynasty.
- They both issued a large number of Coins. Kadphises I, minted a large number of copper coins in sync with Roman coins. Kadphises II issued gold money and also expanded the kingdom to the far east.

Second:

- Kanishka succeeded the House of Kadphises. Kanishka kings further expanded the kingdom over lower Indus basin and upper India. The authority was much higher over the Gangetic basin.
- The large number and purer gold coins were issued by them, found mainly in the west of Indus.

- Kanishka continued to rule the northwestern part until 230 AD. Several of his successor intermingled completely into India, and also acquired Indian names. Vasudeva was the last ruler of the dynasty.

The Rise and Growth of the Gupta Empire



1. **Chandragupta I (319-334 AD)**
   - He was the first great ruler of the Gupta Dynasty. He assumed the title Maharajadhiraja. Married Licchhavi princess
   - Started the Gupta Era by 319-20 AD
   - The original type of Gold coins Dinaras was issued.
2. **Samudragupta (335-380 AD)**
   - He followed a policy of violence and conquest which led to the enlargement of the Gupta empire
   - Harisena, his court poet, vividly mentions his military exploits in Allahabad inscriptions
   - He reached Kanchi in the south which was ruled by Pallavas
   - Meghavarman, the ruler of Srilanka, sent a missionary for permission to build a Buddhist temple at Gaya
   - Samudragupta is called as Napoleon of India
3. **Chandragupta II (380-412 AD)**
   - He adopted the title Vikramaditya
   - He conquered Malwa and Gujarat which provided him access to the sea which enabled trade and commerce. Ujjain was made as the second capital
   - His court was adorned by *the Navaratnas* including Kalidasa and Amarasimha.
   - His exploits are glorified in *Iron Pillar* at *Qutub Minar*
   - Chinese pilgrim *Fa-Hsien (399-414AD)* visited India during his period.

1. **Art**

- Gupta period is called the Golden age of ancient India. Art was mostly inspired by Religions.
- **Rock cut caves –** Ajanta, Ellora and Bagh caves
- **Structural temples –** Dashavatar temple of Deogarh, Laxman temple of Sirpur, Vishnu temple and Varah temple of Eran. The growth of Nagara style also enabled the development of temple architecture in India
- **Stupas –** Dhammek stupa of Sarnath, Ratnagiri stupa of Orissa, Mirpur Khas in Sindh developed in this period.
- **Paintings –** Ajanta paintings and Bagh caves paintings
- **Sculpture –** the Bronze image of Buddha near Sultanganj, Sarnath and Mathura school flourished during this period which supports the growth of Mahayana Buddhism and Idol worship.
- Images of Vishnu, Shiva and some other Hindu gods were also found.

1. **Literature**
   - **Religious**
     Ramayana, Mahabharata, Vayu Purana etc were re-written. Dignaga and Buddhagosha were certain Buddhist literature written in this period
   - **Secular**
     a. **Mudrarakshasha** by Vishakadatta
     b. **Malavikagnimitra, Vikramorvashiyam, AbhijanaShakuntalam – Dramas by** Kalidasa
     c. **Ritusamhar, Megadoot, Raghuvamsam, Kumarasambhavam – Poetries** by Kalidasa

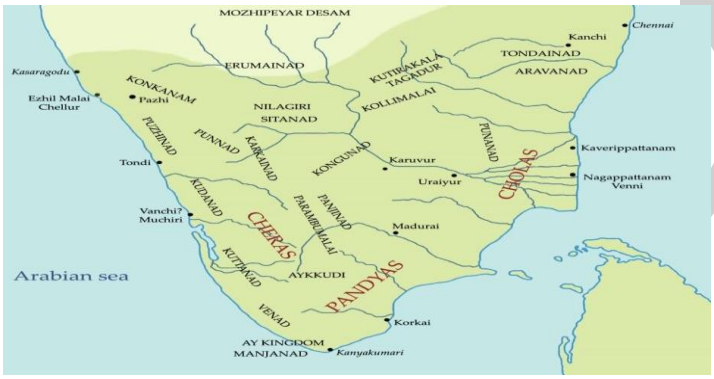
d. **Mricchakatika by** Sudraka
e. **Kamasutra** by Vatsyayana
f. **Panchatantra by** Vishnu Sharma

- **Scientific**
  a. **Aryabhatiya and Surya Siddhanta** by Aryabhatta
  b. **Romaka Siddhanta**
  c. **Mahabhaskarya and Laghubhaskarya by** Bhaskara
  d. **Pancha Siddhanta, Vrihat Jataka, Vrihat Samhita by** Vrahamihira

Sangam Age - The Dawn of History in the Deep South

Sangam Period

Sangam period is the period in the history of ancient Tamil Nadu spanning from c. 3rd century BC to c. 3rd century AD. It is named after the famous Sangam academies of poets and scholars centred in the city of Madurai.



Three early kingdoms

Kingdom	Capital	Port	Emblem	Famous Ruler
Cheras	Vanji – Modern Kerala	Muzuri and Tondi	Bow	Senguttuvan
Cholas	Uraiyur and Puhar	Kaveripatinam/ Puhar. They had an efficient Navy	Tiger	Karikalan
Pandyas	Madurai	Korkai for Pearl Fishing	Fish	Nedunzheriyan

Cheras

- They had Palmyra flowers as their Garland
- Pugalur inscriptions mention of three generations of Cheras
- Senguttuvan introduced Pattni cult or Worship of Kannagi as ideal wife

Cholas

- Karikalan built Kallanai (Check dam) against River Kaveri

Pandyas

- Maduraikkanji written by Mangudi Maruthanar describes the socio-economic conditions of the Pandyas
- Invasion by Kalbharas led to their decline

These kingdoms had a profitable trade with the Roman empire. They produced Pepper, Ivory, Pearls, Precious stones, Muslin, Silk, Cotton etc. which led to prosperity in their region.

Rise of social classes

- Enadi – captains of the army
- Vellalas – Rich peasants
- Arasar – ruling class
- Kadaisiyar – the lowest class
- Pariyars – agricultural labourers

Four castes mentioned in Tolkappiyam

- Arasar – Ruling class
- Anthanar – Brahmanas
- Vanigar – People involved in Trade and Commerce
- Vellalar – Labourers

Five-fold division of land

Land	Type of land	Chief deity	Chief occupation
Kurunji	Hilly tracts	Murugan	Hunting and honey collection
Mullai	Pastoral	Mayon	Cattle rearing and dealing with dairy products

Marudham	Agricultural	Indira	Agricultural
Neidhal	Coastal	Varunan	Fishing and salt manufacturing
Palai	Desert	Korravai	Robbery

Sangam administration

- **Avai** – the imperial court
- **Kodimaram –** tutelary tree of every ruler
- **Panchmahasabha**
    1. Amaichar – ministers
    2. Senatipathiar – Army chief
    3. Otrar – Spy
    4. Thoodar – Envoy
    5. Purohitar – Priest
- **Kingdom's division**
    1. Mandalam/Nadu – Province
    2. Ur – town
    3. Perur – Big village
    4. Sitrur – Small village

Sangams

Sangam	Place	Chairman	Surviving texts
1st	Then-Madurai	Agasthiyar	Nil
2nd	Kapadapuram	Agasthiyar and Tolkappiyar	Tolkappiyam
3rd	Madurai	Founder - Mudathirumaran Nakkirar	Ettutogai, Pattu Pattu (10 idylls)

Tamil language and Sangam literature

- **Narrative –** Ettutogai and Pattupattu which are called Melkankakku – 18 Major works. They are divided into Agam (love) and Puram (Valour)
- **Didactive –** Pathinenkilkanakku – 18 minor works. They deal with Ethics and Morals.
- **Thirukkural –** Written by Thiruvalluvar is a treatise covering various aspects of life.
- **Tolkappiyam** by Tolkappiyar is the earliest of Tamil literature. It is a work on Tamil Grammar but also provides information on Political and Social conditions of Sangam period

Epics

- **Silapadhikaram** by Elango Adigal
- **Manimegalai** by Sitthalai Sathanar
- **Valayapathi**
- **Kundalagesi**
- **Sivaga Sinthamani**

Chalukyas and Pallava Dynasty

THE CHALUKYAS

- Chalukyas were the Karnataka rulers and their History can be classified into three eras:

1. **The early western era** (6th - 8th century), the era which belonged to Chalukyas of Badami (Vatapi);
2. **The later western era** (7th - 12th century), the era which belonged to Chalukyas of Kalyani;
3. **The eastern Chalukya era** (7th - 12th century), the era which belonged to Chalukyas of Vengi. **Pulakeshin I** (543-566) was the first independent ruler of Badami dynasty. The capital of his kingdom was Vatapi in Bijapur. **Pulakeshin I** was succeeded by **Kirthivarma I** (566-596). After his untimely death, his brother **Mangalesha (597-610)** was made the caretaker ruler as the son of Kirthivarma I - **Prince Pulakesin II** was a baby. Mangalesha made several failed attempts to kill the prince but was killed himself by the prince and his friends. The most famous king of the Chalukyan dynasty was **Pulakeshin II** (610-642), the son of Pulakeshin I. Pulakeshin II was a contemporary of Harshavardhana. He defeated Harshavardhana **on the banks of the Narmada** and his reign is remembered as the greatest period in the history of Karnataka.
4. The rise of the Eastern Chalukyan Era was started by Pulakeshin II brother **Kubja Vishnuvardana** after conquering the **Kosalas** and the **Kalingas**.
5. **By 631**, the Chalukyan Empire was at its peak. It extended from sea to sea. Their fall

began when Pulkeshin II was defeated and killed by the Pallavas under the able leadership of **Narsimhavarma I**. The Pallavas attacked their capital Badami & captured it.

6. Under the leadership Of ***Vikramaditya I (655-681)*** the Chalukyas rose to power once again. ***Vikramaditya I*** defeated his contemporaries Pandya, Pallava, Cholas and Kerala rulers to establish his supremacy over the Chalukyan Empire in the southern region.
7. Vikramaditya I was succeeded by **Vikramaditya II** (733-745) who also defeated the Pallava king Nandivarma II to capture a major portion of the Pallava kingdom.
8. The fall of the Chalukyan Empire started with Vikramaditya II's son, **Kirtivarma II (745)**, who was defeated by the Rashtrakuta ruler, **Dhantidurga**, who went on to establish the Rashtrakuta dynasty.

PALLAVA DYNASTY

1. After the decline of the Satavahana dynasty, the **Pallava dynasty,** founded by **Shivaskandavarman** emerged in South India.
2. Kanchi was the capital of the Pallava dynasty.
3. Some of the leaders who are worth mentioning are Simhavarama I Sivaskandavarma I, Veerakurcha, Shandavarma II, Kumaravishnu I, Simhavarma II, and Vishnugopa.
4. The decline of the Pallavas started after Samudragupta defeated Vishugopa.
5. The Pallavas kingdom was re-established by **Simhavishnu**, the son of **Simhavarma II**, who ended the **Kalabhras**' dominance in **575 AD** and re-established his kingdom.
6. Vikramaditya I was defeated by **Parameshwaravarma I in 670** and restricted the advance of the Chlukyan king. Eventually, **Parameshwaravarma I** was defeated by the combined armies of the Chalukyas, the Pandyas (lead by their ruler Arikesari Maravarma) and another prominent enemy of the Pallavas.
7. **Narasimhavarma II**, a peace-loving ruler, succeeded **Parameshwaravarma I** after he died in 695. The **famous Kailashanatha temple at Kanchi** is built by **Narasimhavarma II.** After the accidental death of his elder sons in 722, **Narasimhavarma II** too died grieving.
8. **Parameshwaravarma II** the youngest son of **Narasimhavarma II,** came to power in 722 after the death of his father. The Pallava kingdom was in a state of disarray after the death of **Parameshwaravarma II** in 730 as he had no heirs to the throne.
9. After some brief infighting for the throne among the family, **Nandivarma II** came to power. Nandivarma then went on to marry the Rashtrakuta princess **Reeta Devi** and re-established the Pallava kingdom.
10. Dantivarma (796-846) succeeded **Nandivarma II** who ruled for 54 long years. Rastrakuta king **Dantidurga** defeated Dantvarma and was succeeded by Nandivarma III in 846.

Palas, Pratiharas, Rashtrakutas

The struggle for domination – Palas, Pratiharas and Rashtrakutas – tripartite struggle

- There was a common struggle between these kingdoms over the control of Kannauj which enabled them to control the fertile upper Gangetic plains

The Palas

- They dominated Eastern India.
- Founded by Gopala in 750 AD and succeeded by Dharam Pala. The Pala rulers were defeated by the Prathiharas and Rashtrakutas in the North.
- They were patrons of Buddhism.
- Dharmapala revived the Nalanda University by setting aside 200 villages for its expenses. He also founded Vikramashila University and built many Viharas for Buddhist monks.
- They had trade contacts and cultural links with South-East Asia. Sailendra Dynasty sent many ambassadors and asked permission to build a monastery near Nalanda

The Pratiharas

- They dominated Western India and Upper Gangetic valley
- The real founder and major ruler was Bhoja with title Adivaraha

- Al-Masudi, a Baghdad traveller, visited India during the times of Pratiharas in 915-16 AD
- Rajashekar, a great Sanskrit poet, and dramatist lived at the court of Mahipala
- The attacks by Rashtrakuta rulers, Indra III and Krishna III led to the faster dissolution of the empire

The Rashtrakutas

- They dominated Deccan and certain territories in North and South India. Kingdom was founded by Dandi Durga with capital at Malkhed
- Amogavarsha was a great king. He was credited with writing the first poetics book in Kannada. He also built the Capital city, Manyakhet.
- They were in the constant contest with the Pallavas, the Cholas and the Chalukyas in the South
- Krishna I built the rock-cut temple of Shiva at Ellora
- They had a tolerant religious policy which favoured their foreign trade

Political ideas and Organizations

- The king was the centre of administration and his position became hereditary
- Royal household = Antahpur
- Administration in Palas and Pratiharas
    1. Bhukti – Province under Uparika
    2. Mandala or Visaya – district under Visayapati
    3. Group of Villages – Samanthas or Bhogapatis.
    4. Pattala – smaller unit
- Administration in the Rashtrakutas
    1. Rashtra – Province under Rashtrapati
    2. Visaya – district
    3. Bhukti – smaller unit
- Grama-Mahajana – Village elder
- Kotwal – responsibility to maintain law and order
- Nad-Gavundas/Desa-gramakutas – hereditary revenue officers in Deccan

The Chola Empire

- The Chola empire, which arose in the 9th century, brought a large part of the Peninsula under their control. With a strong Navy, they conquered Sri Lanka, Maldives and had a strong foreign trade.
- The empire was founded by Vijaylala, a feudatory of Pallavas, in 850 AD.
- Rajaraja (985-1014) and Rajendra I (1014-1044) were the greatest Chola kings. They followed a policy of annexation which included annexing Sri Lanka, Maldives, Pandyas and Cheras to control the prosperous trade with South-East Asian countries
- Rajarajeshwara temple was built in 1010 at Tanjore.
- Rajendra I assumed the title Gangaikondachola (the Chola conqueror of Ganga) and instituted a new capital at the banks of Kaveri called "Gangaikondacholapuram"
- Rajendra I also undertook a naval expedition against revived Sri Vijaya Empire of Indo-China
- The ruler of Sailendra dynasty had built a Buddhist monastery at Nagapattinam.
- The strong navy of Chola led to the conversion of Bay of Bengal into "Chola lake"
- The Cholas encouraged Local Self-Government in the villages under their administration

Chola Government

- The King administered his territories with advice from his Council of Ministers
- Chola administration
    1. Mandalams – Provinces
    2. Valanadu – minor provinces
    3. Nadu – district
    4. Kurram – a group of villages
- Infrastructure: Royal roads were built, irrigation projects were undertaken
- Village assemblies: the Ur – general assembly of the village; the Mahasabha – the gathering of adult men in Brahmana villages which were called Agraharas

Cultural life

- Kailashnath temple in Kanchi, Brihadeswara temple in Tanjore are examples of Dravidian architecture
- After the fall of Cholas, the Hoysalas continued the tradition with building temples in Halebid (Hoysaleshwara temple), an example of Chalukyan architecture.

- Sculpture art attained its heights with Gomateshwar statue in Sharvana Belagola and Bronze Nataraja statue
- Bhakti movement started with Alvars and Nayanars flourished in 6th to 9th Their writings "Tirumurai" is seen as Fifth Veda. Kamban's Ramayan is also considered as a classic in Tamil literature.
- Pampa, Ponna, and Ranna are regarded as the three gems of Kannada Poetry

The Rajput States

Rajputana

There was an expansion of aggressive and expansionist Turk tribesmen in the North-western India whose main mode of warfare was rapid advance and retreat. The disintegration of Gurjara-Pratiharas in North-Western India led to a time of political uncertainty.

The Ghaznavids

- Mahmud (998-1030) ascended the throne of Ghazni
- Firdausi was a court-poet of Ghazni. His famous work "Shah Namah" was a watershed in Iranian renaissance
- Mahmud was a plunderer and destroyer of temples. In 1025, he raided and plundered the Somnath temple in Gujarat. He undertook 17 raids in India and constantly fought against the Hindushahi rulers
- Seljuk Empire was established with the death of Mahmud

The Rajput States

- The break-up of the Pratiharas empire led to the formation of Rajputana states.
- Few important of these were-
  (a) Gahadavalas of Kannauj
  (b) Paramaras of Malva
  (c) Chauhans of Ajmer
- Few other significant states were Kalachuris near Jabalpur, Chandellas in Bundelkhand, Chalukyas of Gujarat, Tomars of Delhi etc.
- Rajputs patronized Hinduism and Jainism to a certain extent.
- They also upheld the Varna system and the Privileges of Brahmanas

Turkish Conquests

- The Seljuk empire was replaced by Khwarizmi empire in Iran and Ghurid empire in Ghur.
- Muizzudin Muhammed ascended the throne at Ghazni while Chauhan's powers were also constantly rising. With the capture of Delhi, the Chauhans and Ghurids were in the direct contest.
- 1st Battle of Tarain (1191) Muhammed Ghori Vs. Prithviraj Chauhan – Ghurids lost the battle
- 2nd Battle of Tarain(1192) Muhammed Ghori Vs. Prithviraj Chauhan – Prithviraj Chauhan lost the battle. This led to Delhi and Eastern Rajasthan passing under the Turkish rule.
- Muhammad Ghori entrusted the positions under Qutbuddin Aibak, who later found the Slave dynasty and led to the foundations of Delhi Sultanate. Bakthiyar Khalji has entrusted the positions east of Benares.

The Chauhans of Ajmer

- The Chauhans were the feudatories of Gurjara-Pratiharas
- Ajayaraj Chauhan, king of Sakhambari established a city called Ajayameru which was later known as Ajmer
- His successor Vigraharaj captured Dhillika from Tomar Kings
- After the defeat of Prithviraj Chauhan, the dynasty was weakened.
- Qutbuddin Aibak dealt the final blow by defeating the dynasty in 1197 AD.

The Tomars of Delhi

- The Tomars were the feudatories of the Pratiharas.
- They founded the city of Delhi in 736 A.D. During 9th-12th century, the Tomars of Delhi ruled parts of the present-day Delhi and Haryana.
- Mahipala Tomar captured Thaneshwar, Hansi and Nagarkot in 1043 A.D.
- Chauhans captured Delhi in middle of the 12th century and the Tomars became their feudatories.

Mewar

- Mewar is a region of south-central Rajasthan state in western India.
- It includes the present-day districts of Bhilwara, Chittorgarh, Rajsamand, Udaipur, Pirawa Tehsil of Jhalawar District of Rajasthan, Neemuch and Mandsaur of Madhya Pradesh and some parts of Gujarat.

- The region was a part of the Rajput-ruled Mewar Kingdom or the Udaipur Kingdom. In 1568, Akbar captured Chittorgarh, the capital of Mewar.

Maha Rana Sanga (1508 - 1528)

- Rana Sanga of Mewar belonged to the Sisodiya clan who was a contemporary to Ibrahim Lodhi and Babur.
- **The Battle of Khanwa, 1527** took place between Babur and Rana Sanga in which Babur won and established the Mughal's rule firmly in North India.

Maha Rana Pratap (1572 - 1597)

- Rana Pratap of Mewar belonged to the Sisodiya Rajputs as was Rana Sanga.
- He was a contemporary of Akbar.
- When Akbar sent a number of envoys in making Rana Pratap as a vassal and submitting to Akbar, Rana refused and the Battle of Haldighati was fought on 1576 between Raja Man Singh I of Amber and Maha Rana Pratap in which Maha Rana Pratap was defeated by the Mughals.

Marwar

- In 1194, Mahmud of Ghori defeated Jaichand of Kannauj.
- His descendant, Sheoji, established themselves at Mandore city in Marwar.
- The Jodhpur state was founded in the 13th century by the Rathore clan of Rajputs, who claim descent from the Gahadvala kings of Kannauj.
- The Rathore rulers of the Indian princely state of Jodhpur were of an ancient dynasty established in the 8th century.
- However, the dynasty's fortunes were made by *Rao Jodha*, first of the rulers of the Rathore dynasty in Jodhpur in 1459.

The Chandelas of Bundelkhand

- Established them in the 9th century. Harshadeva was the founder of this dynasty.
- Bundelkhand was also known as Jejakabhukti
- Mahoba was the capital of Chandela during the period of Chief Yasovarman
- Kalinjar was their important fort.
- The Chandelas built the most famous Kandariya Mahadeva Temple in 1050 A.D. and a number of beautiful temples at Khajuraho. Vidyadhara is noted for having commissioned the Kandariya Mahadeva Temple.
- Paramal the last Chandela ruler was defeated by Qutb-ud-din Aibak in 1203 A.D.

The Paramaras of Malwa

- They were a part of Agnivanshi Rajput dynasty. Established in 9-10th Century, they were vassals of Rashtrakutas
- They made Dhar as their capital. Bhoja was an important ruler in their period.
- The later Paramara rulers moved their capital to Mandu after Dhar was sacked multiple times by their enemies.
- Mahalakadeva, the last known Paramara king, was defeated and killed by the forces of Alauddin Khalji of Delhi in 1305 CE

The Chalukyas of Gujarat

- The Chalukya dynasty ruled parts of what is now Gujarat and Rajasthan in north-western India, between c. 940 CE and c. 1244 CE. Their capital was located at Anahilavada (modern Patan).
- Mularaja was the founder of the dynasty. During the rule of Bhima, I, Mahmud of Ghazni plundered Somnath temple.
- Mularaja is said to have built Mulavasatika temple for Digambara Jains and the Mulanatha-Jinadeva temple for the Svetambara Jains.
- The Dilwara Temples and the Modhera Sun Temple have constructed during the reign of Bhima I.
- Rani-ki-Vav was commissioned by Queen Udayamati

The Kalachuris of Tripuri

- The Kalachuris of Chedi, ruled parts of central India during 7th to 13th centuries from their capital Tripuri near Jabalpur.
- The kingdom reached its zenith during the reign of *Lakshmikarna*, who assumed the title *Chakravartin* after military campaigns against several neighbouring kingdoms
- The Karan temple at Amarkantak was built by Lakshmikarna (1041 – 1173 CE)

Vijayanagar and Bahmani Empire

Vijayanagar Kingdoms

The Sangama Dynasty

- Sangama dynasty was founded by Harihara and Bukka, who were the feudatories of Kakatiyas of Warangal in 1336.

Year	Ruler	Significance
1336 – 1356	Haihara I	Laid the foundations of Vijayanagar empire
1356 – 1379	Bukka I	Strengthened the city of Vidyanagar and renamed it to Vijaynagar
1379 – 1404	Harihara II	Son of Bukka I
1406 – 1422	Deva Raya I	1) Built a dam across Tungabadhra 2) *Nicolo de Conti* visited Vijaynagar 3) Induction of Muslim cavalrymen and archers in army begun
1423 – 1446	Deva Raya II	1) He was called *Praudh Deva Raya* 2) His inscriptions have the title *Gajabetekara* 3) *Dindima* was the court poet 4) *Abdur Razzak*, Persian Traveler, envoy of Sharukh visited Vijaynagar

The Suluva Dynasty

Year	Ruler	Significance
1486 – 1491	Suluva Narashima	Founder of Suluva dynasty
1491	Tirumal Narasimha	Minor during the reign of Narasa Nayaka
1491 – 1505	Immadi Narashima	Vasco-da-Gama landed in Calicut during his reign

The Tuluva dynasty

Year	Ruler	Significance
1505 – 1509	Vira Narashima	Son of Narasa Nayaka, became the King after assassinating Immadi Narashima
1509 – 1529	Krishna Deva Raya	1) He re-established the internal law and order situation and restored the old territories of Vijayanagar which were usurped by other powers. 2) Architecture: he built the Vijay Mahal, Vithal swami temple and Hazara Mahal. 3) Foreign Travelers: Duarte Barbosa and Dominigo Paes were Portuguese travellers who visited Vijayanagar empire. 4) The Ashtadiggajas: Peddana, Timmaya, Bhattamurthi, Dhurjati, Mallan, Raju Ramachandra, Surona and Tenali Ramakrishna. 5) He maintained the friendly relationship with Portuguese governor *Albuquerque* 6) He took the titles *Yavanaraja Sthapnachrya, Abhinava Bhoja, Andhra Pitamaha etc* 7) Literature: he composed *Amuktamalayada* –Telugu work on Polity and *Jambavati Kalyanam* – Sanskrit Drama
1529 – 1542	Achyuta Deva Raya	*Farnao Nunij*, a Portuguese horse trader visited Vijaynagar
1542	Venkata I	Rama Raja exercised real power
1543 – 1576	Sadashiva Raya	The Battle of Talikota was fought in 1565 in which the five kingdoms of the Bahmani Empire fought against the Vijaynagar and imposed a crushing defeating on Vijaynagar, executing Rama Raja and looting the city and destroying it completely

		Caesar Frederick, a Portuguese traveller, Visited Vijaynagar

The Araveedu dynasty (1570 – 1650 AD)

- Tirumal Raya ruled in this period in the name of Sadashiva Raya. He shifted his capital from Vijaynagar to Penugonda.

Administration in the Vijaynagar Empire

- Territorial division
    1. Rajyas or Mandalams – Provinces
    2. Nadu – District
    3. Sthala – Sub-district
    4. Grama – Village
- *Ayngar System*, a body of 12 functionaries to conduct village affairs developed.
- Pagodas/Varahas – Gold coins issued in Vijaynagar
- *Amaram* – territory with fixed revenue were given to Military chiefs called *Palaiyagar* or *Nayaks* who had to maintain a fixed number of horses, elephants and foot soldiers for the service of the state

Architecture

- They had a vibrant combination of Chalukyan, Hoysala, Pandya and Chola style in their temple architectures.
- *Dravida style* was developed in Vijaynagar which had a large number of Pillars and Piers.
- Mandapas with rising platforms were made along with Amman Shrine in temples
- Stories of Ramayana and Mahabharata were inscribed on the walls of Vijaynagar temples.
- Important temples are
    1. Vithalswami and Hazara Rama temple – Hampi
    2. Tadapatri and Parvati temple – Chidambaram
    3. Varadaraja and Ekambranath Temple - Kanchipuram

The Bahmani Empire

- The Bahmani Empire was situated in the north and acted as a dominating rival to the Vijaynagar Empire.
- It was founded by an Afghan, Alauddin Hasan in 1347.
- For the *first* time, the use of *Artillery* was heard in their battles.
- The Bahmani capital was Hasanabad (Gulbarga) between 1347 and 1425 when it was moved to Muhammadabad (Bidar)

Year	Ruler	Significance
1347 – 1358	Allaudin Hasan Bahman Shah	Known as Hasan Gangu, founded the Bahmani kingdom with capital at Gulbarga
1397 – 1422	Tajuddin Firoz Shah	1) He determined to make Deccan as the cultural centre of India due to the decline of Deccan Sultanate in the North 2) He improvised the ports of Chahul and Dabhol 3) He inducted Hindus in administration on a large scale 4) He encouraged the pursuit of Astronomy and built an observatory near Daulatabad
1422 – 1435	Ahmad Shah	1) Last great ruler who transferred the capital from Gulbarga to Bidar 2) He was called as Wali for his association with Sufi Gesu Daraz
1463 - 1482	Mahmud Gawan	1) He was granted the title Malik-ul-Tujjar and was the Prime minister of Sultan Muhammad Shah III Lashkari 2) His military expeditions led to the weakening of the Vijaynagar Empire. The loss of the port of Goa and Dabhol dealt a serious blow to the Vijaynagar Empire 3) He divided the kingdom into 8 provinces or Tarafs, each governed by a Tarafdar 4) Khalisa lands were set aside for the expenses of Sultan 5) He built a magnificent Madarasa in Bidar

Dynasties of Delhi Sultanate

Dynasty	Period of Rule	Prominent rulers
Mamluk or Slave dynasty	1206 – 1290	Qutubuddin Aibek, Iltutmish, Razia Sultan, Ghiyasuddin Balban
Khilji dynasty	1290 – 1320	Alauddin Khilji
Tughlaq dynasty	1321 – 1413	Muhammad Bin Tughlaq, Firoz Shah Tughlaq
Sayyid dynasty	1414 – 1450	Khizr Khan
Lodhi dynasty	1451 – 1526	Ibrahim Lodhi

Slave Dynasty (1206-1290)

Year	Ruler	Important Facts
1206 - 1210	Qutbuddin Aibak	1) Most trusted slave of Muhammed of Ghori 2) Died in 1210 while playing *Chaughan* (Polo) 3) He was granted the title *Lakh Bakhsh* 4) He constructed the *Quwat-ul-Islam* mosque in Delhi and *Adhai din ka jhonpra* at Ajmer 5) He also started the construction of *Qutb Minar* in the honour of Sufi saint *Khwaja Qutbuddin Bakthiyar Kaki*
1210 – 1236	Illtutmish	1) The real consolidator of Turkish conquests 2) He saved the Delhi Sultanate from the invasion of the Mongol, *Chengiz Khan* 3) He introduced the currency system of Tanka and Jittal 4) He organized *Iqta System* – land grant to soldiers and nobility 5) He set up the *Chahalgani* system – nobility of 40 members 6) He completed the construction of Qutb Minar
1236 – 1240	Razia Sultana	1) The first and the only Muslim lady who ever ruled India 2) Though a popular ruler, she was disliked by the Chahalgani who wanted to put a puppet ruler at the throne 3) She was defeated and killed by Bandits while in a fight
1240-1266	An era of weak rulers	After the death of Raziya, weak rulers ascended the throne, who were supported by the Nobles. Bahram Shah, Masud shah and Nasiruddin Muhammad were the successors.
1266 – 1287	An era of Balban	1) A strong and centralized government was established 2) He acted as a champion of Turkish Nobility 3) He broke the strength of Chahalgani to restore the powers of the Monarchy 4) He established *Diwan-i-arz*, military department towards a strong army 5) He adopted a policy of blood and iron to restore the law and order problems 6) He insisted on the ceremony of *Sijada and Paibos* 7) He took up the title *Zil-i-illahi*
1218 - 1227	**Changez Khan**	1) The Mongol leader who prided in being called the *Scourge of God* 2) They attacked the Khwarizmi empire and sacked the flourishing cities 3) Delhi Sultanate became the only important Islam state of this period 4) Illtutmish, in 1221, refused an asylum request of Jallaudin, who was defeated

		by Changez Khan. Changez Khan did not cross River Indus, which saved the weak sultanate from loot and plunder.

The Khaljis (1290- 1320)

Year	Rulers	Important Facts
1290 – 1296	Jalaluddin Khalji	1) He checked the monopoly of Turkish nobility and followed a policy of tolerance
1296 – 1316	Allauddin Khalji	1) He separated religion from politics and proclaimed, 'Kingship knows no kinship' 2) He followed an imperialist and annexation policy. He annexed Gujarat, Ranthambore, Malwa, Mewar etc **Administrative reforms** 1) By series of 4 Ordinances, Allaudin took steps to avoid the problems caused by the nobles 2) He introduced the Dagh – branding of horse and Chehra – a descriptive roll of soldier's system. 3) By setting up markets, Allauddin fixed the cost of all commodities 4) He constructed the *Alai fort* and *Alai Darwaza* – entrance of Qutb Minar 5) He also built the palace of thousand pillars called *Hazar Sutun* 6) Amir Khusrau was the court poet of Allaudin
1316 – 1320	Mubarak Khan	
1320	Khusrau Khan	Ghazi Malik deposed Khusrau Khan in a rebellion.

Tughlaq dynasty (1320-1412)

Emperor	Period
Ghiyasuddin Tughlaq	1320-24
Muhammad Tughlaq	1324-51
Firoz Shah Tughlaq	1351-88
Mohammad Khan	1388
Ghiyassuddin Tughlaq Shah II	1388
Abu Baqr	1389-90
Nasiruddin Muhammad	1390-94
Humayun	1394-95
Nasiruddin Mahmud	1395-1412

Ruler	Period of Rule	Important facts
Ghiyasuddin Tughlaq	1320-1325	1. Khusrau Khan, the last king of the Khilji dynasty was killed by Ghazni Malik, and Ghazni Malik ascended the throne assuming the title Ghiyasuddin Tughlaq. 2. He died in an accident and his son Jauna (Ulugh Khan) succeeded him under the title Mohammad-bin-Tughlaq.
Mohammad-bin Tughlaq	1325-1351	1. Prince Jauna, Son of Ghiyasuddin Tughlaq ascended the throne in 1325 2. He tried to introduce many administrative reforms. He had 5 ambitious projects for which he has become **particularly debatable.** Taxation in the Doab (1326) Transfer of Capital (1327) Introduction of Token Currency (1329) Proposed Khurasan Expedition (1329) Qarachil Expedition (1330) 3. His five projects have led to revolts all around his empire. His last days were spent in checking the revolts 1335 -- Madurai became independent (Jalaluddin Ahsan Shah) 1336 -- Foundation of Vijayanagar (Harihar & Bukka), Warangal became independent (Kanhaiya)

		1341-47 -- Revolts of Sada Amirs & Foundation of Bahamani in 1347 (Hasan Gangu) He died in Thatta while campaigning in Sindh against Taghi, a Turkish slave.
Firoz Shah Tughlaq	1351-1388	1. He was a cousin of Mohammad-bin-Tughlaq. After his death, the nobles and the theologians of the court selected Firoz Shah as the next Sultan. 2. Established of Diwan-i-Khairat (department for poor and needy people) and Diwan-l-Bundagan (department of slaves) 4. Making Iqtadari system hereditary. 5. Construction of canals for irrigation from the Yamuna to the city of Hissar 6. From the Sutlej to the Ghaggar. From the Ghaggar to Firozabad 7. From Mandvi and Sirmour Hills to Hansi in Haryana. 8. Establishment of four new towns, Firozabad, Fatehabad, Jaunpur and Hissar.
After Firoz Shah Tughlaq	1388-1414	1. The Tughlaq dynasty would not survive much after Firoz Shah's death. The Malwa, Gujarat and Sharqi (Jaunpur) Kingdoms broke away from the Sultanate. 2. Timur Invasion: (1398-99) Timur, a Turk, invaded India in 1398 during the reign of Muhammad Shah Tughlaq, the last ruler of the Tughlaq dynasty. His army mercilessly sacked and plundered Delhi. 3. Timur returned to Central Asia, leaving a nominee to rule to Punjab which ended the Tughlaq dynasty.

Sayyid dynasty (1414 – 1450)

Emperor	Period
Khizr Khan	1414-21
Mubarak Shah	1421-33
Muhammad Shah	1421-43
Alauddin Alam Shah	1443-51

Ruler	Period of Rule	Important facts
Khizr Khan	1414-1421	1. Timur's nominee captured Delhi and was proclaimed the new Sultan and the first of the Sayyid Dynasty. 2. They ruled over Delhi and surrounding districts.
Mubarak Shah	1421-1434	1. He succeeded Khizr at the throne after his successful expeditions against Mewatis, Katehars and the Gangetic Doab area. 2. He was killed by the nobles in his own court.
Muhammad Shah	1434-1443	1. The nobles put Muhammad Shah on the throne, but could not survive the in-fighting among the nobles in the court. 2. He was authorized to rule a meagre area of around 30 miles and rest of the Sultanate was ruled by the nobles.
Alam Shah	1443-1451	The last Sayyid king descended in favour of Bahlol Lodhi and he retired. Thus began the Lodhi dynasty, which confined to Delhi and a few surrounding areas.

The Lodhi Dynasty (1451-1526 AD)

Ruler	Period of Rule	Important facts

Bahlol Lodhi	1451-88	1. Bahlol Lodhi was one of the Afghan sardars who established himself in Punjab after the invasion of Timur 2. He founded the Lodhi dynasty. He founded the rule of the Lodhi dynasty by usurping the throne from the last of the Sayyid rulers. 3. He was a strong and brave ruler. He tried to restore the glory of Delhi by conquering territories around Delhi and after the continuous war for 26 years, he succeeded in extending his authority over Jaunpur, Rewail, Itawah, Mewar, Sambhal, Gwalior etc. 4. He was a kind and generous ruler. He was always prepared to help his subjects. 5. Though he was himself illiterate, he extended his patronage to art and learning. He died in 1488.
Sikandar Lodhi	1489-1517	1. Sikandar Lodhi was the son of Bahlol Lodhi who conquered Bihar and Western Bengal. 2. He shifted his capital from Delhi to Agra, a city founded by him. 3. Sikandar was a fanatical Muslim and he broke the sacred images of the Jwalamukhi 4. Temple at Naga Kot and ordered the temples of Mathura to be destroyed. 5. He took a keen interest in the development of agriculture. He introduced the Gaz-i-Sikandari (Sikandar's yard) of 32 digits for measuring cultivated fields. 6. He was a staunch Sunni and a Muslim fanatic. He lacked religious tolerance. In the name of religion, he perpetuated untold cruelties on the Hindus.
Ibrahim Lodhi	1517-26	1. He was the last king of Lodhi dynasty and the last Sultan of Delhi 2. He was the son of Sikandar Lodhi 3. The Afghan nobility was brave and freedom-loving people but it was because of its fissiparous and individualistic tendencies that the Afghan monarchy was weakened. Moreover, Ibrahim Lodhi asserted the absolute power of the Sultan. 4. At last Daulat Khan Lodhi, the governor of Punjab invited Babur to overthrow Ibrahim Lodhi; Babur accepted the offer and inflicted a crushing defeat on Ibrahim Lodhi in the first battle of Panipat in 1526. 5. No Sultan of India except Sultan Ibrahim had been killed on the battlefield.

Important Central Departments

Department	Function
Diwan-i-Risalat (Foreign Minister)	Department of appeals
Diwan-i-Ariz	Military department
Diwan-i-Bandagan	Department of slaves
Diwan-i-Qaza-i-Mamalik	Department of justice
Diwan-i-Isthiaq	Department of pensions
Diwan-i-Mustakhraj	Department of arrears
Diwan-i-Khairat	Department of charity

Diwan-i-Kohi	Department of agriculture
Diwan-i-Insha	Department of correspondence

Important Central Officials

Post	Role
Wazir	The Chief Minister of the State in Charge of revenue and finances, controlled by other departments.
Ariz-i-Mamlik	Head of Military department
Qazi	Legal Officer(dispensed civil law based on Muslim law Shariat)
Wakil-i-dar	Controller of the royal households.
Barid-i-mumalik	Head of the state news agency
Amir-i-majlis	Officer-in-charge of royal feasts, conference and festivals.
Majlis-i-am	Council of friends and officers consulted on important affairs of the state.
Dahir-i-mumalik	Head of the royal correspondence.
Sadr-us-sudur	Dealt with religious matters and endowments.
Sadr-i-Jahan	Officers-in-charge of the religious and charitable endowment.
Amir-i-dad	Public prosecutors
Naib wazir	Deputy Minister
Mushrif-i-mumalik	Accountant general

Mughal Empire

Mughal Empire		
1526 – 1530 AD	Babur	Founder of Mughal empire after the 1st Battle of Panipat
1530 – 1540 AD 1555 – 1556 AD	Humayun	He was defeated by Sher Shah
1540 – 1555 AD	Sur Empire	Sher Shah defeated Humayun and ruled from 1540-45 AD
1556	2nd Battle of Panipat	Akbar Vs. Hemu
1556 – 1605 AD	Akbar	Established Din-i-illahi, expanded Mughal empire
1605 – 1627 AD	Jehangir	Captain William Hawkins and Sir Thomas Roe visited the Mughal court
1628 -1658 AD	Shahjahan	The pinnacle of Mughal empire and art and architecture
1658 – 1707 AD	Aurangazeb	Beginning of the decline of Mughal empire
1707 – 1857 AD	Later Mughals	Decline and disintegration of the Mughal empire with gaining strength of the British

Babur (1526 - 1530)

- **Babur,** the founder of Mughal Empire in India, traced his ancestry to the Timurid dynasty.
- In 1517 Ibrahim Lodhi succeeded Sikander Lodhi.
- Embassies from Daulat Khan and Rana Sanga inviting Babur to displace Ibrahim Lodhi led to *the 1st Battle of Panipat* in 1526.
- Babur used an Ottoman (Rumi) device in this war.
- Babur also heavily used Gunpowder in this war, though it was known in India in earlier times.
- *The Battle of Khanwa* (1527) was fought between Rana Sanga and Babur. With the defeat of Sanga, Babur's position got strengthened in the Gangetic plains.
- He declared the war as a *Jihad* and assumed the title *Ghazi* after his victory.

- Babur composed Tuzuk-i-Baburi, a Masnavi and the Turkish translation of a well-known Sufi work. Tuzuk-i-Baburi was translated into Persian as Baburnama by Abdur Rahim Khankhana
- He built two mosques, one at Kabulibagh, Panipat and another in Sambhal, Rohilkhand

Humayun (1530 – 1540 and 1555 - 1556)

- Humayun became the Mughal Emperor on 29 December 1530 at the age of 23.
- In the Battle of Chausa, 1539, Humayun was defeated for the first time by Shershah Suri.
- In the next year (1540) Shershah completely defeated Humayun in the Battle of Kanauj and founded the Sur dynasty.
- After the lapse of 15 years, Humayun re-captured the Empire by defeating the last Sur ruler Sikandar Shah Suri in the Battle of Sirhindh, 1555, after which he ruled only for 6 months.
- The period from 1540 to 1555 is known as the period of the temporary eclipse of the Mughal.
- Humayun died by an accidental fall from the staircase of his Library 'Shermandal' at the Puranakwila in Delhi on 24 January 1556.
- Humayun was an accomplished mathematician and astronomer. He earned the title *Insan-i-Kamil* (Perfect Man), among the Mughals
- Humayun's biography Humayun Namah was written by Humayun's sister Gulbadan Begum. The language used to write this biography was a mixture of Turkish and Persian.

Architecture during Humayun's Period

- The Purnakwila was constructed by Humayun but its construction was completed by Shershah.
- Humayun's tomb is situated in Delhi (the first building in India having double domes) which was built by Haji Begum
- In 1533 Humayun built the city of Dinpanah (world refuge) in Delhi.

Sher Shah Suri (Sur Empire)

- Shershah's original name was Farid.
- His family came to India from Afghanistan.
- In *the Battle of Chausa*, 1539, Sherkhan defeated Humayun for the first time and assumed the name Shershah.
- Later in 1540 he completely defeated Humayun in *the Battle of Kanauj* and founded the Sur dynasty.

Architecture:

- Shershah constructed the Grand Trunk Road from Sohargaon to Attock (Calcutta to Amritsar) He introduced the National Highway concept for the first time in India. Now the Grand Trunk Road is known as Shershah Suri Marg. Its part from Delhi to Amritsar is known as National Highway -1.
- He also built roads from Agra to Jodhpur and Chittoor and Lahore to Multan. He built Sarais at a distance of every two Kos. These sarais later developed into Market towns, Qasbas. They were also used as stages for news-services, Dak-Chowkis.
- He built the Purana Qila in Delhi (its Construction was started by Humayun) and his own Mausoleum (Tomb) at Sasaram in Bihar.
- He also constructed the Khooni Darwaza (blood-stained gate) the gateway of Firozshah Kotla in Delhi.

Economy and Administration

- He was the first ruler to introduce Silver *Rupiya* (one rupiya was equal to 64 dams) and gold coin *Ashrafi*.
- Administrative divisions:
    1. Iqta – Province under Haqim or Amin
    2. Sarkar – District under Shiqdar-i-Shiqadaran or Munsif-i-Munsifan
    3. Pargana – Taluk under Shiqdar or Munsif
    4. Gram – Village under Muqqadam or Amil
- He made local Muqaddams/Zamindars responsible for local crimes
- Hindi poet Malik Muhammed Jayasi completed his Padmavat, during his reign.

Mughal Empire

Akbar (1556 - 1605)

Year	Significance
1556	Akbar ascends the throne at the age of 14

1556	2nd Battle of Panipat between Hemu and Bairam Khan(khan-i-khannan). Hemu gets defeated in the battle
1560	Akbar becomes independent at the age of 18 and dismisses Bairam Khan
1564	Abolition of Jizyah tax
1571	Foundation of Fatehpur Sikri, near Agra, was laid
1574	Mansabdari system introduced
1575	Ibadatkhana was built
1576	Battle of Haldihatti fought between Rana Pratap and the Mughal army led by Raja Man Singh
1580	Dahsala Bandobast system introduced
1582	Din-i-illahi – a new religion was propounded by Akbar which was s synthesis of values taken from several religions like Hinduism, Islam, Jainism etc. It was a move against religious orthodoxy and bigotry. He followed the policy of *Sulh-kul* or peace to all.

- Akbar was an **illiterate person**, but he was a patron of men of eminence. He maintained a Scholastic Assembly (Navratnas) in his court. They included the following personalities.
- Abul Fazal: Akbar's court historian who wrote Akbar's biographical works Ain-i-Akbari and Akbar Namah.
- Abul Faizi: Persian poet and brother of Abul Fazal. He translated Mahabharata into Persian in name 'Razam Namah' and Bhaskaracharya's mathematical work Leelavati into Persian.
- Mian Tansen: His original name was Ram Thanu Pande. He was the court Musician of Akbar. He composed a Raga, Rajdarbari in honour of Akbar.
- Birbal: His real name was Mahesh Das. He was the court jester of Akbar.
- Raja Todarmal: Raja Todarmal was Akbar's finance or revenue minister. He formulated Akbar's revenue system Zabti and Dashala systems. Raja Todermal also translated Bhagavatapurana into Persian.
- Maharaja Man Singh: Akbar's military commander.
- Bhagawandas: Son of Bharmal
- Abdur Rahim Khankhana: Hindi Poet
- Mulla Do Pyaja

Administration

Land revenue

- Akbar started the *Annual assessment* system where land was assessed by *Qanungos* or hereditary holders of land and tax collected by *Karoris*.
- In 1580, a new system *Dahsala* (prices over the last 10 years) were calculated. The land was measured using the *Zabti* system which was an improvement over the Dahsala system. It was also known as Todarmal's *Bandobast*
- In *Batai* system, the production was divided in fixed proportions.
- In *Nasaq* system, rough calculation of Peasant's payments over the past years was calculated and the empire's share was fixed.
- Types of Cultivable Lands
    1. Polaj – land under cultivation every year
    2. Paratti – fallow land
    3. Chanchar – land fallow for 2-3 years
    4. Banjar – land fallow more than 2-3 years
- Taccavi – loans to the peasants
- Land divisions for the purpose of revenue
    1. Khalisa – lands kept separately to meet the expenses of the emperor
    2. Jagir – land was given to nobles or mansabdars to meet their expenses
    3. Inam – land was given to religious persons

Mansabdari System: This was introduced to maintain a huge army. Ranks (Mansabs) were awarded to nobles. They were divided into Zat (Personal status) and Sawar (Cavalryman required to maintain). Along with this, Dagh and Chehra system were also followed. Mansabdars were assigned Jagirs which they used to pay the salary of soldiers

Important Posts:

- Wazir/Diwan – Head of Revenue department
- Subedar – Governor of a province
- Mir Bakshi – head of Military who was also the head of nobility

- Barids – Intelligence officers
- Waqia-navis – news reporters
- Mir Saman – in charge of imperial households and royal workshops (Karkhanas)
- Chief Qazi – head of Judicial departments
- Chief Sadr – responsible for charitable and religious endowments
- Diwan-i-am – open durbar
- Ghusal Khana – private consultation chamber

Architecture during Akbar's period

- He built Agra Fort, Lahore Fort, Allahabad Fort, Humayun's tomb and Fatehpur Sikri near Agra.
- At Fatehpur Sikri, Akbar built Ibadat Khana or Hall of Prayer in which he called selected theologians and mystics with whom he discussed religious and spiritual topics.
- Akbar built Buland Darwaza at Fatehpur Sikri in 1601 to commemorate his victory over Gujarat.
- He opened Ibadat Khana to people of all religions and took liberal views in discussing religions.

Jahangir (1605 - 1627)

- Jahangir came to the throne in 1605. He issued 12 ordinances. He established *Zanjir-il-Adal* – Chain of Justice in Agra Fort and was known for his strict administration of Justice.
- He married Mehrunnisa, an Afghan widow in 1611 and Later he gave her the titles Noor Mahal (light of the palace), Noor Jahan (light of the world) and Padshah Begum.
- In 1606 Jahangir executed fifth Sikh Guru, Guru Arjun Dev because he helped Jahangir's son Prince Khusru to rebel against him.
- In 1609, Jahangir received *William Hawkins*, an envoy of King James I of England, who reached India to obtain trade concession.
- In 1615, *Sir Thomas Roe* reached the court of Jahangir as the first ambassador of James I of England in the court of Jahangir. As a result of his efforts, the first English factory was established at Surat in Gujarat.
- Period of Jahangir is considered as the **Golden Age of Mughal Painting**. Jahangir himself was a painter. Ustad Mansur and Abul Hassan and Bishan das were famous painters in the court of Jahangir.
- Jahangir wrote his autobiography Tuzukh-i-Jahangiri in the Persian language.
- Jahangir died in 1627 and was cremated at Shahdara in Lahore.

Architecture

1. Jahangir built Shalimar and Nishant Gardens in Srinagar.
2. He completed the tomb of Akbar at Sikandara
3. Jahangir introduced the vigorous use of Marble instead of red sandstone and use of Pietra dura for decorative purposes. Nurjahan built Itimad-ud-daula/Mirza Ghiyas Beg's Marble tomb at Agra
4. He built Moti Masjid at Lahore and his own mausoleum at Shahdara

Shah Jahan (1628 - 1658)

- Shah Jahan was born on 5th January 1592 at Lahore. His childhood name was Khurram. He ascended the throne in 1628.
- He married Arjumand Benu Begum, daughter of Asaf Khan, brother of Noor Jahan. She later came to be known as Mumtaz Mahal which means beloved of the Palace.
- Shahjahan destroyed the Portuguese settlements at Hoogly in 1631-32.
- The Gateway of Red Fort is the Lahore Gate. It is here at the Lahore Gate that the Prime Minister of India hoists the National Flag and addresses the nation on the Independence Day.
- In 1656 Shahjahan constructed the Jama Masjid in Delhi. It is the biggest masjid in India. The first masjid in India was constructed at Kodungallur in Kerala (Cheraman Palli) in 644 AD by Malik Ibn Dinar.
- Shah Jahan's period is known as the **Golden Age of Mughal Empire.**
- The Portuguese introduced European painting in India during the reign of Shah Jahan
- In 1658 Shah Jahan was imprisoned by his son Aurangzeb and he died in 1666, after eight years. His daughter Jahan Ara was also kept in prison along with him at the Agra Fort.

- Shah Jahan's son Dara Shikoh was a famous scholar. He translated Bhagavat Gita and Sixty Upanishads into Persian. He also wrote a book titled Mujm-ul-Behrain (Mingling of the Oceans) He also translated Atharva Veda into Persian.
- Shah Jahan was a famous lyricist who wrote in Hindi. The famous Peacock Throne was built by Shah Jahan. It was abducted from here by Nadir Shah in 1739 during his Indian invasion (Persian conqueror). Now it is kept at the London Tower Museum, Britain.
- French travellers Bernier and Tavernier, Italian travellers Nicoli Manucci, Peter Mundi visited India during Shah Jahan's period.

Architecture

- Shah Jahan's period is considered as the Golden Age of Mughal Architecture and Shah Jahan is known as the **Prince of Builders.**
- In 1631, he started the construction of Taj Mahal in memory of his wife and completed in 1653. **Ustad Iza**, a Turkish/ Persian was its architect. British administrator Furguson called it 'a love in marble'
- In 1638 Shah Jahan built his new capital Shahjahanabad in Delhi and shifted the capital from Agra to there. He also built Takht-i-Taus or Peacock throne.
- In 1639, he started the construction of **Red Fort in Delhi** on the model of Agra fort built by Akbar. The Diwan-i- Aam, Diwan-i-Khas and the Moti Masjid are situated inside the Red Fort. The Moti Masjid in Agra was constructed by Shah Jahan.

Aurangzeb (1658 - 1707)

- Aurangzeb imprisoned his father and made himself the Padshah in 1658. But his actual coronation was conducted in 1659. He defeated Dara and crowned himself under the title "*Alamgir*". He was the last great Mughal Emperor after which the disintegration had started.
- Aurangzeb is known as 'Zinda Pir' or living saint because of his simple life.
- He was a staunch and orthodox Muslim who banned singing and dancing in the Royal court. He reintroduced Jizyah and Pilgrimage tax.
- In 1675, he executed 9th Sikh Guru, Guru Teg Bahadur because of his reluctance to accept Islam. Guru Gobind Singh, the last Sikh Guru, organized his followers under Khalsa to fight the tyranny of Aurangzeb. He was assassinated in 1708.
- Aurangzeb's son built ***Bibi ka Makbara*** in 1679 AD in memory of his mother Rabia-Durrani.
- The only building by Aurangzeb in Red Fort is Moti Masjid. He also built the Badshahi Masjid in Lahore.

Later Mughals

Year	Ruler	Significance
1707 – 12	Bahadur Shah I	Original name – Muazzam
1712 – 13	Jahandar Shah	Ascended the throne with the help of Zulfikar Khan
1713 – 19	Farrukh Siyar	Sayyid brothers helped him in ascending the throne
1719 – 48	Muhammad Shah	Nadir Shah raided India. Weak successor
1748 – 54	Ahmad Shah	Ahmad Shah Abdali raided India. Mughals ceded Punjab and Multan
1754 – 59	Alamgir II	Delhi was occupied by Ahmad Shah Abdali and later plundered
1759 – 06	Shah Alam II	Lived outside Delhi
1806 – 37	Akbar II	Pensioner of East India Company conferred the title Raja on Raja Ram Mohan Roy
1837 – 57	Bahadur Shah II	1857 Revolt took place under his nominal leadership. Was deported to Burma

Bhakti and Sufi Movement in Medieval India

Bhakti Movement

Development in South India

- The development of the Bhakti movement took place in *Tamil Nadu* between 7th and 12th CE.

- It was reflected in the emotional poems of the *Nayanars* (devotees of Shiva) and *Alvars* (devotees of Vishnu).
- These saints looked upon religion not as cold formal worship but as a loving bond based upon love between the worshipped and worshipper.

Philosophical schools

Philosophy	Founder
Vishishtadvaita	Ramanuja
Dvaitadvaita / Bhedabhed	Nimbarka
Dvaita	Madhava
Shudadvaita	Vishnu swami
Advaita (non-dualism)	Sankaracharya

Significant Facts

- Appar, Sambandar, Sundaramurti, and Manikkavasagar were prominent Nayanars. The hymns of the first three are mentioned in *Thiruvasagam* was written by Manikkavasagar.
- *Tirumurais* is the collection of works of Nayanars which is called as the fifth Veda.
- *Andal* was a women Alvar saint. There were 12 Alvars and 63 Nayanars. *Periyapuranam* by Shekkihzar traces the life history of Nayanars
- *Divya Prabhandam* was the collection of hymns by Alvars

Development of Bhakti movement in North India

- The saints wrote in local languages, Tamil and Telugu and were, therefore, able to reach out to many people. They also translated Sanskrit works in local languages. Few saints are
    1. Jnanadeva – Marathi
    2. Kabirdas, Surdas, Tulsi das – Hindi
    3. Shankaradeva - Assamese
    4. Chaitanya and Chandidas - Bengali
- Sanskrit, which was prevalent in the north, was given a new form as the movement moved to North. Bhagavata Purana was a significant work in 9th century and an important component of Bhakti movement
- Kabir, Namdev and Guru Nanak had preached devotion to a *Nirankar* form of god. The followers of Guru Nanak identify themselves as Sikhs.

The Vaishnavite movement

- Devotion on *Sakar* form of god. Rama and Krishna were seen as avatars of Lord Vishnu. The main exponents were Surdas, Mirabai, Tulsidas and Chaitanya who espoused the path of salvation through the medium of poetry, songs, dance, and kirtans.

Sursagar by Surdas, Ramacharitmanas by Tulsidas were important works during this period.

Bhakti Saints

- **Ramananda** – first great saint in North India
- **Kabir** – the disciple of Ramananda, Nirguna saint, sought Hindu-Muslim unity, his followers are called Kabir Panthis
- **Guru Nanak** – founder of Sikhism, social reformer and Nirguna saint
- **Chaitanya** – Krishna bhakti cult and founder of *Gaudiya* or Bengal Vaishnavism
- **Purandara das** – laid the foundations for modern Carnatic music
- **Vallabhacharya** – propounded the principle of *Pushti Marg*

Bhakti saints of Maharastra Dharma

- **Jnanadeva –** founder of Bhakti movement in Maharashtra; *bhavarthadipka* – Marathi commentary of Bhagavad Gita
- **Namadeva –** founder of the Vithoba or Vithal cult which was known as *Varkari* sect
- **Eknath –** Wrote *Bhavartha Ramayana* – commentary on Ramayana
- **Tukaram –** Wrote devotional poetry known as *Abhangas*
- **Ramdas –** *Dasabodha* – Compilation of his writings and sermons

Sufi Movement

Sufism in India

- The Sufis came to India via Afghanistan. In the beginning, the main centres were Punjab and Multan which later spread to Kashmir, Bihar, Bengal, and Deccan.

Abu Fazl in *Ain-i-Akbari* speaks of fourteen silsilahs. They were divided into

1. Ba-shara: Orders which followed the Shariat and its directives such as Namaz and Roza. Chief of them are Chisthi, Suhrawadi, Firdwasi, Qadiri and Naqshbandi
2. Be-shara: They were not bound by Shariat. The Qalandars belonged to this group

Silsilahs

- **The Chishti Silsilah**: Founded by Khwaja Moinuddin Chisti who made Ajmer as the centre of learning. His disciples were Sheik Hamiduddin and Qutbuddin Bakhtiyar Kaki. Baba Farid, the disciple of Sheikh Nizamuddin Auliya made Delhi as an important centre. Sheik Nasiruddin Mahmud, famously called Nasiruddin *Chirag-i-Dilli* was also the famous Chisthi saint
- **The Suhrawadi Silsilah**: founded by Sheik Shihabuddin Suhrawadi, it was established by Sheik Bahauddin Zakariya in India. He set up Khanaqa at Multan and received the title Shaikhul Islam.

The arrival of Europeans in India

Portuguese

- **Vasco-da-Gama** reached the port of Calicut in 1498 during the reign of king Zamorin (Hindu ruler of Calicut).
- **Settlements:** Daman, Salsette, Chaul, and Bombay (West coast), San Thome (near Madras) and at Hooghly.
- **Alfonso de Albuquerque**, the second Governor of India (first being Fransisco de Almeida) arrived in 1509 and captured Goa in AD 1510.

Dutch

- **Dutch** East India Company was formed in AD 1602.
- **Dutch** were defeated by English at the **Battle of Bedara** in AD 1759 and as per the agreement, the Dutch gained control over Indonesia and the British over India, Sri Lanka and Malaya.
- **Settlements** They set-up their first factory at Masulipatnam in 1605. Their other factories were at Pulicat, Chinsura, Patna, Balasore, Naga pattanam, Cochin, Surat, Karikal, and Kasimbazar.

English

- The English East India Company was formed in 1599 under a charter granted by Queen Elizabeth in 1600. Jahangir granted a Farman to **Captain William Hawkins** permitting the English to erect a factory at Surat (1613).
- In 1615, **Sir Thomas Roe** succeeded in getting an imperial Farman to trade and establish a factory in all parts of the Mughal Empire by ruler Jahangir.
- In 1690, a factory was established at Suttanati by **Jab Charnock**. In 1698, following the acquisition of zamindari of three villages of **Suttanati, Kalikata** and **Govindpur**, the city of Calcutta was founded. Fort William was set-up in 1700.
- In 1717, John Surman obtained a Farman from Farrukhsiyar, which gave large concessions to the company. This Farman has been called the Magna Carta of the Company.
- **Battle of Plassey** (1757) English defeated Sirajuddaula, the Nawab of Bengal.
- **Battle of Buxar** (1764) Captain Munro defeated joint forces of Mir Qasim (Bengal), Shujauddaula (Awadh) and Shah Alam II (Mughal).

Danes

- **The Danish East India Company** was formed in 1616.
- The Danish colony 'Tranquebar' was established on the Southern Coromandel coast of India.
- **Settlements** Serampur (Bengal) and Tranquebar (Tamil Nadu) sold their settlements to the English in 1845.

French

- **The French East India Company** was formed by Colbert under state patronage in 1664. The First **French factory** was established at Surat by Francois Caron in 1668. A factory at Masulipatnam was set-up in 1669.
- French were defeated by English in **the Battle of Wandiwash** (1760).

Peasant Movements in India

Important Civil Uprisings

Year	Uprising	Facts
1763-1800	Sanyasi Revolt (or) Fakir rebellion	Causes: Famine of 1770 and the harsh economic exploitation by the British Participants: Peasants, dispossessed zamindars, disbanded soldiers and rural poor. Equal participation of Hindus and Muslims was seen Leaders: Debi Chaudhurani, Majnum Shah, Chirag Ali, Musa Shah, Bhawani Pathak

		Literary works: Anandmath and Devi Chaudhurani by Bankim Chandra Chattopadhyay
1766-1774	Revolt in Midnapore and Dhalbhum	Causes: Introduction of Permanent Settlement System in Bengal and dispossession of Zamindaries Leaders: Damodar Singh and Jagannath Dhal
1769-1799	Revolt of Momarias	Causes: Rise of low-caste Momaria peasants to challenge the authority of Ahom kings Results: The Ahom king, though survived the rebellion, finally fell to a Burmese invasion and came under British Rule
1781	Civil Uprisings in Gorakhpur, Basti, and Bahraich	Causes: Plan of Warren Hastings to meet the war expenses against Marathas and Mysore. English officers were involved as Izaradars or revenue farmers in Awadh.
1794	Revolt of Raja of Vizianagaram	Causes: British asked for help from the Raja of Vizianagaram, Ananda Gajapatiraju, to oust the French from Northern Circars. After their victory, the British went back on their words, demanded a tribute from the Raja and asked him to disband his troops. Raja Vizayaramaraju, the son of Late Ananda Gajapatiraju rose up in revolt. He was later killed in a battle.
1799-1800	Revolt of Dhundia in Bednur	Dhundia was a Maratha leader who rose up in revolt against the British. He was defeated by Wellesley in 1800.
1797; 1800-1805	The resistance of Kerala Simham	Extension of British paramountcy over Kottayam and exorbitant rates of tax on the peasants led to a mass
	Pazhassi Raja	resistance by peasants under the leadership of Pazhassi Raja.
1799	Civil Rebellion in Awadh	Massacre of Benares by Wazir Ali. He was the fourth Nawab of Awadh who was later deposed and pensioned off by the British.
1800; 1835-1837	Uprisings in Ganjam and Gumsur	Rebellion by Strikara Bhanj and his son Dhananjay Bhanj, the zamindars of Gumsur against the British.
1800-1802	Uprisings in Palamau	Agrarian landlordism and the feudal system
1795-1805	Poligars revolt	Poligars were the landlords belonging to South India. They rose in revolt against the British due to their revenue demands. Kattabomman Nayakan, Oomaithurai and Maruthu Pandian were the important chiefs in the revolt.
1808-1809	Diwan Velu Thampi's revolt	Causes: the State of Travancore fell into arrears after agreeing into Subsidiary alliance. The British resident of Travancore was meddling in the internal affairs of the state. This made Velu Thampi to rise against the Company. His call to revolt was known as Kundara Proclamation.
1808-1812	Disturbances in Bundelkhand	The insurgency by Bundela chiefs after Bundelkhand was attached with Bengal Presidency. The disturbances were put down by contractual obligations called *Ikarnamahs* with the Bundelas.
1813-1814	Parlakimedi Outbreak	Resistance from Parlakimedi Raja Narayan Deo against the Company
1816-1822	Kutch Rebellion	Causes:

		· British interference in internal affairs of Kutch. · British administrative innovations · Excessive land assessments Leader: Raja Bharmal II of Kutch
1816	Rising at Bareilly	Causes: · Imposition of Police Tax · Discontent due to alien administration
1817	Upsurge in Hataras	High revenue assessment from Hataras resulted in Dayaram revolting against the Company.
1817	Paika Rebellion or Paike Bidroh	The Paiks of Odisha were the traditional landed militia. Causes: · The English company's conquest of Odisha and the dethronement of the Raja of Khurda had greatly reduced the power and prestige of the Paiks. · The extortionist land revenue policies caused further resentment among the zamindars and peasants. · Increase in the prices of Salt due to taxes · Abolition of Cowrie currency · Requirement of payment of taxes in Silver are other causes Leader: Bakshi Jagabandhu Bidyadhar
1818-1820	Waghera Rising	· Resentment against alien rile · Exactions of the Gaekwad of Baroda
1828	Ahom Revolt	· British attempts to incorporate Assam into their territory after the First Burma War · Gomdhar Konwar was the leader to lead the revolt
1840's	Surat Salt Agitations	· Raise in taxes on salt from 50 paise to 1 rupee
		· Introduction of Bengal standard weights and measures
1844	Kohlapur and Savantvadi revolts	· Gadkaris rose in revolt against the British due to administrative reorganization and unemployment
1840's	Wahabi movement	· Islamic revivalist movement founded by Syed Ahmed of Rai Bareilly · Conversion of Dar-ul-Harb into Dar-ul-Islam · Jihad declared on Sikhs and later on British
1840's	Kuka Movement	· Founded by Bhagat Jawahar Mal in Western Punjab. Another major leader was Baba Ram Singh who founded the Namdhari Sikh Sect
1782-1831	Narkelberia Uprising	· The first armed peasant uprising against the British · Titu Mir inspired Muslim peasants to rise against Hindu landlords
1825-1835	The Pagal Panthis	· Founded by Karam Shah consisting of the Hajong and Garo tribes · They refused to pay rents and attacked the houses of Zamindars
1838-1857	Faraizi Revolt	· Founded by Haji Shariat-Allah of Faridpur · Dadu Mian organized his followers to expel British from Bengal
1836-1854	Moplah Uprisings	· Took place in Kerala Causes: · Hike in revenue demands · Reduction in field sizes · Oppression of officials
1859-60	Indigo Revolt	• Indigo was identified as a major cash crop for East India Company's Investments in the 18th

		• Indigo had worldwide demand similar piece-goods, opium and salt. • Indigoplanting in Bengal dated back to 1777 when Louis Bonnard, a Frenchman introduced it to the Indians. • The Indigo revolt (or Nil bidroha) was a peasant movement and subsequent uprising of indigo farmers against the indigo planters that arose in Chaugacha village of Nadia in Bengal in 1859.

Tribal Revolts in India During British Period

1. Non-Frontier tribal revolts

Years	**Uprising**	**Facts related to the uprising**
1778	Pahriyas rebellion	Place: Rajmahal Hills Led by: martial Pahariyas Cause: against the British expansion on their lands
1776	Chuar uprising	Place: Bengal Led by: Chuar aboriginal tribesmen Cause: economic privatization by the British
1831	Kol uprising	Place: Chotanagpur Led by: Buddho Bhagat Cause: British rule expansion and land transfers
1827-1831	Ho and Munda uprising	Place: Singhbhum and Chotanagpur Led by: Raja Parahat and others Cause: British expansion and revenue policy
1890s-1900s	Later Munda and Ulugulan uprising	Place: Ranchi and Chotanagpur Led by: Birsa Munda Cause: against feudal and zamindari system and exploitations by money lenders, denial of their rights over forested areas.
1855-56	Santhal rebellion	Place: Bihar Led by: Sido and Kanhu Causes: · Against feudal and zamindari system and exploitations by money lenders. It later turned out Anti-British and was suppressed. · Among the numerous tribal revolts, the Santhal uprising was the most remarkable one. When the Permanent Settlement was introduced in Bengal in 1793, the Santhals were employed as laborers with the promise of wages or rent-free lands. However, they were forced to become agricultural surfs, exploited at will.
1837-56	Kandh uprising	Place: from Tamil Nadu to Bengal Led by: Chakra Bisoi Cause: Interference in tribal customs and imposition of new taxes.
1860s	Naikada Movement	Place: M.P. and Gujrat Cause: against British and caste Hindus.
1870s	Kharwar rebellion	Place: Bihar Cause: against revenue settlement activities.
1817-19 & 1913	Bhil revolts	Place: regions of Western Ghats Cause: against company rule and to form Bhil Raj.
1967-68;1891-93	Bhuyan and Juang rebellion	Place: Kheonjhar,Orissa Led by: Ratna Nayak and Dharni Dhar Nayak

		Cause: Policy of annexation
1880s	Koya revolts	Place: Godavari region of Andhra Pradesh Leader: Raja Anantayyar Cause: against feudal and zamindari system and exploitations by money lenders, denial of their rights over forested areas.
1910	Bastar revolt	Place: Jagdalpur area Cause: New feudal and forest levies.
1914-15	Tana Bhagat movement	Place: Chhota Nagpur area Led by: Jatra Bhagat and Balram Bhagat. Cause: against interference of outsiders, began as Sanskritization movement.
1916-1924	Rampa revolts	Place: Andhra Pradesh region Leader: Alluri Sitarama Raju Cause: Interference in tribal customs and imposition of new taxes.
1920 onwards	Jharkhand uprising	Places: Chhotanagpur region; parts of Bihar, Orissa and West Bengal. Adivasi Mahasabha was formed in 1937.
1920s - 1930s	Forest Satyagrahas	Led by: By Chenchu tribals & by Karwars Cause: · British interference in internal affairs of tribal areas · British administrative innovations · Excessive land assessments
1940s	Gond uprising	· To bring together the believers of Gond dharma.

2. North-East Frontier Tribal Uprisings

Years	Uprising	Facts
1823-33	Ahom's' revolt	Place: Assam Cause: against non-fulfilment of the pledges of the British after the Burmese War. Result: · The British had pledged to withdraw after the first Burmese War(1824-26) from Assam but in contrast, the British attempted to incorporate the Ahoms territories in the company's dominion after the war. · This initiated a rebellion in 1828 under the leadership of Gomdhar Konwar. · Finally, the company decided to follow a conciliatory policy and handed over upper Assam to Maharaja Purandar Singh Narendra and parts of the kingdom was restored to the Assamese king.
1830s	Khasi's revolt	Place: Hilly regions of Meghalaya Leader: Nunklow ruler Tirath Singh Cause: against the occupation of hilly regions. Result: · Due to the compulsory enlistment of labourers for road construction led the Khasis to revolt under the leadership of Tirath Singh, a Khasi chief. The Garos joined them. · The long and harassing warfare with Khasis continued for four years and was finally suppressed in early 1833
1930s	Singhpho's rebellion	Place: Assam Cause: British interference in internal affairs of tribal areas and administrative innovations along with Excessive land assessments.
1917-19	Kuki's revolt	Place: Manipur

		Cause: aginst Britsih labour recruitment policies during WW1.
1920s	Zeliangsong Movement	Place: Manipur Led by: Zemi and Liangmei tribes Cause: British failed to protect these tribes during Kuki's violence.
1905-31	Naga Movement	Place: Manipur Led by: Jadonang It was against British rule and about setting up of a Naga Raj.
1930s	Hereka Cult	Place: Manipur Led by: Rani Gaidinliu As a result of this movement, Kabui Naga Association was formed in 1946

The Revolt of 1857

The Revolt of 1857 is of steppingstone and is regarded as the primary outburst of resentment of simmering anger due to the prevailing discontent against the Britishers. Many revolts took place later such as battles of Plassey and Buxar, which are regarded as the landmark and decisive battles in shaping the modern historical regime.

The genesis of the revolt:

- The revolt was started by the soldiers and later spread across the country by peasants, artisans, and so on. The soldiers had worked for the East India Company and sacrificed their lives for the sake of others.
- People of different religions of India came together and fought united for one cause in this revolt.

Nature of the revolt

- Revolt of 1857 began as a revolt of the sepoys but eventually secured the participation of the masses.
- V.D. Savarkar called 1857 revolt as the First War of Indian Independence.
- Dr S.N. Sen describes it as "having begun as a fight for religion but ended as a war of independence."
- Dr R.C. Majumdar considers it as neither the first, nor national, nor a war of independence.
- As per some British historians, it was just a peasant sepoy mutiny.

Important facts of the Revolt

- Meerut incident - 19th Berhampur Native Infantry refused to use the newly introduced Enfield rifle and mutiny broke out in February 1857, later dissolved in Mar' 1857.
- The 34th Native Infantry's young sepoy, Mangal Pandey, fired at his unit's sergeant major at Barrackpore.
- The 7th Awadh Regiment was also disbanded
- Meerut rose to revolt May 10, they released their imprisoned comrades, killed their officers and moved to Delhi after sunset.
- Delhi- Centre of the Great Revolt

Leaders of the revolt

- At **Delhi,** the symbolic leadership was to the Mughal emperor, Bahadur Shah, but the real command was led by **General Bakht Khan.**
- **Kanpur** rose under **Nana Saheb, Tantia Tope, AZimullah Khan**. Sir Hugh Wheeler, commanding the station, surrendered. Nana Saheb declared himself the Peshwa and Bahadhur Shah as Emperor of India
- **Begum Hazrat Mahal** took over the reign of **Lucknow** and Birjis Qadir, her son, was declared Nawab. Henry Lawrence, the British resident, was killed. The remaining Europeans were evacuated by Sir Colin Campbell, the new commander - in - chief.
- At **Bareilly, Khan Bahadur**, in **Bihar, Kunwar Singh**, Zamindar of Jagdishpur and **Maulvi Ahmadullah of Faizabad** led the revolt at their respective places.
- **Rani Laxmibai**, the most outstanding leader of the revolt, was driven out of **Jhansi** with the application of Lapse's Doctrine as Lord Dalhousie, the Governor-General refused to allow her adopted son to succeed to the throne.

Political & Socio-religious Organization before INC

Pre-Congress Political organizations in Bengal

Name of Organization	Year of formation	Founder/associates	Objectives/ Remarks
Bangabhasaha	1836	Associates of Raja Ram	· Promotion of Bengali education and

Prakasika Sabha		Mohan Roy	build public opinion · Demanded for freedom of press; entry of Indians to higher offices; etc.
Zamindari Association/ Landholders' Society	1838	Dwarkanath Tagore	· To safeguard the interests of landlords. · Only legal machinery was used to raise their demands.
British India Society*	1839 (England)	William Adam, Friend of Raja Ram Mohan Roy	· To make general public of England familiar with the condition of Indians. · Also used legal machinery to raise their demands.
The Bengal British India Society	1843	George Thomson. Members included 'Young Bengal' group	· to present the actual condition of people of British India.
British Indian Association	1851		· It is the merger of Zamindari Association and the Bengal British India Society. · raised many demands like separate legislative council, abolition of stamp duties, etc.
The East India Association*	1866 (London)	Dada Bhai Naoroji	· Welfare of Indians. · To make general public of England familiar with the condition of Indians. · It had branches in Bombay, Madras and Calcutta.
The Indian League	1875	Sisir Kumar Ghosh	Instigate the feelings of nationalism.
The Indian Association of Calcutta (Indian National Association)	1876	Surrendranath Banerjee and Ananda Mohan Bose	· To unify public opinion on key political issues. · Voice was raised for civil services reform · It was later merged with Indian National Congress.

*It was established in England (not in Bengal).

Pre-Congress Political organizations in Bombay and Madras:

Organizations	Year of formation	Founder/ Associates	Remarks
Bombay Association (Bombay	1852	Jagannath Shankersheth, Sir Jamshedji	· They used to take up public grievances

Native Association)		Bhai, Naoroji Fardonji, Dadabhai Naoroji	through constitutional means.
The Poona Sarvajanik Sabha at Pune	1867	Mahadeva Govind Ranade	· They fought for legal rights of peasants and farmers. · Connected common people with the British Government. · B. G. Tilak was also a member of this Sabha.
The Bombay Presidency Association		Pherozshah Mehta and K. T. Telang	opposing Lord Lytton's policies and the controversial Ilbert Bill.
Madras Native Association	1849	Gazulu Lakshminarasu Chetty	· It was first of such type in Madras.
The Madras Mahajan Sabha	1884	M. Viraraghavachari, B. Subramaniya Aiyer and P. Ananda Charlu	· It was formed to oppose government policies through peaceful ways.

Pre-Congress Socio-Religious Organizations:

Organizations	Year of formation	Place of operation	Founder/Associates	Objectives/ Remarks
Atmiya Sabha	1814	Bengal	Raja Ram Mohan Roy	It was formed to attack social evils of Hinduism and spread of monotheism. It campaigned against caste rigidities, idol worship, social evils like Sati, etc.
Brahma Samaj	1828	Bengal	Raja Ram Mohan Roy	The long-term agenda of Brahma Samaj was to purify Hinduism from evils of idolatry, meaningless rituals and to preach monotheism.
Dharma Sabha	1830	Bengal	Raja Radhakant Deb	To counter the propaganda of Brahma samaj. Even he was the supporter of 'Sati System'. However, it was in favour of the promotion of western education (including women).
Tattvabodhini Sabha	1839	Bengal	Maharishi Debendranath Tagore	The systematic study of India's past with rational outlook and to propagate the ideas of Raja Ram Mohan Roy.

Young Bengal movement/ Derozians	1830s	Bengal	Henry Vivian Derozio	To foster the ideals of equality, fraternity, liberty and freedom; to question all authority; political and social reforms.
Prathna Samaj	1867	Bombay	Founder: Atmaram Pandurang Associate: M. G. Ranade, R. G. Bhandarkar and N. G. Chandavarkar	Women education, widow remarriage, denounce caste system and raising the age of marriage for both boys and girls.
Brahma Samaj of India	1866	Bengal	Keshav Chandra Sen	To promote inter-caste marriages; denounce caste system; assimilate ideas from all religions
Arya Samaj	1875	Earlier Bombay; then shifted to Lahore	Dayanand Saraswati	• Establish a casteless and classless society in India. • It propagated the infallibility of Vedas; • Encouraged inter-caste marriages and • Widow remarriage; • Strongly criticized the Hindu belief system regarding Maya and moksha.
Sadaran Brahma Samaj	1878	Bengal		After the split of 1878, the disgusted followers of Keshav Chandra Sen established this new organization. It was based on the original ideals of Brahma Samaj.
Tayyuni	1839		Karmat Ali Jaunpuri	Based mainly on the teaching of Shah Walimullah movement.
Indian Reform Association	1870	Bengal	Keshav Chandra Sen	To organize people against child marriage and improve women's social condition
Satya Sodhak Samaj (Truth seeker's society)	1873	Bombay	Jyotibha Phule	Social service; upliftment of women and lower caste by providing them education

Deccan Educational Society	1884	Bombay	M.G Ranade	Spread of education in Western India
Theosophical Society	1875 (In 1882, headquarters were shifted to Adiyar)	United States	Madame H. P. Blavatsky and M. S. Olcott. Annie Besant took charge after the death of Olcott.	• Accepted the Hindu beliefs of incarnation and transmigration of the soul. • Aimed to work for the universal brotherhood of humanity without any discrimination based on religion, race, caste, creed or colour.
Seva Sadan	1885		Behramji M. Malabari	This organization took care of exploited and discarded women of society. It was not caste or class specific and was open to all.
Rehnumai Mazdayasnan Sabha (Religious reform Association)	1851	Bombay	Dada Bhai Naoroji, K. R. Cama, S. S. Bengalee	It was a socio-religious reform movement of Parsis. The main objective of this organization was- upliftment of women, removal of the purdah system, promote western education in the Persian community. It also aimed at restoration of the Zoroastrian religion.

Governor-General and Viceroy of India
Governors of Bengal (1757–74)

Robert Clive

- Governor of Bengal during 1757–60 and again during 1765–67 and established Dual Government in Bengal from 1765–72.
- Clive's initial stay in India lasted from 1744 to 1753.
- He was called back to India in 1755 to ensure British supremacy in the subcontinent against the French.
- In 1757, Clive along with Admiral Watson was able to recapture Calcutta from the Nawab of Bengal Siraj Ud Daulah.
- In the Battle of Plassey, the Nawab was defeated by the British despite having a larger force.
- Clive ensured an English victory by bribing the Nawab's army Commander Mir Jaffar, who was installed as Bengal's Nawab after the battle.
- Clive was also able to capture some French forts in Bengal.
- For these exploits, Robert Clive was made Lord Clive, Baron of Plassey.
- As a result of this battle, the British became the paramount power in the Indian subcontinent.

- Bengal became theirs and this greatly increased the company's fortunes. (Bengal was richer than Britain at that time).
- This also opened up other parts of India to the British and finally led to the rise of the British Raj in India. For this reason, Robert Clive is also known as "Conqueror of India".
- **Vansittart (1760–65):** The Battle of Buxar (1764).
- **Cartier (1769–72):** Bengal Famine (1770).

Governors-General of Bengal (1774–1833)

Warren Hastings (1772–1785)

- First Governor-General of Bengal.
- Brought the Dual Government of Bengal to an end by the Regulating Act, 1773
- Became Governor-General in 1774 through the Regulating Act, 1773.
- Wrote an introduction to the first English translation of the 'Gita' by Charles Wilkins
- In 1781, he founded the Calcutta Madrasa, for the promotion of Islamic studies
- He founded the Asiatic Society of Bengal with William Jones in 1784.
- Auctioned the right to collect land revenue to the highest bidder; Divided Bengal into districts and appointed collectors and other revenue officials.
- Rohilla War (1774); 1st Anglo-Maratha War (1776–82): 2nd Anglo-Mysore War (1780–84).

Lord Cornwallis (1786–93)

- Established lower courts and appellate courts
- Sanskrit College established by Jonathan Duncan
- Permanent Settlement in Bihar and Bengal in 1793
- Introduction of Cornwallis Code
- Introduction of Civil Services in India
- 3rd Anglo-Mysore War (defeat of Tipu and the Treaty of Serinagpatanam, 1792).

Sir John Shore (1793–98)

- Policy of Non-intervention
- Charter Act of 1793
- Battle of Kharda between Nizam and the Marathas (1795).

Lord Wellesley (1798–1805)

- He adopted the policy of Subsidiary Alliance- a system to keep the Indian rulers under control and to make British the supreme power.
- Fort William College at Calcutta.
- Formation of Madras Presidency in 1801.
- 4th Anglo-Mysore War (1799)-defeat and the death of Tipu Sultan; 2nd Anglo-Maratha War (1803–05)-defeat of the Scindia, the Bhonsle and the Holkar; Treaty of Bassein (1802).

Subsidiary Alliance in India

- The Subsidiary Alliance System was used by Wellesley to bring Indian Slates within the orbit the British political power. The system played a very important part in the expansion of the Company's dominions and many new territories were added to the Company's possessions.
- There were four stages in it:- In the first stage, the Company undertook to lend its troops to the friendly Indian prince to assist him in his wars.
- In the second stage, the Company's sent troops to the field on their own account with the assistance of an Indian ally who made a common ally.
- The next stage was reached when the Indian ally was not to supply men but money. The company undertook to raise, train and equip an army under English officers and render to the ally a fixed number of troops on receiving a sum of money towards the cost of these troops.
- The final stage was the next logical step. The Company undertook to defend the territories of an Indian ally and for that purpose stationed a subsidiary force in the territory of the state. The Indian ally was asked not to pay money but surrender territory from the revenue of which the expenses of the subsidiary force were to be met.
- The Indian states were to conduct negotiations with other states through the Company.
- The state had to accept a British Resident at its headquarters.
- The Alliance enabled the Company to maintain a large standing army at the expense of Indian princes. It disarmed the Indian

states and threw British protectorate over them.
- The states that accepted this policy were the Nizam of Hyderabad, the ruler of Mysore, the Raja of Tanjore, the Nawab of Awadh, the Peshwa, the Bhonsle Raja of Berar, the Scindia, the Rajputs of Jodhpur, Jaipur, etc.

George Barlow (1805–1807): Vellore Mutiny (1806)

Lord Minto I (1807–1813)
- He concluded the Treaty of Amritsar (1809) with Maharaja Ranjit Singh.
- Charter Act of 1813 was passed.

Lord Hastings (1813–1823)
- Ended the policy of Non-intervention and adopted the policy of intervention and war.
- Creation of Bombay Presidency in 1818.
- Establishment of Ryotwari System in Madras.
- Anglo-Nepalese War (1813–23); 3rd Anglo-Maratha War (1817–18). Hastings forced humiliating treaties on Peshwa and the Scindia

Lord Amherst (1823–28)
- First Anglo Burmese War (1824-26)
- Acquisition of territories in Malay Penisula; Capture of Bharatpur (1826).

Lord William Bentick (1828–33)
- Most liberal and enlightened Governor-General of India; Regarded as the Father of Modern Western Education in India
- He carried out social reforms such as the abolition of Sati Pratha with the help of Raja Ram Mohan Roy, Suppression of Thuggee.
- Annexation of Mysore (1831).
- Passed the Charter Act of 1833, which provided that no Indian subject of Company was to be debarred from holding an office on account of his religion, place of birth, descent and colour.
- On the recommendation of Macaulay Committee made English the medium of higher education in India.
- Established first Medical College in Calcutta.

Governors-General of India (1833–58)

Lord William Bentick (1833–35)
- First Governor-General of India
- Abolished provincial courts of appeal and circuit set up by Cornwallis, the appointment of Commissioners of revenue and circuit.
- Annexed Coorg (1834), Central Cachar (1834) on the plea of misgovernment.

Sir Charles Metcalfe (1835–1836)
- Passed the famous Press Law, which liberated the press in India (called Liberator the Press).

Lord Auckland (1836–42)
- 1st Anglo-Afghan War (1839–42)—a great blow to the prestige of the British in India.

Lord Ellenborough (1842–44)
- Brought an end to the Afghan War.
- Annexation of Sindh (1843)
- War with Gwalior (1843).

Lord Hardinge I (1844–48)
- 1st Anglo-Sikh war (1845–46) and the Treaty of Lahore 1846 (marked the end of Sikh sovereignty in India.
- Gave preference to English education in employment.

Lord Dalhousie (1848–56)
- Shifted the headquarters of Bengal Artillery from Calcutta to Meerut.
- Shimla was made the permanent headquarters of the army & summer capital.
- Formation of Gurkha regiments took place in his reign.
- Youngest Governor-General of India (36 Years), & also known as
- Father of Indian Telegraph
- Father of Indian Railways
- Father of Indian Postal system
- Father of Indian Engineering Services
- Maker of modern India
- Abolished Titles and Pensions, Widow Remarriage Act (1856).
- Introduced the system of Centralized control in the newly acquired territories known as Bon-Regulation system
- Recommended the Thomsonian system of Vernacular education for the whole of the Northwestern Provinces (1853)
- Wood's Educational Despatch of 1854 and opening of Anglo-Vernacular Schools and Government Colleges.
- Started the first railway line in 1853 (connecting Bombay with Thana)
- Started an electric telegraph service.
- Laid the basis of the modern postal system (1854)

- A separate public works department was set up for the first time.
- Started work on the Grand Trunk Road and developed the harbours of Karachi, Bombay and Calcutta.
- Introduced Doctrine of Lapse (Captured Satara (1848), Jaitpur and Sambhalpur (1849), Baghat (1850), Udaipur (1852), Jhansi (1853) and Nagpur (1854); Fought 2nd Anglo-Sikh War (1848–49) and annexed the whole of the Punjab; 2nd Anglo-Burmese War (1852) and annexation of Lower Burma or Pegu; Annexation of Berar in 1853; Annexation of Avadh in 1856 on charges of maladministration.

Lord Canning (1856–58)

- The last Governor-General and first Viceroy of India
- Revolt of 1857; Passed the Act of 1858, which ended the rule of the East India Company.
- Withdrew Doctrine of Lapse.

Governor-General & Viceroys (1858–1947)

Lord Canning (1858–62)

- He was the Governor-General during Mutiny of 1857 and after the war, he was made the first Viceroy of India.
- The Indian Councils Act of 1862 was passed, which proved to be a landmark in the constitutional history of India
- The Indian Penal Code of Criminal Procedure (1859) was passed
- The Indian High Court Act (1861) was enacted
- Income Tax was introduced for the first time in 1858
- The Universities of Calcutta, Bombay and Madras founded in 1857.

Lord Elgin I (1862–63)

- Wahabi Movement (Pan-Islamic Movement).
- High Courts were established at Calcutta, Bombay and Madras in 1862

Sir John Lawrence (1864–69)

- Telegraphic communication was opened with Europe;
- Expanded canal works and railways
- Bhutan War (1865)
- Advocated State-managed railways
- Created the Indian Forest Department and recognised the native Judicial service.
- He introduced various reforms and became the member of Punjab Board of Administration after the second Sikh war.
- He was known as the Saviour of Punjab.

Lord Mayo (1869–72)

- Introduced financial decentralization in India
- Established Rajkot College at Kathiawar and Mayo College at Ajmer for the princes
- Organised the Statistical Survey of India
- Established the Department of Agriculture & Commerce.
- He was the only Viceroy to be murdered in office by a Pathan convict in Andamans in 1872.
- For the first time in Indian history, a census was held in 1871.

Lord Northbrook (1872–76)

- Kuka Movement of Punjab took a rebellious turn during his period.

Lord Lytton (1876–80)

- Most infamous Governor-General pursued free trade and abolished duties on 29 British manufactured goods which accelerated drain of the wealth of India
- Arranged the Grand Darbar in Delhi (in 1877) when the country was suffering from a severe famine
- Passed the Royal Title Act (1876) and Queen Victoria was declared as the Kaiser-i-Hind
- Arms Act (1878) made mandatory for Indians to acquire a license for arms
- Passed the infamous Vernacular Press Act (1878)
- Proposed the plan of Statutory Civil Service in 1878-79 and lowered the maximum age limit from 21 to 19 years

Lord Ripon (1880–84)

- Repeal of the Vernacular Press Act, 1882
- The First Factory Act, 1881 to improve labour condition
- Resolution of Local Self Government in 1882
- Resolution on Land Revenue Policy
- Appointed Hunter Commission (for education reforms) in 1882
- The Ilbert Bill controversy erupted during his time (1883) which enabled Indian district

magistrates to try European criminals. But this was withdrawn later.

Lord Dufferin (1884–88)

- 3rd Burmese War (Annexation of Upper and Lower Burma) in 1885.
- Establishment of Indian National Congress in 1885.

Lord Lansdowne (1888–94)

- The second Factory Act of 1891; Categorization of Civil Services into imperial, provincial and subordinate.
- Indian Council Act of 1892 (introduced elections which were indirect).
- Appointment of the Durand Commission to define the line between British India and Afghanistan (1893).

Lord Elgin II (1894–99)

- The Munda uprising (under Birsa Munda) of 1899.
- Convention delimiting the frontier between China and India was ratified.
- The great famine of 1896–97.
- Lyall Commission appointed after famine (1897).
- The assassination of two British officials-Rand & Amherst-by Chapekar Brothers in 1897.

Lord Curzon (1899–1905)

- Appointed a Police Commission in 1902 under Andrew Frazer.
- Set up the Universities Commission and accordingly the Indian Universities Act of 1904 was passed.
- Set up the Department of Commerce and Industry.
- Calcutta Corporation Act (1899).
- Passed the Indian Coinage and Paper Currency Act (in 1899) and put India on a gold standard.
- Partition of Bengal took place in 1905.
- Created the NWFP and Archaeological Survey of India.

Lord Minto II (1905–10)

- Swadeshi Movement (1905–08).
- Foundation of the Muslim League, 1906.
- Surat session and split in the Congress (1907).
- Newspapers Act, 1908.
- Morley-Minto Reforms, 1909.

Lord Hardinge II (1910–16)

- Annulment of the partition of Bengal (1911).
- Transfer of Capital from Calcutta to Delhi (1911).
- Delhi Darbar and Coronation of King George V and Queen Mary (1911).
- Establishment of Hindu Mahasabha by Madan Mohan Malviya (1915).

Lord Chelmsford (1916–21)

- Home Rule Movement launched by Tilak and Annie Besant (1916).
- Lucknow Pact between Congress and Muslim League (1916).
- The arrival of Gandhi in India (1915).
- Champaran Satyagraha (1917).
- Montague's August Declaration (1917).
- Kheda Satyagraha and Satyagraha at Ahmedabad (1918).
- Government of India Act (1919).
- Repressive Rowlatt Act (1919).
- Jalianwala Bagh Massacre (1919).
- Khilafat Movement (1920–22).
- Non-cooperation Movement (1920–22).
- Saddler Commission (1917) and an Indian Sir S. P. Sinha was appointed Governor of Bengal.

Lord Reading (1921–26)

- Criminal Law Amendment Act and abolition of cotton excise
- Repeal of Press Act of 1910 & Rowlatt Act of 1919
- Violent Moplah rebellion in Kerala (1921)
- Foundation of CPI (1921)
- Chauri Chaura Incident (1922)
- Foundation of Swaraj Party (1923)
- Kakori Train Dacoity (1925)
- Foundation of RSS (1925)
- Murder of Swami Shardhanand (1926).
- Suppressed non-cooperation movement.

Lord Irwin (1926–31)

- Simon Commission announced in 1927.
- Butler Commission (1927); Nehru Report (1928).
- 14 points of Jinnah (1929); Lahore session of Congress and 'Poorna Swaraj' declaration (1929).
- Civil Disobedience Movement (1930).
- Dandi march (1930).
- 1st Round Table Conference (1930).

- Gandhi-Irwin Pact (1931).
- Martyrdom of Jatin Das (hunger strike).

Lord Willingdon (1931–36)

- 2nd Round Table Conference (1931).
- Civil Disobedience Movement (1932).
- The announcement of MacDonald's Communal Award (1932).
- 3rd Round Table Conference.
- Foundation of Congress Socialist Party-CSP (1934).
- Government of India Act (1935).
- Burma separated from India (1935).
- All India Kisan Sabha (1936).
- Poona Pact was signed between Ambedkar and Gandhi.

Lord Linlithgow (1936–43)

- First General Election (1936–37).
- Congress ministries in 1937 and Resignation of Congress ministries in 1939.
- 'Deliverance Day' by Muslim League in 1939.
- Foundation of Forward Block by S.C. Bose (1939).
- Lahore Resolution (1940); August Offer (1940); Cripps Mission (1942); Quit India Movement (1942) and Outbreak of Second World War in 1939.

Lord Wavell (1943–1947)

- R. Formula 1944; Wavell Plan and Shimla Conference in 1945.
- End of 2nd World War in 1945.
- INA Trials in 1945; Naval mutiny in 1946.
- Cabinet Mission, 1946 and acceptance of its proposals by Congress.
- Direct Action Day by the Muslim League on 16th August 1946 and the first meeting of the constituent assembly was held on Dec. 9, 1946.

Lord Mountbatten (March–August 1947)

- Announced the 3 June 1947 Plan; Introduction of Indian Independence Bill in the House of Commons and passed by the British Parliament on July 4, 1947.
- Appointment of 2 boundary commissions under Sir Cyril Radcliffe.

Governor Generals of Independent India (1947–50)

Lord Mountbatten (1947–48)

- The first Governor-General of free India; Kashmir acceded to India (Oct. 1947); Murder of Gandhi (Jan. 30, 1948).

C. Rajagopalachari (June 1948–January 25, 1950)

- The last Governor-General of free India; The only Indian Governor-General.

INDIAN NATIONAL MOVEMENT

EMERGENCE OF INDIAN NATIONAL CONGRESS (1885)

- Allan Octavian Hume, a retired civil servant in the British Government took the initiative to form an all-India organization.
- Thus, the Indian National Congress was founded and its first session was held at Bombay in 1885.
- The history of the Indian National Movement can be studied in three important phases:
  - The phase of moderate nationalism (1885-1905) when Congress continued to be loyal to the British crown.
  - The years 1906-1916 witnessed-Swadeshi Movement, the rise of militant nationalism and the Home Rule Movement. The repressive measures of the British gave rise to extremists within Congress like Bipin Chandra Pal, Bal Gangadhar Tilak and Lala Lajpat Rai (Lai, Bal, Pal), along with Aurobindo Ghosh
  - The period from 1917 to1947 is known as the Gandhian era.

Important Sessions of Indian National Congress

Year	Venue	President
1885	Bombay	W.C.Bannerji
1886	Calcutta	Dadabhai Naoroji
1893	Lahore	"
1906	Calcutta	"
1887	Madras	Badruddin Tyyabji (first Muslim President)
1888	Allahabad	George Yule (first English President)
1889	Bombay	Sir William Wedderburn
1890	Calcutta	Sir Feroze S.Mehta

1895, 1902	Poona, Ahmedabad	S.N.Banerjee
1905	Banaras	G.K.Gokhale
1907, 1908	Surat, Madras	Rasbehari Ghosh
1909	Lahore	M.M.Malviya
1916	Lucknow	A.C.Majumdar (Reunion of the Congress)
1917	Calcutta	Annie Besant (first woman President)
1919	Amritsar	Motilal Nehru
1920	Calcutta (sp.session)	Lala Lajpat Rai
1921,1922	Ahmedabad, Gaya	C.R.Das
1923	Delhi (sp.session)	Abdul Kalam Azad (youngest President)
1924	Belgaon	M.K.Gandhi
1925	Kanpur	Sarojini Naidu (first Indian woman President)
1928	Calcutta	Motilal Nehru (first All India Youth Congress Formed)
1929	Lahore	J.L.Nehru (Poorna Swaraj resolution was passed)
1931	Karachi	Vallabhbhai Patel (Here, resolution on Fundamental rights and the National Economic Program was passed)
1932, 1933	Delhi, Calcutta	(Session Banned)
1934	Bombay	Rajendra Prasad
1936	Lucknow	J.L.Nehru
1937	Faizpur	J.L.Nehru (first session in a village)
1938	Haripura	S.C.Bose (a National Planning Committed set-up underJ.L.Nehru).
1939	Tripuri	S.C.Bose was re-elected but had to resign due to protest by Gandhiji (as Gandhiji supported Dr.Pattabhi Sitaramayya). Rajendra Prasad was appointed in his place.
1940	Ramgarh	Abdul Kalam Azad
1946	Meerut	Acharya J.B.Kriplani
1948	Jaipur	Dr.Pattabhi Sitaramayya.

Moderate Nationalism

- **Surendranath Banerjee:** was called the Indian Burke. He firmly opposed the Partition of Bengal. He founded the Indian Association (1876) to agitate for political reforms. He had convened the Indian National Conference (1883) which merged with the Indian National Congress in l886.
- **Subramanya Aiyar** preached nationalism through the Madras Mahajana Sabha. He also founded the Hindu and Swadesamitran.
- **Dadabhai Naoroji** was known as the Grand Old Man of India. He is regarded as India's unofficial Ambassador in England. He was the first Indian to become a Member of the British House of Commons.
- **Gopal Krishna Gokhale** was regarded as the political guru of Gandhi. In 1905, he founded the **Servants of India Society** to train Indians to dedicate their lives to the cause of the country.

Indian National Movement (1905-1917)

- The period from 1905 was known as the era of extremism in the Indian National Movement.
- The extremists or aggressive nationalists believed that success could be achieved through bold means.
- The important extremist leaders were Lala Lajpat Rai, Bal Gangadhar Tilak, Bipin Chandra Pal and Aurobindo Ghosh.

Leaders of the Extremists

- The extremists were led by Bala Gangadhar Tilak, Lala Lajpat Rai, Bipin Chandra Pal and Aurobindo Ghosh

- Bal Gangadhar Tilak is regarded as the real founder of the popular anti-British movement in India. He was known as 'Lokamanya'. He attacked the British through his weeklies The Maratha and the Kesari. He was jailed twice by the British for his nationalist activities and in 1908 deported to Mandoli for six years. He set up the Home Rule League in 1916 at Poona and declared "Swaraj is my birth-right and I will have it."
- Lala Lajpat Rai is popularly known as the 'Lion of Punjab'. He played an important role in the Swadeshi Movement. He founded the Indian Home Rule League in the US in 1916. He was deported to Mandalay on the ground of sedition. He received fatal injuries while leading a procession against the Simon Commission and died on November 17, 1928.
- Bipin Chandra Pal began his career as a moderate and turned an extremist.
- Aurobindo Ghosh was another extremist leader and he actively participated in the Swadeshi Movement.
- He was also imprisoned. After his release, he settled in the French territory of Pondicherry and concentrated on spiritual activities

PARTITION OF BENGAL (1905)

- Curzon announced the partition of Bengal.
- The reason for partition was given as an attempt to improve administration.
- But the real aim was to 'Divide and Rule'. The partition was done in order to create a separate State for Muslims and so introduce the poison of communalism in the country.

Swadeshi Movement

- The Swadeshi Movement involved programmes like the boycott of government service, courts, schools and colleges and of foreign goods, Promotion of Swadeshi goods, Promotion of National Education through the establishment of national schools and colleges.
- It was both a political and economic movement
- In Bengal, even the landlords joined the movement
- The women and students took to picketing. Students refused using books made of foreign paper.
- It was Bal Gangadhar Tilak who realized the importance of boycott as a weapon that could be used to paralyze the whole British administrative machinery in India.
- The boycott and Swadeshi movements were instrumental in the establishment of swadeshi enterprises - textile mills, banks, hosiery, tanneries, chemical works and insurance companies. Swadeshi stores were opened.
- This made the British reverse the partition of Bengal and unite it in 1911.

Hind Swaraj

- When the movement against the partition of Bengal was at its height the annual session of the Congress was held at Calcutta in 1906 under the president ship of Dadabhai Naoroji.
- This session is very important because of the conciliation between the Moderates and Extremist
- The Congress condemned the Partition of Bengal. In the words of DadaBhai Naoroji, it is a bad blunder of England.
- Promotion of education was declared as the aim of Congress.
- The Swadeshi and the Boycott were accorded full support by the Congress. For the first time Boycott was authorised to be used as a political weapon.

Formation of Muslim League (1906)

- In December 1906, during the Muhammadan Educational conference in Dacca, Nawab Salim Ullah Khan raised the idea of establishing a Central Muhammadan Association to take care of Muslim interests.
- Accordingly, on 30th December 1906, the All India Muslim League was founded. Another prominent person, Aga Khan was chosen as its president.

Surat Session (1907)

- The INC split into two groups -The extremists and The moderates, at the Surat session in 1907.
- Extremists were led by Bal, Pal, Lai while the moderates by G.K. Gokhale.

- Controversy arose over the elected president, Ras Bihari Ghosh, as extremists didn't accept him.
- Extremists wanted Lala Lajpat Rai to be chosen.
- The government after this launched a massive attack on extremists by suppressing their newspapers and arresting their leaders.

MORLEY-MINTO REFORMS (1909)

- The Council Act of 1909 was an extension of the 1892 reforms, also known as the Morley-Minto Reforms after the names of the then Secretary of State (Lord Morley) and the then Viceroy (Lord Minto).
- It increased the members of the Legislative Assembly from sixteen to sixty.
- A few non-elected members were also added.
- Though the members of the Legislative Council were increased, they had no real powers. They remained mainly advisory in character.
- They could not stop any bills from being passed. Nor did they have any power over the budget.
- The British made another calculated move to sow the seed of communalism in Indian politics by introducing separate electorates for the Muslims.
- This meant that from the constituencies dominated by Muslims only Muslim candidates could be elected.
- Hindus could only vote for Hindus, and Muslims could only vote for Muslims.
- Many leaders protested against this communal electorate policy of the British to 'Divide and Rule'.

Annulment of Bengal Partition

- It was decided to annul the partition of Bengal in 1911 mainly to curb the menace of revolutionary terrorism.
- The annulment came as a rude shock to the Muslim political elite.
- It was also decided to shift the capital to Delhi as a sop to the Muslims, as it was associated with Muslim glory, but the Muslims were not pleased.
- Bihar and Orissa were taken out of Bengal and Assam were made a separate province.

Ghadar Party (1913)

- Formed by Lala Hardayal, Taraknath Das and Sohan Singh Bhakna.
- The name was taken from a weekly paper, Ghadar, which had been started on November 1, 1913 to commemorate the 1857 revolt.
- HQ was at San Francisco.
- The outbreak of the First World War provided the Ghadarites with an opportunity to free India from a Government which was indifferent to their cause.
- They began to return to India in thousands for a coordinated revolt in collaboration with the Bengal revolutionaries. Their plan was foiled at the last moment due to treachery.

Komagata Maru Incident

- The importance of this event lies in the fact that it created an explosive situation in Punjab.
- Komagata Maru was the name of a ship which was carrying 370 passengers, mainly Sikh and Punjabi Muslim would-be immigrants, from Singapore to Vancouver.
- They were turned back by Canadian authorities after two months of privation & uncertainty.
- It was generally believed that the Canadian authorities were influenced by the British Government.
- The ship finally anchored at Calcutta in September 1914 but the inmates refused to board the Punjab-bound train.
- In the ensuing with the police near Calcutta, 22 persons died.
- Inflamed by this and with the outbreak of the War, the Ghadr leaders decided to launch a violent attack on British rule in India.
- They urged fighters to go to India. Bengal revolutionaries were contacted; Political dacoities were committed to raising funds mainly in Punjab.
- Thus, an explosive situation was created in Punjab.

NATIONAL MOVEMENT DURING THE FIRST WORLD WAR

- The First World War started in the year 1914.
- This War was fought among the nations of Europe to get the colonial monopoly. During wartime, the British Government made an

appeal to the Indian leaders to join hands with them in their time of crisis.

- Indian leaders agreed but they put their own terms and conditions i.e. after the war was over, the British government would give Constitutional (legislative and administrative) powers to the Indian People.
- Unfortunately, the steps taken by the British government during World War I created unrest among the Indian people. This was because the British government had taken a huge loan during wartime which they had to repay.
- They increased the rent from the land, i.e. lagan. They forcefully recruited Indians in the British Army.
- They increased the price of necessary goods and imposed taxes on personal and professional income.
- As a result, they had to face protest from Indian society.
- Farmers and workers of Champaran, Bardoli, Kheda and Ahmedabad actively protested against the exploitative policies of the British government.
- Lakhs of students left schools and colleges. Hundreds of lawyers gave up their practice. Women also significantly contributed to this movement and their participation became wider with the emergence of Gandhi.
- The boycott of foreign cloth became a mass movement, with thousands of bonfires of foreign cloth lighting the Indian sky.

Lucknow Session (1916)

- The 31st Session of the Congress was held at Lucknow in 1916.
- It was presided over by the Ambica charan Majumdar who was a prominent lawyer and was actively associated with the Congress since its birth.

Home Rule League Movement 1916

- By early 1915, Annie Besant had launched a campaign to demand self-government for India after the war on the lines of white colonies
- She campaigned through her newspapers, New India & Commonweal, and through public meetings and conferences
- Two Home Rule Leagues were established, one by BG Tilak at Poona in April 1916 and the other by Mrs Annie Besant at Madras in September 1916
- Tilak's Movement concentrated on Maharashtra (excluding Bombay), Karnataka, Central Provinces and Berar
- Annie Besant's Movement covered the rest of India (including Bombay)

Complete List of Newspapers and Journals during British India

Name of the Paper/Journal	**Year and Place from which Published**	**Name of the Founder/Editor**
Bengal Gazette	1780, Calcutta	James Augustus Hickey
Sambad Kaumudi (weekly in Bengali)	1821	Raja Ram Mohan Roy
Mirat-ul Akbar (First journal in Persian)	1822, Calcutta	Raja Ram Mohan Roy
Banga-Duta (A weekly in four languages- English, Bengali, Persian, Hindi)	1822, Calcutta	Raja Ram Mohan Roy and Dwarkanath Tagore
Bombay Times (from 1861 onwards, The Times of India)	1838, Bombay	Robert Knight and Thomas Bennett
Rast Goftar (A Gujarati fortnightly)	1851	Dadabhai Naoroji
Hindu Patriot	1853, Calcutta	Girishchandra Ghosh
Somprakasha	1858, Calcutta	Dwarkanath Vidyabhushan
Indian Mirror	1862, Calcutta	Devendranath Tagore and NN Sen

*Bengalee (*this and *Amrita Bazar Patrika*- the first vernacular papers)	1862, Calcutta	Girishchandra Ghosh (taken over by SN Banerjea in 1879)
National Paper	1865, Calcutta	Devendra Nath Tagore
Amrita Bazar Patrika (Bengali in the beginning and later on English Daily)	1868, Jessore District	Sisirkumar Ghosh and Motilal Ghosh
Bangadarshana	1873, Calcutta	BankimChandra Chatterjee
The Statesman	1875, Calcutta	Robert Knight
The Hindu	1878, Madras	GS Aiyar, Viraraghavchari and Subba Rao Pandit
The Tribune	1881, Lahore	Dayal Singh Majeetia
Sudharak		Gopal Ganesh Agarkar
Hindustani and Advocate		GP Verma
Kesari (Marathi daily) and Maharatta (English Weekly)	1881, Bombay	Tilak, Chiplunkar, Agarkar
Swadeshamitran	Madras	GS Aiyar
Paridasak (Weekly)		Bipin Chandra Pal
Yugantar	1906, Bengal	Barindra Kumar Ghosh and Bhupendranath Dutta
Sandhya	1906, Bengal	Brhamanabandab Upadhay
Indian Sociologist	London	Syamji Krishna Verma

Bande Matram	Parish	Madam Bhikaji Cama
Free Hindustan	Vancouver	Taraknath Das
Ghadr	San Francisco	Ghadar Party
Talwar	Berlin	Virendrnath Chattopadhay
Bombay Chronical (a daily)	1913, Bombay	Pherozshahs Mehta, BG Horniman
The Hindustan Times	1920, Delhi	KM Pannikkar as a part of Akali Dal Movement
Leader (in English)		Madan Mohan Malviya
Bahishkrit Bharat	1927	BR Ambedkar
Kudi Arasu (Tamil)	1910	E.V. Ramaswamy Naicker (Periyar), SS MIrajkar, KN Joglekar
Bandi Jivan	Bengal	Sachindranath Sanyal
National Herald	1938, Delhi	Jawaharlal Nehru
Tagzin-ul-Akhlaq (journal)	1871	Sir Syed Ahmed Khan
Kesari (Marathi Daily Newspaper)	1881	Bal Gangadhar Tilak
Comrade (Weekly English Newspaper)	1911	Maulana Mohammad Ali
Al- Balagh and Al-Hilal (Both urdu weekly newspaper)	1912	Abul Kalam Azad
Pratap (Hindi Newspaper)	1913	Ganesh Shankar Vidyarthi
Independent (Newspaper)	1919	Motilal Nehru

Moon Nayak (Marathi Weekly)	1920	BR Ambedkar
Young India (Weekly Journal)	1919	M K Gandhi
Nav Jeevan (Weekly Newspaper)	1929	M K Gandhi
Harijan (Weekly Journal)	1931	M K Gandhi
Hindustan Dainik	1936	Madan Mohan Malviya

Indian National Movement (1917-1947)

Champaran Satyagraha (1917)

- The first civil disobedience movement by Gandhi in the freedom struggle.
- Persuaded by Rajkumar Shukla, an indigo cultivator, Gandhi went to Champaran in Bihar to investigate the conditions of the farmers there.
- Champaran struggle is called the first experiment on Satyagraha by Gandhi.
- It was during this time that Gandhi was given the names 'Bapu' and 'Mahatma' by the people.

Ahmedabad Mill Strike (Feb-March 1918)

- The next scene of Gandhiji's activity was in 1918 at Ahmedabad where an agitation had been going on between the labourers and the owners of a cotton textile mill for an increase of pay.
- While Gandhiji was negotiating with the mill owners, he advised the workers to go on strike and to demand a 35% increase in wages.
- The strike was withdrawn and retrieval later awarded the 35% increase that the workers had demanded.
- Ambalal Sarabhai's sister, **Anasuya Behn**, was one of the main lieutenants of Gandhiji in this struggle in which her brother and Gandhiji's friend was one of the main advisories.

Kheda Satyagraha (March 1918)

- 1918 was a year of failed crops in the Kheda district of Gujarat due to droughts.
- As per law, the farmers were entitled to remission if the produce was less than a quarter of the normal output.
- Sardar Vallabhbhai Patel, under Gandhi's guidance, led the farmers in protest against the collection of taxes in the wake of the famine.

Rowlatt Act (1919)

- In 1917, a committee was set up under the presidentship of Sir Sydney Rowlatt to look into the militant Nationalist activities
- Rowlatt Act was passed in March 1919 by the Central Legislative Council
- As per this Act, any person could be arrested on the basis of suspicion.
- No appeal or petition could be filed against such arrests.
- This Act was called the Black Act and it was widely opposed.
- An all-India hartal was organized on 6 April 1919.
- Meetings were held all over the country.
- Mahatma Gandhi was arrested near Delhi.
- Two prominent leaders of Punjab, Dr Satya Pal and Dr Saifuddin Kitchlew, were arrested in Amritsar.

Jallianwala Bagh Massacre (13 April 1919)

- The Jallianwala Bagh Massacre took place on 13 April 1919 and it remained a turning point in the history of India's freedom movement
- In Punjab, there was unprecedented support to the Rowlatt Satyagraha
- On 13 th April, the Baisakhi day (harvest festival), a public meeting was organized at the Jallianwala Bagh (garden)
- Dyer marched in and without any warning opened fire on the crowd
- According to the official report, 379 people were killed and 1137 wounded in the incident.
- Rabindranath Tagore renounced his knighthood as a protest

Khilafat Movement (1920)

- The chief cause of the Khilafat Movement was the defeat of Turkey in the First World War.
- The harsh terms of the Treaty of Sevres (1920) were felt by the Muslims as a great insult to them.

- The whole movement was based on the Muslim belief that the Caliph (the Sultan of Turkey) was the religious head of the Muslims all over the world
- Maulana Abul Kalam Azad, M.A. Ansari, Saifuddin Kitchlew and the Ali brothers were the prominent leaders of this movement.
- Mahatma Gandhi was particularly interested in bringing the Hindus and the Muslims together to achieve the country's independence.
- The Khilafat Movement merged with the Non-Cooperation Movement launched by Mahatma Gandhi in 1920:

Non-Cooperation Movement (1920-1922)

- It was approved by the INC at the Nagpur session in December 1920.
- The programmes of the Non-Cooperation Movement were:
    - Surrender of titles and honorary positions
    - Resignation of membership from the local bodies.
    - Boycott of elections held under the provisions of the 1919 Act
    - Boycott of government functions.
- Boycott of courts, government schools and colleges.
- Boycott of foreign goods
- Establishment of national schools, colleges and private panchayat courts.
- Popularizing Swadeshi goods and khadi.
- National schools such as the Kashi Vidyapeeth, the Bihar Vidyapeeth and the Jamia Millia Islamia were set up.
- No leader of the Congress came forward to contest the elections for the Legislatures
- In 1921, mass demonstrations were held against the Prince of Wales during his tour of India.
- Most of the households took to weaving cloths with the help of charkhas.
- But the whole movement was abruptly called off on 11th February 1922 by Gandhi following the Churi Chaura incident
- In the Gorakhpur district of U.P. Earlier on 5 th February an angry mob set fire to the police station at Churi Chaura and twenty-two policemen were burnt to death

Swaraj Party

- Leaders like Motilal Nehru and Chittaranjan Das formed a separate group within the Congress known as the Swaraj Party on 1 January 1923.
- In the Central Legislative Council Motilal Nehru became the leader of the party whereas in Bengal the party was headed by C.R. Das.
- After the passing away of C.R. Das in June 1925, the Swaraj Party started weakening.

Simon Commission

- In November 1927 the British Government appointed the Simon Commission to look into the working of the Government of India Act of 1919 and to suggest changes.
- The Commission consisted of Englishmen without a single Indian representative
- The Commission arrived in India in Feb 1928 and was met with countrywide protests.
- Peaceful demonstrators were beaten by the police in many places. Lala Lajpat Rai was assaulted and soon after died.

Nehru Report (1928)

- In the meanwhile, the Secretary of State, Lord Birkenhead, challenged the Indians to produce a Constitution
- The challenge was accepted by the Congress, which convened an all-party meeting on 28 February 1928
- A committee consisting of eight was constituted to draw up a blueprint for the future Constitution of India.
- It was headed by Motilal Nehru

Civil Disobedience Movement (1930-1934)

- In the prevailing atmosphere of restlessness, the annual session of the Congress was held at Lahore in December 1929.
- During this session presided over by Jawaharlal Nehru the Congress passed the Poorna Swaraj resolution
- Moreover, as the government failed to accept the Nehru Report, Congress gave a call to launch the Civil Disobedience Movement.
- The Congress had also observed January 26, 1930, as the Day of Independence.
- The same date later became the Republic Day when the Indian Constitution was enforced in 1950.

Dandi March

- On 12th March 1930, Gandhi began his famous March to Dandi with his chosen 79 followers to break the salt laws.
- He reached the coast of Dandi on 5 April 1930 after marching a distance of 200 miles
- On 6 April formally launched the Civil Disobedience Movement by breaking the salt laws.
- On 9 April, Mahatma Gandhi laid out the programme of the movement which included making of salt in every village in violation of the existing salt laws;

Round Table Conferences

First Round Table Conference

- Held in November 1930 at London and it was boycotted it by the Congress.
- In January 1931 in order to create a conducive atmosphere for talks.
- The government lifted the ban on the Congress Party and released its leaders from prison.
- On 8 March 1931, the Gandhi-Irwin Pact was signed.
- As per this pact, Mahatma Gandhi agreed to suspend the Civil-Disobedience Movement and participate in the Second Round Table Conference.
- In September 1931, the Second Round Table Conference was held at London
- Mahatma Gandhi participated in the Conference but returned to India disappointed as no agreement could be reached on the demand for complete independence and on the communal question.
- In January 1932, the Civil-Disobedience Movement was resumed.
- The government responded to it by arresting Mahatma Gandhi and Sardar Patel and by reposting the ban on the Congress party

Communal Awards

- The Communal Award was announced by the British Prime Minister, Ramsay MacDonald, in August 1932.

Poona Pact (1932)

- On 16 August 1932, the British Prime Minister Ramsay MacDonald made an announcement, which came to be as the Communal Award.
- Mahatma Gandhi protested against the Communal Award and went on a fast unto death in the Yeravada jail on 20 September 1932.
- Finally, an agreement was reached between Dr Ambedkar and Gandhi.
- This agreement came to be called the Poona Pact. The British Government also approved of it.
- Accordingly, 148 seats in different Provincial Legislatures were reserved for the Depressed Classes in place of 71 as provided in the Communal Award.

Third Round Table Conference (1932)

- Congress again did not take part in it.
- Nonetheless, in March 1933, the British Government issued a White Paper.
- Which became the basis for the enactment of the Government of India Act, 1935.

Government of India Act, 1935

Main features of this act were -

- Provision for the establishment of an All India Federation at the Centre, consisting of the Provinces of British India and the Princely States
- It did not come into existence since the Princely States refused to give their consent for the union
- Division of powers into three lists viz. Federal, Provincial and Concurrent.
- Introduction of Diarchy at the Centre
- The Governor-General and his council administered the “Reserved subjects”
- The Council of Ministers were responsible for the “Transferred” subjects
- Abolition of Diarchy and the introduction of Provincial Autonomy in the provinces.
- The Governor was made the head of the Provincial Executive but he was expected (not bound) to run the administration on the advice of the Council of ministers.
- Provincial Legislatures of Bengal, Madras, Bombay, United Provinces, Bihar and Assam were made bicameral.
- Extension of the principle of Separate Electorates to Sikhs, Europeans, Indian Christians and Anglo Indians
- Establishment of a Federal Court at Delhi with a Chief Justice and 6 judges.

Second World War & National Movement

- In 1937 elections were held under the provisions of the Government of India Act of 1935
- Congress Ministries were formed in seven states of India.
- On 1 September 1939, the Second World War broke out.
- The British Government without consulting the people of India involved the country in the war.
- As a mark of protest the Congress Ministries in the Provinces resigned on 12 December 1939
- The Muslim League celebrated that day as the Deliverance Day
- In March 1940 the Muslim League demanded the creation of Pakistan.

August offer

During the course of the 2nd World War, in order to secure the cooperation of the Indians, the British Government made an announcement on 8 August 1940, which came to be known as the 'August Offer', which proposed –

- Dominion status as the objective for India.
- Expansion of viceroy's executive council & setting up of a constituent assembly after the war consisting of Indians to decide their constitution according to their social, economic and political conceptions subject to fulfilment of the obligation of the Government regarding defence, minority rights, treaties with states & all India services
- No future constitution to be adopted without the consent of minorities.

Individual Satyagraha

- In order to secure the cooperation of the Indians, the British Government made an announcement on 8 August 1940,
- The August Offer envisaged that after the War a representative body of Indians would be set up to frame the new Constitution.
- Acharya Vinoba Bhave was the first to offer Satyagraha and he was sentenced to three months imprisonment.
- Jawaharlal Nehru was the second Satyagrahi and imprisoned for four months.
- The individual Satyagraha continued for nearly 15 months.

Cripps Mission (1942)

- In the midst of worsening wartime international situation, the British Government in its continued effort to secure Indian cooperation seent Sir Stafford Cripps to India on 23 March 1942. This is known as Cripps Mission.

Quit India Movement (1942-1944)

- The failure of the Cripps Mission and the fear of an impending Japanese invasion of India led Mahatma Gandhi to begin his campaign for the British to quit India.
- Mahatma Gandhi believed that an interim government could be formed only after the British left India and the Hindu-Muslim problem sorted out.
- The All India Congress Committee met at Bombay on 8 August 1942 and passed the famous Quit India Resolution.
- On the same day, Gandhi gave his call of 'do or die'
- On 8th and 9th August 1942, the government arrested all the prominent leaders of the Congress.
- Mahatma Gandhi was kept in prison at Poona.
- Pandit Jawaharlal Nehru, Abul Kalam Azad, and other leaders were imprisoned in the Ahmednagar Fort.
- At this time, leadership was provided by Ram Manohar Lohia, Achyuta and S.M. Joshi.
- The role of Jayaprakash Narain in this movement was important.
- A large number of students also left their schools and colleges to join the movement.
- The youth of the nation also participated in this movement with patriotism.
- In 1944 Mahatma Gandhi was released from jail.
- Quit India Movement was the final attempt for the country's freedom.
- The British Government ordered for 538 rounds of firing. Nearly 60,229 persons were jailed.
- At least 7,000 people were killed.
- This movement paved the way for India's freedom. It aroused among Indians the feelings of bravery, enthusiasm and total sacrifice.

Rajgopalachari Formula

- Rajagopalachari, the veteran Congress leader, prepared a formula for Congress-League cooperation, accepted to Gandhi.
- It was a tacit acceptance of the League's demand for Pakistan.
- Hindu leaders led by Vir Savarkar condemned the CR Plan.

Desai-Liaqat Pact

- Bhulabhai Desai, leader of the Congress with Liaqat Ali Khan, leader of the Muslim drafted a proposal for the formation of an interim government at the centre, consisting of —
  - an equal number of persons nominated by the Congress & League in the central legislature
  - 20% reserved seats for minorities
- No settlement could be reached between the Congress and the League on these lines
- But the fact that a sort of parity between the Congress and the League was decided upon, which had far-reaching

Wavell Plan

- A conference was convened by the viceroy, Lord Wavell; at Shimla in June 1945
- Aimed to reconstruct the governor general's executive council pending the preparation of a new constitution.

Indian National Army

- On 2 July 1943, Subhas Chandra Bose reached Singapore and gave the rousing war cry of 'Dilli Chalo'
- He was made the President of Indian Independence League and soon became the supreme commander of the Indian National Army.
- The names of the INA's three Brigades were the Subhas Brigade, Gandhi Brigade and Nehru Brigade
- The women's wing of the army was named after Rani Lamiae
- The Indian National Army marched towards Imphal after registering its victory over Kohima.
- After Japan's surrender in 1945
- The INA failed in its efforts. Under such circumstances, Subhas went to Taiwan.
- Then on his way to Tokyo, he died on 18 August 1945 in a plane crash
- The trial of the soldiers of INA was held at Red Fort in Delhi
- Pandit Jawaharlal Nehru, Bhulabhai Desai and Tej Bahadur Sapru fought the case on behalf of the soldiers

Cabinet Mission (1946)

- After the Second World War, Lord Atlee became the Prime Minister of England.
- On 15 March 1946 Lord Atlee made a historic announcement in which the right to self- determination and the framing of a Constitution for India were conceded.
- Consequently, three members of the British Cabinet - Pethick Lawrence, Sir Stafford Cripps and A. V. Alexander - were sent to India. This is known as the Cabinet Mission.
- The Cabinet Mission put forward a plan for the solution of the constitutional problem.
- Provision was made for three groups of provinces to possess their separate constitutions.
- The Cabinet Mission also proposed the formation of a Union of India, comprising both British India and the Princely States.
- The Union would remain in charge of only foreign affairs, defence and communications. leaving the residuary powers to be vested in the provinces till a new government was elected.
- Both the Muslim League and the Congress accepted the plan.
- Consequently, elections were held in July 1946 for the formation of a Constituent Assembly.
- The Congress secured 205 out of 214 General seats.
- The Muslim League got 73 out of 78 Muslim seats.
- An Interim Government was formed under the leadership of Jawaharlal Nehru on 2 September 1946.

Mountbatten Plan (1947)

- On 20 February l947, Prime Minister Atlee announced in the House of Commons the definite intention of the British Government to transfer power to responsible Indian hands.
- Thus, to effect the transference of that power Atlee decided to send Lord Mountbatten as Viceroy to India.

- Lord Mountbatten armed with vast powers became India's Viceroy on 24 March 1947.
- The partition of India and the creation of Pakistan appeared inevitable to him.
- After extensive consultation, Lord Mountbatten put forth the plan of partition of India on 3 June 1947.
- The Congress and the Muslim League ultimately approved the Mountbatten Plan. Indian Independence Act, 1947.
- The British Government accorded formal approval to the Mountbatten Plan by enacting the Indian Independence Act on 18 July 1947.
- The partition of the country into India and Pakistan would come into effect from 15 August 1947.

Education during the British Period

Individual efforts under company rule	• Calcutta Madrasah was established by Warren Hastings in 1781 to study Muslim laws and customs. • Jonathan Duncan established Sanskrit college at Banaras in 1791 for Hindu laws and philosophy. • Fort William College was set up in 1800 by Wellesley for the training of civil servants of the Company. (It was closed in 1802).
Charter Act of 1813	• 1 lakh rupees were to be spent by the company for the promotion of education in India.
Lord Macaulay's Minute of 1835	• Amidst Orientalist-Anglicist controversy, Macaulay supported the latter view. • The English language was chosen as the sole medium of education. • The government decided to spend limited resources for teaching western sciences and literature.
	• They adopted '**downward filtration theory'** instead of mass education. Note: 'Downward filtration theory' means teaching a few upper- and middle-class people would produce interpreters which would eventually penetrate to the masses. However, this theory failed miserably as envisaged by the British but has helped in the growth of Modern Intelligentsia who shaped the struggle for independence.
Wood's Despatch, 1854	• This was also known as "**Magna Carta of English Education in India".** • It rejected 'downward filtration theory'. • It recommended English for higher studies and vernaculars at the school level. • Secular education. • Encouraged private enterprises.
Hunter Education Commission, 1882-83	• Its objective was to assess the Wood Dispatch. • It emphasized on state's role in improving education. • Advocated for transfer of control to local bodies (district and municipal boards).
Rayleigh Commission, 1902	• To review the performance of universities in India.
Indian Universities Act, 1904	On the recommendation of Rayleigh commission, the act provided for: • **greater control over universities**

	• Universities were given due importance for research and studies. • the number of fellows reduced. • Rules were made stricter for private college affiliations. • Gopal Krishna Gokhale called this move a "retrograde measure".
Government Resolution on Education Policy, 1913	• Government refused to take up the responsibility of compulsory education. • It urged the provincial government to do the same. • Even private players were encouraged.
Saddler University Commission, 1917-19	• The commission was set up to review Calcutta University which later extended to all universities. • 12+3 program (12-year schooling and 3-year degree) • A separate board of secondary and intermediate education were to be set up. • It laid stress on Female education, applied scientific and technological education, teachers' training.
Hartog Committee, 1929	• Laid emphasis on primary education. • Quality of education was given priority over a number of schools and colleges. • Admissions were highly restricted.
Wardha Scheme of Basic Education (1937)	• Zakir Hussain committee formulated this national scheme for basic education. • The main principle of 'learning through activity'. • secular in approach. • First seven years of schooling through mother tongue and English after 8th.
Sergeant Plan of Education, 1944	• The sergeant was the educational advisor to the British Government. • He advocated a number of reforms and aimed to make the Indian education system equivalent to that of England in 40 years. But it seriously lacked methodology for implementation. It was just lip service of the government.

Revolutionary movements

Chapekar brothers (1897)

- This was the first political assassination of British officer post-1857.
- Damodar, Balkrishna and Vasudev Chapekar shot at WC Rand, Chairman of the Special Plague Committee.
- The Chapekar brothers were hanged.

Alipore Bomb Conspiracy (1908)

- Douglas Kingsford was a British Chief Magistrate who was the target of the bomb thrown at Muzaffarpur.
- Instead, two women died in the attack.
- Prafulla Chakki and Khudiram Bose, who threw the bomb. Prafulla Chakki committed suicide while Bose (18 years) caught and sentenced to death.
- Aurobindo Ghosh, Barin Ghosh, Kanailal Dutt and 30 other members of **Anushilan Samiti** were also tried in this case.

Curzon Wyllie's assassination (1909)

- He was assassinated in London by Madan Lal Dhingra in the evening of 1 July 1909.
- Madan Lal Dhingra had close ties with the **Indian House.**

Howrah Gang Case (1910)

- Arrest and trials of 47 Bengali Indian Nationalist of Anushilan Samiti because of the murder of Inspector Shamsul Alam in Calcutta.
- He uncovered the revolutionary network of Anushilan Samiti that linked the murder and other robberies.

Delhi Lahore Conspiracy Case (1912)

- Assassination attempted on Lord Hardinge, the then Viceroy of India.
- On the occasion of the transfer of British capital from Calcutta to Delhi, a bomb was thrown into the viceroy's carriage. Lord Hardinge was injured and an Indian attendant was killed.
- it was led by Rash Bihari Bose and Sachin Chandra Sanyal.

The Ghadar Movement (1913)

- 1907 Lala Hardayal started a weekly called Ghadar.
- His association with more leaders led to the formation of the Ghadar party in 1913 in North America. This movement was planned to temper the loyalty of Indian troops, form secret societies and assassinate British officials etc.
- This movement was intensified because of the **Komagata Maru incident.**

Kakori Conspiracy (1925)

- Case of a train robbery near Kakori in Uttar Pradesh.
- It was led by the youth of **Hindustan Republican Association** including Ram Prasad Bismil, Chandrashekhar Azad, Thakur Roshan Singh, Ashfaqulla Khan and others.
- In 1924 Hindustan Republican Army was founded at Kanpur by Sachin Sanyal and Jogesh Chandra Chatterjee with an aim to organise armed revolution to overthrow colonial government.
- In September 1928 many of the major revolutionaries gathered at Firoz Shah Kotla, set up a new association by adding 'socialist' into their names.

Chittagong Armoury Raid (1930)

- It was led by Surya Sen and others were Loknath Bal, Kalpana Dutta, Ambika Chakraborty Subodh Roy etc. They were not able to raid arms but able to cut the telephones and telegraph wires.

Central Assembly Bomb Case (1929) and the Lahore Conspiracy Case (1931)

- Bhagat Singh, Sukhdev, Azad and Rajguru avenged the death of Lala Lajpat Rai by killing General Saunders in 1928.
- Batukeshwar Dutt and Bhagat Singh threw a bomb in the central assembly against the passage of public safety bill and trade dispute bill. The intention was to popularise the activities and philosophy.
- Bhagat Singh was arrested for the case of the killing of General Saunders; this was known as Lahore conspiracy case.
- After the trial, Bhagat Singh, Sukhdev and Rajguru executed by hanging in March 1931 and
- Chandrashekhar Azad also died the same year in February in the gun battle with the police in Allahabad.

Important Revolutionary Organisations

Name of Organisation	Year of Formation	Affected Area	Founders/Associated members
Anushilan Samiti	1902	Bengal region	Promodha Mitter, Jatindranath Banerjee, Barindra Kumar Ghosh and others.
Jugantar Party	Active during the first World War	Bengal region	Aurobindo Ghosh, Barin Ghosh and Jatindranath Mukherjee or Bagha Jatin
Mitra Mela	1899	Nasik, Bombay and Poona region	Savarkar and his brother
Abhinav Bharat/ Young India	1904	Nasik, Bombay and	Savarkar and his brother

Society (Mitra mela merged into this)		Poona region	
Swadesh Bandhab Samiti	1905	Bengal region	Ashwini Kumar Dutta
Hindustan Republican Association (HRA)	1924	Kanpur	Sachindra Nath Sanyal, Narendra Mohan Sen, Pratul Ganguly
Hindustan Socialist Republican Association Army (HSRA)	1928	New Delhi	Chandrasekhar Azad, Bhagat Singh, Sukhdev Thapar
Bharat Naujawan Sabha	1926	Lahore	Bhagat Singh
Indian Home Rule Society	1905	London	Shyamji Krishna Varma
Gadar Party	1913	USA & Canada (North America)	Lala Hardayal
Indian Independence League	1907	California (USA)	Taraknath Das
Berlin Committee for Indian Independence	1915	Berlin	Virendranath Chattopadhyay, Bhupendra Nath Dutta, Lala Hardayal and others with the help of the German foreign office

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	equivalent to that of England in 40 years. But it seriously lacked methodology for implementation. It was just lip service of the government.

Zamindari System

In 1793, Lord Cornwallis introduced the Permanent Settlement system for fixing the land revenue at a permanent amount. It was introduced in areas of Bengal and Bihar. It was later extended to Orissa, Northern Districts of Madras and Districts of Varanasi. In this system, zamindars were recognised as the owner of lands. Its provisions are:

- Zamindars and revenue collectors were converted into landlords. They acted as agents of government in collecting land revenue from ryots.
- The right of ownership of land made hereditary and transferable.
- The attempt of the official was to secure the maximum amount. Hence rent of revenue was fixed very high.
- Zamindars were to give $10/11^{th}$ of the rental they derived, keeping the only $1/11^{th}$ for themselves.
- If rental of zamindar's estate increased as a result of the extension of cultivation and improvement in agriculture, he would keep the entire amount of the increase.
- On the other hand, even if the crop had failed, he had to pay his revenue rigidly on the due date; otherwise, his lands were to be sold.

THE RYOTWARI SYSTEM:

This system was introduced on the recommendation of Reed and Thomas Munro by Waren Hasting. It was considered to be a continuation of the state of affairs that existed in the past. It was introduced in parts of Madras and Bombay Presidencies at the beginning of the nineteenth century. Its provisions were:

- The cultivator was to be recognised as the owner of his land. So the payment of land revenue was direct to be done by him.
- It was not a permanent system and was revised periodically after 20 to 30 years when revenue demand was raised.
- Cultivators could sale, mortgage and lease land on the condition that they pay taxes regularly.

THE MAHALWARI SYSTEM:

The system of Mahalwari was introduced by Holt Mackenzie and was mainly centralised in Ganga valley, the North West province, parts of Central India and Punjab. This was a modified form of the zamindari system. This was in congruence with the traditional system of joint land rights on the villages in the said provinces. Its provisions were:

- The village was taken as a unit for assessment of land revenue.
- On the whole community in the village, taxation was imposed as its rights were common.
- The landlord or head of the family claimed to be the landlord of the village or the estate (mahal) with whom the settlement was taken place.
- There was a periodic revision of land revenue.
- The collection target was to be divided among cultivators.
- So everyone was responsible to meet the target of revenue.
- The farmer was given the right to sell or mortgage the respective proper

GEOGRAPHY

India and the Administrative Units; the States and Union Territories

a. Physiography of India

- India lies in the northern hemisphere of the globe between 8º 4' N and 37º6' N latitudes and 68º7' E and 97º25' E longitudes.
- The southern extent goes up to 6º45' N latitude to cover the last island of the Nicobar group of islands. The southern extreme is called Pygmalion Point or India Point.
- The Tropic of Cancer passes through the middle part of India and crosses the eight states of Gujarat, Rajasthan, Madhya Pradesh, Chhattisgarh, Jharkhand, West Bengal, Tripura and Mizoram.
- The total land frontier of 15,200 km passes through marshy lands, desert, plains, mountains, snow-covered areas and thick forests.
- The maritime boundary of 6100 km along the main landmass which increases to 7516 km of the coastlines of Andaman-Nicobar and Lakshadweep Islands are added to it.
- India commands a total geographical area of 32,87,263 sq.km which is roughly 0.57% of the area of the earth and 2.4% of the total area of the land hemisphere.
- India is the seventh-largest country of the world after Russia, Canada, USA, China, Brazil and Australia (all are mentioned in the descending order).
- India's area is almost equal to the area of Europe (excluding Russia), one-third of Canada, one-fifth of Russia, eight times of Japan and twelve times of the United Kingdom.
- India has roughly a quadrangular shape. It measures about 3,214 km from north to south and about 2933 km from east to west, the difference between the two is just 281km.

b. Land frontiers of India

- The Himalayan ranges from a natural frontier between India and China. In the north-west, Jammu and Kashmir share the international border with Sinkiang and Tibet in China.
- In the east, Himachal Pradesh and the mountain region of Uttarakhand have a common frontier with Tibet.
- Nepal has its border with Uttar Pradesh and Bihar.
- West Bengal and Sikkim also touch the Nepalese border for a small distance.
- India-Afghanistan and Pakistan-Afghanistan international boundary are called the Durand Line, determined as a 'military-strategic border' between British India and Afghanistan.
- The boundary between with Pakistan and Bangladesh (East Pakistan) was finalized at the time of partition in 1947 through the 'Radcliff Award'.
- In Punjab, the frontier runs through a smooth and fertile plain, which is purely man-made. The Indian frontier with Pakistan in Kashmir is still disputed and has led to strained relations between the two countries since partition in 1947.
- The eastern boundary of India is formed by a complex chain of the Himalayan offshoots consisting of the Mishmi, the Patkai, the Naga hills, the Barail range, the Mizo hills and finally the Arakan Yoma mountain range.
- The Arakan Yoma is submerged in the Bay of Bengal for a sufficiently long stretch and emerges again in the form of Andaman and Nicobar Islands.
- The boundary line between India and Bangladesh crisscrosses the vast Ganga-Brahmaputra delta. This boundary runs through an entirely flat country in which there is not even a small mount or hill which could be used for demarcating the boundary between two countries.
- Bangladesh and India share a the fifth-longest land border in the world, including Assam, Tripura, Mizoram, Meghalaya, and West Bengal.
- There is a maritime boundary of 6100 km along with the main landmass which increases to 7156 km if the coastlines of Andaman and Nicobar Islands are added to it.

- The nearest neighbour in the south across the seas in Sri Lanka which is separated from India through the narrow channel of Palk Strait.
- Similarly, the Eight Degree Channel forms the boundary between the Lakshadweep and Maldives islands.
-

Name of the Country	Length in Km
Bangladesh	4,096.7
China	3,488
Pakistan	3,323
Nepal	1,751
Myanmar	1,643
Bhutan	699
Afghanistan	106
Total	15,106.7

The states having a common boundary with the neighboring countries.

Country	States
Pakistan	3 States: Punjab, Rajasthan, Gujarat and 2 Union Territories- Jammu & Kashmir and Ladakh
Afghanistan	1 Union Territory- Ladakh
China	4 States: Himachal Pradesh, Uttarakhand, Sikkim, Arunachal Pradesh and 1 Union Territory- Ladakh
Nepal	5 States: Uttarakhand, Uttar Pradesh, Bihar, West Bengal, Sikkim
Bhutan	4 States: Sikkim, West Bengal, Assam, Arunachal Pradesh
Myanmar	4 States: Arunachal Pradesh, Nagaland, Manipur, Mizoram
Bangladesh	5 States: West Bengal, Meghalaya, Assam, Tripura and Mizoram

Quick Glance at States Area-wise:

State	Area (Km^2)	Capital	Main Language
Rajasthan	342,239	Jaipur	Rajasthani, Hindi
Madhya Pradesh	308,245	Bhopal	Hindi

Maharashtra	307,713	Mumbai	Marathi
Uttar Pradesh	240,928	Lucknow	Hindi
Gujarat	196,024	Gandhinagar	Gujarati
Karnataka	191,791	Bengaluru	Kannada
Andhra Pradesh	162,968	Hyderabad	Telugu
Odisha	155,707	Bhuvaneswar	Oriyya
Chhattisgarh	135,191	Raipur	Hindi
Tamil Nadu	130,058	Chennai	Tamil
Telangana	112,077	Hyderabad	Telugu
Bihar	94,163	Patna	Hindi
West Bengal	88,752	Kolkata	Bengali
Arunachal Pradesh	83,743	Itanagar	Tribal
Jharkhand	79,714	Ranchi	Hindi
Assam	78,438	Dispur	Assamese
Himachal Pradesh	55,673	Shimla	Hindi
Uttarakhand	53,483	Dehradun	Hindi
Punjab	50,362	Chandigarh	Punjabi
Haryana	44,212	Chandigarh	Hindi
Kerala	38,863	Thiruvananthapuram	Malayalam
Meghalaya	22,429	Shillong	Khasi, Garo, English
Manipur	22,327	Imphal	Manipuri
Mizoram	21,081	Aizawl	Mizo, English
Nagaland	16,579	Kohima	Angami Ao
Tripura	10,486	Bengali, Tripuri	Agartala

Sikkim	7,096	Gangtok	Lepcha, Bhutia
Goa	3,702	Panaji	Marathi, Konkani
Union Territories	Area (sq. km)	Capital	Language
Andaman and Nicobar Is.	8,249	Port Blair	Andamanese, Nicobarese
Delhi	1,490	New Delhi	Hindi
Puducherry	492	Puducherry	Tamil, French
Dadra and Nagar Haveli and Daman and Diu	603	Daman	Gujarati, Marathi
Chandigarh	114	Chandigarh is itself the capital of two states i.e. Punjab and Haryana.	Hindi, Punjabi, and Haryanvi
Lakshadweep	32	Kavaratti	Malayalam
Jammu Kashmir	-	Srinagar (Summer capital) Jammu (winter capital)	Kashmiri, Urdu
Ladakh	-	Leh, Kargil	Urdu, Hindi, English

Physical Geography of India

- India has vast diversity in physical features.
- This diversity of landmass is the result of the large landmass of India formed during different geological periods and also due to various geological and geomorphological processes that took place in the crust.
- According to Plate Tectonic theory folding, faulting and volcanic activity are the major processes involved in the creation of physical features of Indian landscape. For example, the formation of the Himalayas in the north of the country attributed to the convergence of Gondwana land with the Eurasian plate.
- The Northern part of the country has a vast expanse of rugged topography consisting of a series of mountain ranges with varied peaks, beautiful valleys and deep gorges.
- The Southern part of the country consists of stable table land with highly dissected plateaus, denuded rocks and developed series of scarps.
- The Great Northern Plains lies between these two landscapes.

- The physical features of India can be grouped under the following Physiographic Divisions:

1. The Himalayas
2. The Northern Plains
3. The Peninsular Plateau
4. The Indian desert
5. The Coastal Plains
6. The Islands

The Himalayas

- The longest range of this system is Pir Panjal Range.
- This range consists of famous valley of Kashmir, the Kangra and the Kullu Valley.
- The Outer most range of the Himalayas is called the Shiwaliks. They composed of unconsolidated sediments brought down by rivers from the main Himalayan range located farther north.
- The Longitudinal valley lying between lesser Himalayas and Shiwaliks are known as Duns. Example: Dehra Dun, Kotli Dun, Patli Dun.
- The highest peak of Himalayas is: Everest, Nepal (8848 m); Kanchenjunga, India (8598 m); Makalu, Nepal (8481 m)
- On the basis of relief, alignment of ranges and other geomorphological features the Himalayas can be subdivided into following
    - North-western or Kashmir Himalayas
    - Himachal and Uttarakhand Himalayas
    - Darjeeling and Sikkim Himalayas
    - Arunachal Himalayas
    - Eastern Hills and Mountains

North-Western or Kashmir Himalayas

- Important Ranges: Karakoram, Ladakh, Zaskar and Pir Panjal
- Important Glaciers: Siachen, Baltoro, Remo, etc.,
- Important Pass: Zoji la, Bara Lacha la, Banihal, rohtang, etc.,
- Important Peaks: Nanga Parbat, K2, etc.,
- Kashmir valley: lies between Greater Himalayas and Pir Panjal Range.
- Cold Desert: between Greater Himalayas and Karakoram Range.
- Important Lakes: Dal and Wular are freshwater lakes, whereas Pangong Tso and Tso Moriri are saltwater lakes.
- The Southernmost part of this region consists of longitudinal valleys known as Duns. Eg: Jammu dun, Pathankot dun, etc.,

Himachal and Uttarakhand Himalayas

- Important Ranges: Great Himalayas, Dhaoladhar, Shiwaliks, Nagtibha, etc.,
- Important River System: Indus and Ganga
- Important Hill Stations: Dharamshala, Mussoorie, Shimla, kausani, etc.,
- Important Pass: Shipki la, Lipu Lekh, Mana pass, etc.,
- Important Glaciers: Gangotri, Yamunotri, Pindari, etc.,
- Important Peaks: Nanda Devi, Dhaulagiri, etc.,
- Important Duns: Dehradun (largest), Harike Dun, Kota Dun, Nalagarh Dun, Chandigarh-Kalka Dun, etc.,
- This region is known for five Prayags (River Confluences). Valley of flowers is also situated in this region.

The Darjeeling and Sikkim Himalayas

- This lies between Nepal Himalayas in the west and Bhutan Himalayas in the east.
- It is the region of fast flowing rivers and high mountain peaks.
- Important Peaks: Kanchenjunga
- Duar formations replace the Shiwaliks (absent) in this region which enhanced the development of Tea gardens.
- Important Glaciers: Zemu Glacier
- Important Peaks: Nathu La and Jelep La

The Arunachal Himalayas

- This lies between Bhutan Himalayas and Diphu Pass in the east
- Important Peaks: Namcha Barwa and Kangto
- Important Rivers: Subansiri, Dihang, Dibang and Lohit
- Important Ranges: Mishmi, Abor, Dafla, Mihir, etc.,
- Important pass: Diphu pass

The Eastern Hills and Mountains

- These are the part of Himalayan Mountain system having their general alignment from the north to south direction.
- The Himalaya in the eastern boundary of the country is called Purvanchal. These are mainly composed of sandstones (sedimentary rocks).
- Important Hills: Patkai Bum, Naga Hills, Manipur Hills, Mizo hills, etc.

THE NORTHERN PLAINS

- The northern plain has been formed by the interplay of the three major river systems – the Indus, the Ganga and the Brahmaputra.
- **Bhabar** is a narrow belt ranging between 8-10 km parallel to the Shiwalik foothills at the break-up of the slope. The river after descending from the mountains deposit pebbles in a narrow belt. All the streams disappear in this belt.
- **Bhangar** is the region south of Terai region. This region is formed by older alluvium. The soil in this region contains calcareous deposits locally known as kankar.
- The region with new alluvium deposits is known as **Khadar**. They are renewed almost every year and are so fertile, thus ideal for intensive cultivation.
- Riverine Islands – these are the islands which are formed due to depositional work of rivers especially in the lower course due to the gentle slope and resultant decrease in the velocity of rivers. **Majuli** – in the Brahmaputra is the largest inhabited riverine island in the world
- Distributaries – the rivers in the lower course split into numerous channels sue to deposition of silt are called distributaries.
- Doab – the area which lies behind the confluence of two rivers.

Major Mountain Peaks in India	Description
Godwin Austen (K2)	Highest peak of Karakoram range in POK
Nanga Parbat	Jammu and Kashmir
Nanda Devi	Uttarakhand, Second highest mountain in India and the highest entirely within the country
Kanchenjunga	Nepal and Sikkim (B/w Teesta river in east & Tamur river in the west), the Highest mountain in India & 3rd highest mountain in the world
Nokrek	Highest point of the Garo Hills (Meghalaya)
Gurushikhar	Mt. Abu, Rajasthan, highest point of the Aravalli Range
Kundremukh	Karnataka
Doddabetta	Highest point in Tamil Nadu, near Udhagamandalam (Nilgiri Hills) Second highest peak in the Western Ghats only next to Anamudi
Anaimudi	Located in Kerala, It is the highest peak in the Western Ghats and in South India

Agasthyamalai	Lie at the extreme southern end of Western Ghats, straddle both sides in Kerala and in Tamil Nadu
Saddle Peak	Highest point of the archipelago in the Bay of Bengal, located in North Andaman
Mount Hariet	Third highest peak in the Andaman and Nicobar archipelago only next to, Saddle peak (Highest of Andaman) and Mount Thullier (Highest of Nicobar)
Mahendragiri	Orissa, the Highest peak of Eastern Ghats (According to NCERT)
Arma Konda	Andhra Pradesh

Important Passes in India

State	Pass name	Comment
Jammu and Kashmir	Banihal Pass	Jammu to Srinagar
Jammu and Kashmir	Chang-La	Ladakh with Tibet
Jammu and Kashmir	Pir-Panjal pass	Between Jammu and Kashmir Valley
Jammu and Kashmir	Zoji La	important road link between Srinagar on one side and Kargil and Leh on the other side
Himachal Pradesh	Bara Lacha La	Connecting Mandi in Himachal Pradesh with Leh in Jammu and Kashmir
Himachal Pradesh	Rohtang Pass	road link between Kullu, Lahaul and Spiti Valleys
Himachal Pradesh	Shipki La	Himachal Pradesh and Tibet
Uttarakhand	Lipu Lekh	trijunction of Uttarakhand (India), Tibet (China) and Nepal borders
Uttarakhand	Niti Pass	Uttarakhand with Tibet
Sikkim	Nathu La	Sikkim with Tibet
Sikkim	Jelep La	Sikkim-Bhutan border

Arunachal Pradesh	Bom Di La	Arunachal Pradesh with Bhutan
Arunachal Pradesh	Dihang Pass	Arunachal Pradesh and Myanmar.

The Peninsular Plateau

- It is an irregular triangle in structure extends as Delhi ridge in the north-west, Rajmahal hills in the east, Gir range in the west and Cardamom Hills in the south.
- The important physiographic features of this are - block mountains, rift valleys, spurs, bare rocky structures, series of hummocky hills and wall like quartzite dykes offering natural sites for water storage.
- On the basis of relief features, the peninsular plateau is divided into three broad groups –
- The Deccan Plateau
- The Central Highlands
- The North-eastern Plateau

The Deccan Plateau

- The Deccan Plateau is a triangular landmass that lies to the south of R. Narmada.
- It is bordered by the Western Ghats in the west, the Eastern Ghats in the east and the Satpura, Maikal and Mahadeo range in the north and north-eastern part.
- An extension of the peninsular plateau is also visible in the north-east known as Karbi-Anglong Plateau and North Cachar Hills.
- The Deccan Plateau is higher in the west and slopes gently eastwards.
- Western and Eastern Ghats are prominent features of the Deccan plateau, the comparison between these two ranges are mentioned in the following table

S. NO.	WESTERN GHATS	EASTERN GHATS
1.	They are continuous and can be crossed only through passes.	They are discontinuous and irregular
2.	Average Elevation – (900 – 1600)m	Average Elevation – 600 m
3.	The altitude increases from north to south	The altitude has no general pattern
4.	Important Hills – Nilgiri, Anaimalai, Cardamom, Babubudan, etc.,	Important Hills – Javadi, Palkonda, Nallamala, Mahendragiri, etc.,
5.	Important Peaks – Anaimudi (highest), Doda Betta (Ooty), Kodaikanal etc.	Important Peaks – Mahendragiri (highest) etc.

6.	Most of the peninsular rivers originate here and acts as a water divide between west-flowing and east-flowing rivers.	They are dissected by major rivers like Mahanadi, Godavari, Krishna, Cauvery, etc., which are draining into the Bay of Bengal

The Central Highlands

- The Central Highlands is a part of Peninsular Plateau lying north of R. Narmada covering a major area of Malwa plateau, Vindhyan Range covers the southern extent and Aravalis in the north-west.
- The plateaus like Bundelkhand, Bagelkhand, Chotanagpur makes the eastern extension of the central highlands.
- This region has undergone metamorphic processes in its geologic history, which can be corroborated by the presence of metamorphic rocks such as marble, slate, gneiss, etc.

The North-Eastern Plateau

- This region consists of many plateaus like Meghalaya Plateau, Karbi Anglong Plateau, etc.,
- Important Hills – Khasi, Garo, Jaintia, etc.,

The Indian Desert

- The Great Indian Desert lies in the north-western region of the country.
- The prominent desert features are – Mushroom Rocks, Shifting Dunes and Oasis.
- It is a land of undulating topography dotted with longitudinal dunes and Barchans.
- Most of the rivers in this region are ephemeral. Example: R. Luni
- Low precipitation and evaporation make it a water deficit region.
- The desert can be divided into two regions: Northern part sloping towards Sindh and the Southern part towards the Rann of Kachchh.

The Coastal Plains

- The Peninsular plateau is covered by marine water in 3 sides: the Indian Ocean in the South; the Bay of Bengal in the east and the Arabian Sea in the West.
- The extent of coastline in the country is 6100 km in the mainland and 7517 km in the entire geographical coast of the country (including Islands).
- On the basis of the location and active geomorphological processes, it can be broadly divided into two: the Western Coastal Plains and the Eastern Coastal Plains.

The Islands

- Besides the vast physical features in the mainland of the country, there are two major island groups located in both sides of the peninsular plateau.
- The island groups provide the site for Fishing and Port activities.
- Though more than 4000 islands present in Indian territory Andaman and Nicobar and Lakshadweep are the two major island groups.

ANDAMAN & NICOBAR ISLANDS

- Duncan passage lies between south Andaman and Little Andaman.
- Important Peaks: Saddle Peak, North Andaman (738 m); Mount Diavolo, middle Andaman (515 m); Mount Koyob, South Andaman (460 m); Mount Thuiller, Great Nicobar (642 m).

Note

- **Ten Degree Channel-** Between Little Andaman and Car Nicobar
- **Duncan Passage-** Between great Andaman and Little Andaman

THE LAKSHADWEEP ISLANDS

- Kavaratti Island is the administrative headquarters of Lakshadweep islands.
- Minicoy is the largest island in this group.
- This island group consists of storm beaches consisting of unconsolidated pebbles, shingles, cobbles and boulders.

Note

- **Nine Degree Channel**- Minicoy is separated from rest of the Lakshadweep

- **Eight Degree Channel**- Lakshadweep Group separated from the Maldives

Other Islands

- Newmoore Island- located in the Bay of Bengal on the mouth of Ganga.
- Pamban Island- located in the Gulf of Manner between Sri Lanka and India.

INDIAN DRAINAGE SYSTEM

Comparison between Himalayan and the Peninsular Rivers of India

S. No.	Aspect	Himalayan River	Peninsular River
1.	Place of origin	Himalayan mountain covered with glaciers	Peninsular plateau and central highland
2.	Nature of flow	Perennial; receive water from the glacier and rainfall	Seasonal; dependent on monsoon rainfall
3.	Type of drainage	Antecedent and consequent leading to the dendritic pattern in plains	Superimposed, rejuvenated resulting in trellis, radial and rectangular patterns
4.	Nature of river	Long course, flowing through the rugged mountains experiencing headward erosion and river capturing; In plains meandering and shifting of course	Smaller, the fixed course with well-adjusted valleys
5.	Catchment area	Very large basins	Relatively smaller basin
6.	Age of the river	Young and youthful, active and deepening in the valleys	Old rivers with the graded profile, and have almost reached their base levels

Important Rivers of India

Himalayan rivers come from the Himalayas and flow through the Northern Plains.

The major rivers in the Himalayan System are:

- The Indus River System
- The Ganga River System
- The Yamuna River System
- The Brahmaputra River System

The main source of Peninsular River System or Peninsular Drainage is the Western Ghats. Because the Western Ghats are forming a ' water divide, ' these rivers either flow eastward into Bengal Bay or westward into the Arab Sea. Peninsular rivers are rivers that are essentially rain-fed.

The major rivers in the Peninsular system are:

- Mahanadi
- Godavari
- Krishna
- Cauvery

Drain into the Bay of Bengal as they flow on the plateau eastward and create' delta' at their mouths;

while the Narmada Tapti-the west-flowing rivers fall into the Arab Sea and create' estuaries.'

Not from glaciers, but from rain-fed rivers. During summer, these rivers significantly decrease or dry up.

THE HIMALAYAN RIVERS

Indus River System

In the early Hindu mythological texts, the mention of Indus River or Sindhu River is witnessed. The river comes from Tibet near Lake Mansarovar. In Jammu and Kashmir, it flows westward into India, flows further through Himachal Pradesh, Punjab, and reaches Pakistan.

It enters the Arab Sea near Karachi, flowing further west. Indus is Pakistan's biggest river and the national river of the country. Its Indian tributaries are Zanskar, Nubra, Shyok, and Pakistan's Hunza. Sutlej, Ravi, Beas, Chenab and Jhelum are their other tributaries named after the state of Punjab.

Ganga River System

The Ganga river system (Ganges) is India's largest river system. It originates in the glaciers of Gangotri. The upstream Bhagirathi joins the other stream at Devprayag called Alaknanda to form the Ganga River. Ganga has tributaries on both banks; the Yamuna and Son are its right-bank tributaries.

Some of the left bank tributaries are Gomti, Ghaghara, Gandak, Kosi. The Ganges flows through the Uttarakhand, Uttar Pradesh, Bihar, and West Bengal Indian countries. It lastly reaches the Bay of Bengal.

Yamuna River System

The Yamuna is Northern India's main river system. The river flows through Uttrakhand, Uttar Pradesh and Haryana from Yamnotri. It crosses Delhi, Mathura, Agra and meets the Chambal, Betwa and Ken rivers to lastly join the Allahabad Ganga. Tons, Chambal, Hindon, Betwa and Ken are Yamuna's major tributaries.

Brahmaputra River System

The Brahmaputra, one of India's main rivers, originates in Tibet's Himalayan Angsi glacier. It's called the Tsangpo River there. In Arunachal Pradesh, it enters India and is known as Dihang River.

Dibang, the Lohit, the Kenula are tributaries which form the primary Brahmaputra River and flow through Assam, its longest course, enter Bangladesh and lastly falls into the Bay of Bengal. The Brahmaputra has the largest water quantity of all India's rivers.

THE PENINSULAR RIVERS

Mahanadi

The Mahanadi in East-central India is a significant river. It originates in Chhattisgarh's Sihava hills and flows through the state of Orissa (Odisha) through its main course. This river deposits more silt on the Indian subcontinent than any other river. Mahanadi runs through Sambalpur, Cuttack and Banki cities.

Godavari

The Godavari River, after the Ganga, covers India's second-longest course. The river originates from Triambakeshwar in Maharashtra and flows along with its tributaries (Pravara, Indravati, Maner Sabri etc.) through the countries of Maharashtra, Chhattisgarh, Madhya Pradesh, Orissa (Odisha), Telangana, Andhra Pradesh, Karnataka and

Puducherry to lastly flow into the Bay of Bengal. The river is defined as Dakshina Ganga because of its lengthy course.

Krishna River

The Krishna is India's third-longest river, about 1300 km long. It originates from the Mahabaleshwar region of Maharashtra and flows through Karnataka, Telangana, and Andhra Pradesh to lastly pour into Bengal Bay.

Kaveri River

The Kaveri (Cauvery) is a significant river in southern India and originates in Kogadu, Karnataka. As many tributaries like Hemavati, Moyari, Shimsha, Arkavati, Honnuhole, Kabini, Bhavani, Noyill and Amaravati join it, Kaveri River expands.

Narmada and Tapti

The Narmada & Tapti river is the only major flowing rivers into the Arab Sea. Narmada's complete length flowing through Madhya Pradesh, Maharashtra, and Gujarat countries is equal to 1312 km. Amarkantak is Narmada's location of origin in Shahdol, Madhya Pradesh. From east to west, Narmada flows primarily through Central India and flows into the Arabian Sea. The Tapti river follows a parallel course to the south of Narmada, flowing through the Maharashtra and Gujarat states on their way into the Gulf of Khambat. Purna, Girna and Panjhra are its three main tributaries.

Like most ancient religions, rivers are considered sacred by the Hindu faith and its mythology. The Ganges, Yamuna (a Ganges tributary), Brahmaputra, Mahanadi, Narmada, Godavari, Tapi, Krishna, and Kaveri are nine major Indian rivers. Indian soil also flows through parts of the Indus River.

The Indian river system comprises eight important rivers together with their various tributaries. Most rivers discharge their waters into the Bay of Bengal; nevertheless, there are a number of rivers whose itineraries take them across the west end of India and into the Arab Sea in the east direction.

Northern parts of the Aravalli range, Ladakh parts, and the barren Thar Desert regions have Inland Drainage.

River Systems of India

Name	Length of River	Originates From	Area Covered	Ends in
Indus	3180/ 1114 in India	Tibet in northern slopes of Mount Kailash	India and Pakistan	Arabian sea
Ganga (Bhagirathi)	2525	Gangotri in Uttrakhand	Uttar Pradesh, Uttrakhand, Bihar, West Bengal	Bay of Bengal
Yamuna (Jamuna)	1376	Yamunotri in Garhwal	Delhi, Haryana and UP	Bay of Bengal

Brahmaputra	916 - in India	Angsi Glacier	Assam, Arunachal Pradesh	Bay of Bengal
Kaveri	765	Brahmagiri hills in Kogadu, Karnataka	Karnataka and Tamil Nadu	Bay of Bengal
Godavari (Dakshin Bharat ki Ganga)	1465	Triambakeshwar in Maharashtra	South-eastern part of Andhra Pradesh	Bay of Bengal
Krishna	1400	Mahabaleshwar in Maharashtra	Maharashtra & Andhra Pradesh	Bay of Bengal
Narmada	1312	Amarkantak in Madhya Pradesh	Madhya Pradesh and Maharashtra	Arabian Sea
Tapti	724	Betul, Madhya Pradesh district in the Satpura region	Madhya Pradesh and Maharashtra	Arabian Sea
Mahanadi	858	Sihava mountains of Chhattisgarh	Jharkhand, Chhattisgarh, Orissa	Bay of Bengal
Vaigai	258	Varusanadu Hills	Madurai in Tamil Nadu	Bay of Bengal
Periyar	244	Sivagiri peaks of Sundaramala, Tamil Nadu.	Tamil Nadu and Kerala	Bay of Bengal

Important dams in India

Some Facts about dams

- Tallest dam in the world- Nurek dam (Tajikistan)
- Longest dam in the world- Hirakund dam (Orissa)
- Longest dam in India- Hirakund dam (Orissa)
- Highest dam in India- Tehri dam (Uttarakhand)
- Highest straight gravity Dam in India- Bhakra dam
- First dam of India-Kallanai Dam (Grand Anicut) on river Kaveri (Tiruchirapalli, Tamilnadu)

Important Dams in India

State	Dam	River
Andhra Pradesh	Nagarjuna Sagar Dam	Krishna
	Srisailam Dam	Krishna
	Polavaram Project	Godavari
Arunachal Pradesh	Ranganadi Dam	Ranganadi River, a tributary of the Brahmaputra River
Chhattisgarh	Minimata (Hasdeo) Bango Dam	Hasdeo
	Dudhawa Dam	Mahanadi

Gujarat	Ukai Dam	Tapti
	Sardar Sarovar Dam	Narmada
Himachal Pradesh	Pong Dam	Beas
	Bhakra Dam	Satluj
Jammu and Kashmir	Baglihar Dam	Chenab
	Uri Dam	Jhelum
	Kishenganga Dam	KISHANGANGA
Jharkhand	Panchet Dam	Damodar
	North Koel	North Koel
Karnataka	Krishnarajasagar Dam	Cauvery
	Tungabhadra Dam	Tungabhadra
Kerala	Cheruthoni Dam	Cheruthoni
	Idukki Dam	Periyar
Madhya Pradesh	Ban Sagar Dam	Son
	Gandhi Sagar Dam	Chambal
	Indira Sagar Dam	Narmada
	Omkareshwar Dam	Narmada
Maharashtra	Bhatsa Dam	Bhatsa and chorna
	Koyna Dam	Koyna
Odisha	Hirakud Dam	Mahanadi
	Indravati Dam	Indravati
Punjab	Ranjit Sagar Dam	Ravi
Rajasthan	Jawahar Sagar Dam	Chambal
	Rana Pratap Sagar Dam	Chambal
Tamil nadu	Mettur Dam	Kaveri

Telangana	Nagarjuna Sagar Dam	Krishna (Some Part of Dam also in Telangana)
	Srisailam Dam	Krishna (Some Part of Dam also in Telangana)
Uttarakhand	Tehri Dam	Bhagirathi
	Ramganga Dam	Ramganga
Uttar Pradesh	Rihand Dam	Rihand

Important Lakes in India (State Wise)

- Largest freshwater lake in India – Wular Lake, Jammu and Kashmir
- Largest Saline water lake in India – Chilka Lake, Orissa
- Highest lake in India (Altitude) – Cholamu lake, Sikkim
- Longest Lake in India – Vembanad lake, Kerala
- Largest Artificial Lake in India – Govind Vallabh Pant Sagar (Rihand Dam)

Lakes in India

S.No.	**Name**	**State**	**District**	**Type of Lakes**	**Facts/Description**
1	Pulicat Lake	Andhra Pradesh	Nellore	Brackish Water	It encompasses Pulicat Lake Bird Sanctuary; Satish Dhawan Space Centre located here
2	Kolleru Lake	Andhra Pradesh	West Godavari	Freshwater	Home to migratory birds
3	Nagarjuna Sagar	Telangana	Nalgonda	Freshwater	Artificially constructed; Krishna river
4	MaharanaPratapSagar	Himachal Pradesh	Kangra	Freshwater	Ramsar site

5	Pangong Tso	J &K	Ladakh	Endorheic Lake (saline water)	Indo-China Border
6	Wular lake	J &K	Bandipora	Tectonic lake (fresh water)	Largest freshwater lake in India
7	TsoMoriri	J &K	Ladakh	Saltwater	High altitude lake
8	Ashtamudi Kayal	Kerala	Kollam	Brackish water	Ramsar wetland site
9	Lonar lake	Maharashtra	Buldhana	Crater lake	National Geo-Heritage monument
10	Loktak lake	Manipur	-	Lenticular freshwater	Ramsar wetland; Phumdis (Floating Islands); Multipurpose project
11	Chilika lake	Orissa	Puri	Brackish water	India's largest brackish water lake; lagoon
12	Sambhar lake	Rajasthan	Sambhar Lake-town	Saltwater	Ramsar wetland; largest inland saltwater lake in India
13	Hussain Sagar	Telangana	Hyderabad	Artificial lake	Artificial Gibraltar rock island

14	Govind Ballabh Pant Sagar	Uttar Pradesh	Sonbhadra	Man-made lake	Rihand dam

Soil and Agriculture in India
Soil Profile and Horizon of soil

- O - Horizon containing a high percentage of soil organic matter.
- A - Horizon darkened by the accumulation of organic matter.
- E - Horizon formed through the removal (eluviation) of clays, organic matter, iron, or aluminium. Usually lightened in colour due to these removals.
- B - Broad class used for subsurface horizons that have been transformed substantially by a soil formation process such as colour and structure development; the deposition (illuviation) of materials such as clays, organic matter, iron, aluminium, carbonates, or gypsum; carbonate or gypsum loss; brittleness and high density; or intense weathering leading to the accumulation of weathering-resistant minerals.
- C - A horizon minimally affected or unaffected by the soil formation processes.
- R - Bedrock.

Types of Indian Soil:

1. Alluvial Soil

- This type of soil mainly found in the Indo-Ganga and Brahmaputra plain i.e. the whole northern plain and in some parts of the river basin in the south and some plateau region.
- This soil is also found in the deltas of the Mahanadi, Godavari, Cauvery and Krishna.
- Alluvial soil can be broadly categorised in two types i.e. New alluvial soil (Khadar) and old alluvial soil (Bhangar). Both the Khadar and Bhangar soils contain calcareous concretions (Kankars).
- Crops Grown: the Alluvial soil is suitable for the Rabi and Kharif crop like cereals, cotton, oilseeds and sugarcane.
- They are generally rich in potash but poor in phosphorous.

2. Regur or Black soil

- The regur or black soils have developed extensively upon the Lava Plateaus of Maharashtra, Gujarat, Madhya Pradesh mainly Malwa and are formed due to volcanic activities.
- These soils are very fertile and contain a high percentage of lime, iron and a moderate amount of potash.
- The type of soil is especially suited for the cultivation of cotton and hence sometimes called 'black cotton soil.' Crops Grown: Cotton, Jowar, Wheat, Linseed, Gram, Fruit and Vegetable.
- The black soil is highly retentive of moisture.

3. Red Soil

- Red soils develop on granite and geneses rocks under low rainfall condition i.e. due to weathering of the metamorphic rocks.
- These soils are red in colour due to the high concentration of Iron Oxide.
- These soils are friable and medium fertile and found mainly in almost whole of Tamil Nadu, South-eastern Karnataka, North-eastern and South-eastern Madhya Pradesh, Jharkhand the major parts of Orissa, and the Hills and Plateaus of North-east India.
- These soils are deficient in Phosphoric acid, organic matter and nitrogenous material.
- Crops Grown: Wheat, Rice, Millet's, Pulses.

4. Laterite Soil

- Laterite is a kind of clayey rock or soil formed under high temperature and high rainfall and with alternate dry and wet period.
- Laterite and lateritic soils are found in South Maharashtra, the Western Ghats in Kerala and Karnataka, at places in Odisha, small parts of Chottanagpur and in some parts of Assam, Tamil Nadu, Karnataka, and in western West Bengal (particularly in Birbhum district).

- Crops Grown: Coffee, Cashew etc.
- This type of soil is unsuitable for agriculture due to the high content of acidity and inability to retain moisture.

5. Desert soil

This type of soils found in Rajasthan, Haryana and the South Punjab, and are sandy.

- In the absence of sufficient wash by rainwater, soils have become saline and rather unfit for cultivation.
- In spite of that cultivation can be carried on with the help of modern irrigation.
- Wheat, bajra, groundnut, etc. can be grown in this soil.
- This type of soil is rich in Phosphates and Calcium but deficient in Nitrogen and humus.

6. Mountain Soil

- Soil found in higher altitude on the mountain is called as Mountain soil.
- The characteristics of this type of soil are changed according to the altitudes.
- This type of soil is suitable for the cultivation of potatoes, fruits, tea coffee and spices and wheat.

Type of Soils based on the size of particles

1. Sandy Soil

- Particles are larger in size.
- The particles cannot fit close together and hence there is enough space among them.
- It is not fit for vegetation as it does not retain water.
- However, millets can be grown on sandy soil.

2. Clayey Soil

- Particles are very small in size.
- Very little space among the particles.
- Water does not drain quickly through clayey soil because of less space among particles.
- So, clayey soil is not well aerated and retains more water.

3. Loamy Soil

- Particles are smaller than sand and larger than clay.
- Loamy soil is the mixture of sandy soil, clayey soil and silt.
- Silt is the deposit in river beds.
- The soil has the right water holding capacity and is well aerated.
- It is considered the best soil for the growth of plants.

Types of Agriculture in India

There are different types of farming activities performed in India which are as follows:

Subsistence Farming

- Subsistence farming is a type of farming in which nearly all the crops or livestock raised are used to maintain the farmer and farmer's family leaving little.
- Subsistence farms usually consist of no more than a few acres, and farm technology tends to be primitive and of low yield.

Mixed farming

- Mixed farming is an agricultural system in which a farmer conducts different agricultural practice together, such as cash crops and livestock
- The aim is to increase income through different sources and to complement land and labour demands across the year.

Shifting cultivation

- Shifting cultivation means migratory shifting agriculture.
- Under this system, a plot of land is cultivated for a few years and then, when the crop yield declines because of soil exhaustion and the effects of pests and weeds, is deserted for another area.
- Here the ground is again cleared by slash-and-burn methods, and the procedure is repeated.

Other Names of Shifting Cultivation

Shifting Cultivation Name	**Country**
Chena	Sri Lanka
Ladang	Java and Indonesia
Jhum	North-eastern India
Podu	Andhra Pradesh

Milya	Mexico and Central America
Konuko	Venezuela
Roka	Brazil
Milpa	Yucatan and Guatemala

Extensive Farming

- This is a system of farming in which the farmer uses the limited amount of labour and capital on a relatively large area.
- This type of agriculture is practised in countries where population size is small and land is enough.
- Per acre yield is low but the overall production is in surplus due to less population.
- Here machines and technology are used in farming.

Intensive Farming

- This is a system of farming in which the cultivator uses a larger amount of labour and capital on a relatively small area.
- This type of farming is performed in countries where the population to land ratio is high i.e. the population is big and the land is small.
- Annually two or three types of crops are grown over the land.
- Manual labour is used.

Plantation Agriculture

- In this type of agriculture, cash crops are mainly cultivated.
- A single crop like rubber, sugarcane, coffee, tea is grown.
- These crops are major items of export.

Major Crops & Cropping Patterns in India

Major crops are generally classified as:

Food Crops	Rice, Wheat, Millets, Maize, and Pulses.
Cash Crops	Sugarcane, Oilseeds, Horticulture crops, Tea, Coffee, Cotton, Rubber, and Jute.

Cropping Season in India

	Kharif crops	**Rabi crops**	**Zaid crops**
Time	Kharif crop also known as the autumn crop or monsoon crop are the plants which are cultivated in the monsoon season which extends from June to September.	Also known as winter crops. They are cultivated during the period typically extending between September to April. These plants are cultivated in spring seasons.	These are summer season crops. These crops are grown between April and September or between Rabi season and Kharif season
Condition	Require wet and hot conditions to grow	Require cold and relatively dry conditions to grow	Mostly sown in Gangetic belts of the region.
Examples	Rice(Paddy), Maize, Groundnut, cotton, Soybean, Pigeon Pea(arhar), Mung bean, Red chilies, Sugarcane, Turmeric, Millets like Ragi, Jowar, Bajra	Wheat, Chickpea, mustard, linseed, barley, Sesame, Sunflower, Coriander, Peas, Onion, Potato, Tomato etc	Cucumber, watermelon, bitter gourd, Muskmelon, pumpkin, ridged gourd

Major Food Crops

Rice

- **Soil Type:** Deep clayey and loamy soil.
- **Temperature:** Between 22-32°C with high humidity.
- **Rainfall:** Around 150-300 cm.
- **Top Rice Producing States are West Bengal > Punjab > Uttar Pradesh > Andhra Pradesh > Bihar.**

- In **Odisha,** three varieties of paddy crops are grown in a year which is **Aus, Aman, and Boro.**
- **China** is the top rice-producing country in the world. **India comes 2nd**.

Wheat

- **Soil Type:** Well-drained fertile loamy soil
- **Temperature:** Between 10-15°C (Sowing time) & 21-26°C (Ripening & Harvesting) with bright sunlight.
- **Rainfall:** Around 75-100 cm.
- **Top Wheat Producing States in India: Uttar Pradesh > Punjab > Madhya Pradesh**
- India is the **2nd largest producer after** China.

Millets

Soil Type: It Can be grown in an inferior alluvial or loamy soil

- **Jowar-** Rainfed crop is grown in moist areas with less or no irrigation.
- **Bajra-** Sandy soils & shallow black soil.
- **Ragi-** Red, black, sandy, loamy & shallow black soils. (dry regions)

Temperature: Between 27-32°C

Rainfall: Around 50-100 cm.

Top Millets Producing States in India: Rajasthan > Karnataka > Maharashtra

- **Jowar:** Maharashtra > Karnataka > Madhya Pradesh
- **Bajra:**Rajasthan > Uttar Pradesh > Gujarat
- **Ragi:** Karnataka > Tamil Nadu > Uttarakhand

These are also known as **coarse grains.** They have a **high nutritional value. E.g., Ragi** is very **rich in calcium, iron, other micronutrients** and **roughage.**

Maize

- **Soil Type:** Old alluvial soil.
- **Temperature:** Between 21-27°C
- **Rainfall:** High rainfall.
- **Top Producing States: Karnataka > Maharashtra > Madhya Pradesh**
- India is the **seventh-largest producer**

Pulses

- **Soil Type:** Sandy-loamy soil.
- **Temperature:** Between 20-27°C
- **Rainfall:** Around 25-60 cm.
- **Top Producing States: Madhya Pradesh > Rajasthan > Maharashtra**
- India is the **largest producer** as well as the largest **consumer** of pulses in the world.
- Major pulses grown in India are **urad, tur (arhar), moong, masur, peas and gram.**
- Pulses are **leguminous crops. They** help in restoring soil fertility by **fixing nitrogen from the air (Except Arhar).** This is why these crops are grown in rotation with other crops.

Sugarcane

- **Soil Type:** Deep rich loamy soil.
- **Temperature:** Between 21-27°C with a hot & humid climate.
- **Rainfall:** Around 75-100 cm.
- **Top Producing States: Uttar Pradesh > Maharashtra > Karnataka**
- India is the **2nd largest producer of sugarcane after Brazil.**
- It is the main source of **sugar, khandsari, gur (jaggery), and molasses.**

Oilseeds

- **Soil Type:** Loam to clayey loam & well-drained sandy loams.
- **Temperature:** Between 15-30°C
- **Rainfall:** Around 30-75 cm.
- **Top Producing States: Madhya Pradesh > Rajasthan > Gujarat**
- The main oilseeds produced in India are **groundnut, coconut, mustard, sesamum (til), soyabean, cotton seeds, castor seeds, linseed & sunflower.**
- **Groundnut is a Kharif crop**& accounts for about **half of the major oilseeds produced** in the country.
- **Sesamum is a Kharif crop in north & rabi crop in south India.**
- **Linseed and mustard are rabi crops.**
- **Castor seed is grown in both seasons i.e. rabi & Kharif.**

Tea

- **Soil Type:** Deep & fertile well-drained soil, rich in humus and organic matter.
- **Temperature:** Between 20-30°C
- **Rainfall:** Around 150-300 cm.
- **Top Producing States: Assam > West Bengal > Tamil Nadu.**
- India- **2nd largest producer of** tea plants.

- Slopes of eastern hills have **humid climate & evenly distributed rainfall without waterlogging which** are optimal conditions for **terrace farming** of tea plants.
- Tea is a **labor-intensive industry.** Tea requires abundant, cheap, and skilled labor. It is processed within the tea garden to retain its freshness.

Coffee

- **Soil Type:** Well-drained and deep friable loamy soil.
- **Temperature:** Between 15-28°C
- **Rainfall:** Around 150-250 cm.
- **Top Producing States: Karnataka > Kerala > Tamil Nadu**
- India is the **seventh-largest producer.**
- **Hills that have well-defined shade canopy, comprising evergreen leguminous trees give** the optimal condition for coffee cultivation which is why it is mainly concentrated in the hilly regions.
- **'Arabica' is the Indian variety of coffee which is famous worldwide.**

Rubber

- **Soil Type:** Rich well-drained alluvial soil.
- **Temperature:** Above 25°C with a moist & humid climate.
- **Rainfall:** More than 200 cm.
- **Top Producing States: Kerala > Tamil Nadu > Karnataka.**
- It is an **equatorial crop.** But under special conditions, it can **also be grown in tropical and sub-tropical.**

Cotton

- **Soil Type:** Cotton requires Well-drained black cotton soil of Deccan Plateau.
- **Temperature:** Between 21-30°C
- **Rainfall:**Around 50-100cm.
- **Top Cotton Producing States: Gujarat > Maharashtra > Telangana**
- Cotton needs **210 frost-free days & bright sun-shine for its growth.**
- Cotton is a Kharif **crop and requires 6 to 8 months to mature.**

Jute

- **Soil Type:** Well-drained alluvial soil
- **Temperature:** Between 25-35°C
- **Rainfall:** Around 150-250 cm
- **Top Producing States: West Bengal > Bihar > Assam**
- Jute is **mainly concentrated in eastern India because** of the **rich alluvial soil of Ganga-Brahmaputra delta.**
- It is known as the **golden fiber.**

India is the **largest producer of jute.**

Natural Vegetation, Different Types of Forests of India

Tropical Deciduous Forests

- These are the most widespread and the most extensive forests of India.
- They are also known as monsoon forests.
- These are connected with those parts of India which receive annual rainfall between 200 cm and 70 cm.
- Here rainfall is seasonal in nature.
- In this forest type, trees shed their leaves for about six to eight weeks in dry summer.
- The animals found in these are: *lion, tiger, pig, deer, elephant, a variety of birds, lizards, snakes, tortoise, etc.*

(i) Tropical Moist Deciduous Forests

- Annual rainfall between 200 & 100 cm.
- Found in: (a) an eastern part of India-northeastern states, along with the foothills of Himalayas, (b) Jharkhand, West Orissa and Chhattisgarh, (c) on the eastern slopes of the Western Ghats.
- Examples: *teak, bamboos, sal, shisham, sandalwood, khair, kusum, arjun, mulberry, etc.*

(ii) Tropical Dry Deciduous Forests

- Annual rainfall between 100 & 70 cm.
- Found in: (a) the rainier parts of the peninsular plateau and (b) the plains of Uttar Pradesh and Bihar.
- *Examples: teak, sal, peepal, neem* etc.

Tropical Thorn Forests

- These are connected with those parts which receive rainfall less than 70 cm.
- Here, rainfall is erratic, irregular and inconsistent.
- Xerophytes dominate regions covered with the tropical thorn.

- Found in the north-western part including *semi-arid areas of Gujarat, Rajasthan, Madhya Pradesh, Chhattisgarh, Uttar Pradesh and Haryana*.
- Main plant species here are *acacias (babool), palms, euphorbias,* Cactus, khair, , keekar etc.
- In this vegetation type, stem, leaves and roots of plants are adapted to conserve water.
- Stem is succulent and leaves are mostly thick and small to minimize evaporation.
- Common animals here are *rats, mice, rabbits, fox, wolf, tiger, lion, wild ass, horses, camels, etc.*

Tropical Montane Forests

- The decrease in temperature with the rise in altitude is responsible for the corresponding change in natural vegetation.
- There exists the same hierarchy from foothills of the mountain to the top of it as is observed from tropical to tundra region.
- Mostly found in the southern slopes of Himalayas, places having high altitude in Southern and Northeastern India.
- Upto 1500 n of height, tropical moist deciduous forests exist with *shesham* as the main tree.
- Between 1000-2000m of height, wet temperate type of climate persist wherein evergreen broad-leaf trees like *oaks and chestnut*
- Between 1500-3000 m of height, temperate forests covering coniferous trees like *Chir, pine, deodar, silver fir, spruce, cedar, etc.*
- At higher altitudes above 3500m wet temperate grasslands are common like *Merg (Kashmir), bugyals (Uttarakhand), etc.*
- Common animals that are found in these forests are *Kashmir stag, spotted deer, wild sheep, jackals, yak, snow leopard, rare red panda, sheep and goats with thich fur*, etc.
- In India, there are studied under two groups: Northern Montane Forests and Southern Montane Forests.
- Northern Montane Forests: These are connected with Himalayan mountain ranges. Vegetation types are controlled by sunlight, temperature and rainfall which is described above.
- Southern Montane Forests: These are connected with hills of *Nilgiris, Anaimalai and Cardamom*. These are wet temperate forests which have great endemic biodiversity and these are described as Shola forests.

Mangrove Forests

- Mangrove forests are connected with deltaic regions of tropical and sub-tropical zones.
- These are also known as tidal forests and littoral forests as these are connected with the inter-tidal region.
- Their biodiversity and forest density are comparable with equatorial rainforest and tropical evergreen and semi-evergreen forests.
- Mangroves are salt tolerant plants with roots being adapted to become pneumatophores (these roots emerged from the ground and grow in upward direction).
- Mangrove ecosystem is a unique ecosystem as it has tolerance for periodic flooding and dryness; and mild salinity as well.
- India has the largest cover of Mangrove forest in the world.
- Sunderban, Mahanadi, Godaveri-Krishna and Kaveri delta are most importantly covered with these forests.
- *Sunderban* is the largest mangrove in the world. It is famous for *Sundari tree* which provides durable hard timber.
- Some other example are Rhizophora, Avicennia etc.
- *Palm, coconut, keora, agar*, etc. also grow in some parts of the delta.
- *Royal Bengal Tiger* is a famous animal in these forests.
- *Turtles, crocodiles, gharials, snakes,* are also found in these forests.
- Bhitarkanika mangrove of Mahanadi delta is also famous for its rich biodiversity.

Solar System

Facts about Sun and Planets

Sun

- The only star in our solar system and powerhouse of the solar system.
- Composed of Hydrogen (73%), Helium (25%) gases and other metals. Sun carries almost 99% of the mass of our solar system.
- Approximately 15 crore Kilometres further away from Earth. It takes around 8 minutes 30 seconds for light at the speed of 3 lakh Km/sec to reach the earth.
- Temperature at surface= 5800 K or 5600 degree Celsius.
- The temperature at the centre= 15.7 million K

Planets

1. Mercury

- The closest planet to the Sun and a very hot planet.
- Smallest planet in the solar system with a diameter of 4900 Km.
- Fastest Planet with speed of 172500 Km per hour to complete revolution around Sun in 88 days.
- The planet with no water and gases like Nitrogen, Hydrogen, Oxygen and Carbon Dioxide.

2. Venus

- Hottest planet in the solar system with the surface temperature of 478 degree Celsius.
- Also known as "Earth's Twin". It is because of similarity in size and mass between Venus and Earth.
- One of the two planets in the solar system which rotate around the axis in a Clockwise direction.
- Brightest Star in the Solar system. It can be seen in the morning and evening with open eyes. So known as "Evening Star" and "Morning Star".

3. Earth

- The only Planet to give support to life with a pleasant atmosphere.
- Also known as "Blue Planet" because of the presence of water on it.
- It has one natural satellite named "Moon".

4. Mars

- Known as "Red Planet" because of Iron-rich red soil.
- Second smallest planet in the solar system after Mercury.
- Has two natural moons "Phobos" and "Deimos".
- Has a thin atmosphere and surface with valleys, craters, deserts and ice caps etc.
- "Olympus Mons" – Largest volcano and the tallest mountain in solar system lies on Mars.

5. Jupiter

- Largest planet of the solar system with the shortest rotation
- Has atmosphere filled with Hydrogen, Helium and other gases
- The third brightest object in the night sky after the Moon and Venus.
- Great Red Spot, a giant storm in the solar system exists on this planet.
- Has at least 69 moons, including 4 large Galilean Moons "Io, Europa, Ganymede, and Callisto" which were discovered by Galileo. "Ganymede" is the largest among them.
- It has an unclear ring around it.

6. Saturn

- Second largest planet in the solar system and a gas giant.
- Has bright and concentric rings around it which are made up of tiny rocks and pieces of Ice.
- Saturn can float on water because it has less density than water.
- Has at least 62 moons and Titan is the largest among them.

7. Uranus

- Has the third- largest planetary radius and fourth largest planetary mass in the Solar system.
- Greenish in colour.
- Discovered by William Herschel in 1781.
- Known as "Ice Giant". The atmosphere of Uranus is composed of Hydrogen and Helium primarily, but it also contains more water, ammonia etc.
- Has the coldest planetary atmosphere in the solar system.

- Rotates clockwise on its axis like Venus but unlike other planets
- Has at least 25 moons. Famous moons- Miranda, Ariel and Umbriel

8. Neptune

- Farthest planet from the Sun.
- It is also "Ice Giant". Atmosphere primarily composed of Hydrogen and Helium.
- Bluish in colour because of Methane.
- The fourth largest planet and the third most-massive planet in the solar system
- Discovered by Johann Galle and Urbain Le Verrier in 1846. The only planet in the solar system found by Mathematical Predictions.
- Has known 14 satellites. Famous moon – Triton

Other

Pluto

- As per the new definition of Planets determined by International Astronomical Union (IAU), Pluto has been omitted from the list of planets in 2006.
- Pluto is considered as a dwarf planet (size between planets and asteroids) now and it is a member of Kuiper Belt.

Kuiper Belt

- It is a spherical boundary outside the orbit of Neptune containing a number of asteroids, rocks, and comets.

Interior Structure of the Earth

Structure of the Earth

Crust

- The crust is the outermost brittle solid part of Earth ranging from 5 – 70 km.
- The Crust can be divided into:

1. Continental Crust: Mean thickness is around 30 km, made of SIAL (Silica and Aluminium) and is thicker than Oceanic crust. Its density is around at 2.7 g/cm^3
2. Oceanic Crust: Mean thickness is around 5 km made of SIMA (Silica and Magnesium). Oceanic crust is *basaltic* in origin and relatively of *younger age* than the continental crust. The basaltic crust is denser at 3.0 g/cm^3

Mantle

- They extend up to 2890 km.
- **Asthenosphere:** The upper portion of the mantle which extends up to around 400 km and the main source of Magma.
- The density of mantle is 3.4 g/cm^3
- The lower mantle is in solid state which extends up to the Core-Mantle boundary. This layer is called as the D″ (pronounced dee-double-prime) layer.

Note:

- The Crust and Upper part of Mantle combined called as Lithosphere.

Core

- The Core extends to 2870 – 6370 km.
- It is divided into
  1. Liquid Outer Core
  2. Solid Inner Core: Made of NIFE – Nickel and Ferrous.

Note: Inner core rotates slightly faster than the rest of the planet.

- The density at the outer core is at 5.5 g/cm^3 which increase to 13 g/cm^3 in the inner core.

Note:

Dynamo theory: It suggests that convection in the outer core, combined with the Coriolis effect, gives rise to Earth's magnetic field.

Schematic sections through the Earth:

- Continental crust
- Oceanic crust
- Upper mantle
- Lower mantle
- Outer core
- Inner core

Boundaries in the Earth's interior

Conrad Discontinuity: Between Upper and lower Continental Crust.

Mohorovičić discontinuity, "Moho": Crust-Mantle boundary

Gutenberg discontinuity: Core-Mantle boundary

Lehmann discontinuity: Boundary between Outer and Inner Core

Important Facts

- Earth's radius: 6370 km.
- Earth diameter: about 12756 km at equator & about 12715 km at the poles.

- Crust: 0.5 % of the volume of the Earth Mantle: 83 % of the volume of the Earth Core: 16 % of the volume of the Earth
- Temperature, Pressure and Density increases with the increasing distance from the surface to the interior in deeper depths
- Gravitation force is greater near the poles and lesser near the equator
- Gravity anomaly is the difference in gravity value according to the mass of the material

Earthquake

- It is a shaking of the Earth which is caused due to the release of energy along a fault line.
- *Hypocentre or Focus:* The point where the energy of an earthquake is released
- *Epicentre:* It is the point on the surface, directly above the focus, the first one to experience the waves.

Earthquake waves are divided into

- Body waves: created due to the release of energy at the Hypocentre (focus). These waves travel in all directions through the body of the earth.
  It can be divided into:
  1. P-waves: They are called Primary waves. They move faster and are first to arrive at the surface. They are similar to sound waves and can travel through Solid, Liquid and Gaseous materials. P waves vibrate *parallel* to the direction of the wave which causes stretching and squeezing of the material
  2. S-waves: They are called Secondary waves which arrive at a time lag with Primary waves. They can travel *only* through Solid materials. S-waves vibrate in *perpendicular* to the wave direction which creates crests and troughs.
- Surface waves: the body waves interact with the surface rocks and generate surface waves which move along the surface rocks. They are the *last* to report on the Seismograph and are the most *destructive* They cause displacement of rocks and structural collapse. Surface waves vibrate *perpendicular* to the wave direction.

The velocity of the waves is directly proportional to the density of the material through which they travel. Differing density leads to reflection or refraction of the seismic waves.

Shadow Zone

Shadow zones are those specific areas where seismic waves are not reported. These zones are distinct for P and S-waves.

- Within the distance, up to 105° from epicentre has recorded the arrival of both waves.
- The zone between 105° - 145° from epicentre is identified as a shadow zone for both types of waves (P & S).
- Beyond 105° Zone does not receive S-waves. Thus the shadow zone of S-wave is much larger than P-wave.
- P-wave appears after 145° from the epicentre.

Types of Earthquake

- Tectonic: They are caused due to the sliding of rocks along a fault plane.
- Volcanic: they are confined to areas of active volcanoes. They are caused due to the explosion of volcanos and the corresponding tectonic disturbances.
- Collapse: they are caused in areas of intense mining activities where the roofs of underground mines collapse causing minor tremors
- Explosion: they are caused due to the explosion of chemical or nuclear devices.

Important facts

- A seismograph is an instrument that records the waves reaching the surface.
- Richter Scale: it is known as *Magnitude* scale as it measures the energy released during the quake. It is expressed in absolute numbers 0-10.
- Mercalli Scale: it is called an *Intensity* scale as it measures the visible damage caused by the earthquake. The range is from 1 – 12.

Tsunami

- These are long-wavelength, long-period sea waves or tidal waves produced by the sudden or abrupt displacement of large volumes of

water (including when an earthquake occurs at sea.)

- The effect of Tsunami would occur only if the epicentre of the tremor is below oceanic waters and the magnitude is sufficiently high.

WORLD GEOGRAPHY

1. Important Mountain Ranges and Peaks of the Worlds

Sr.	Mountain Range	Important/Highest Peaks	Location	Description
1.	Rocky Mountains	Mt. Elbert (highest peak in the Rockies)	North America	It is one of the longest fold mountains in the world and extends from Canada to Western US (New Mexico State)
2.	Appalachian Mountains	Mt. Mitchell, North Carolina, US (highest peak of Appalachian Mountains)	North America	It is a fold mountain with rich in mineral resources
3.	Alps	Mont Blanc (French – Italian border)	Europe	It is a folded mountain and source for rivers like Danube, Rhine, etc.
4.	Sierra Nevada	Mt. Whitney	California, USA	Habitat for many Red Indian tribes
5.	Alaska Range	Mt. McKinley	North America	Mt. McKinley highest peak in North America
6.	Altai Mountains	Belukha mountain	Central Asia	Young folded mountain which extends from Kazakhstan to northern China.
7.	Andes Mountains	Mt. Aconcagua	South America	Longest mountain chain in the world

8.	Atlas Mountains	Mt. Toubkal	Northwestern Africa	Young fold mountain spreading over Morocco and Tunisia.
9.	Drakensberg Mountains	Mt. Lesotho	South Africa	Young folded mountain
10.	Caucasus Mountain	Mt. Elbrus	Europe	Located between the Black Sea and the Caspian Sea
11.	Ural Mountains	Mt. Narodnaya	Russia	This mountain range act as a boundary between Europe and Asia.
12.	Hindukush Mountains	Mt. Trich Mir	Pakistan and Afghanistan	Folded mountain with rugged topography which makes it difficult for transportation.
13.	Himalayas	Mt. Everest	Asia	Young fold mountains in Asia which separates Indian sub-continent from Asian plains
14.	Arakan Yoma	Mt. Kennedy peak	Myanmar	It extends from north to south direction. Shifting cultivation is practised.
15.	Kunlun Mountains	Mt. Muztag	North of Tibetan plateau and western China	It is one of the young folded mountains.

16.	Vosges	Mt. Grand Ballon	Eastern France, Europe	Famous for the cultivation of grapes and manufacture of wines.
17.	Great Dividing Range	Mt. Kosciuszko	Australia	This range is the source for the rivers Darling and Murray.

2. List of Important Rivers of the World

Sr. No.	RIVER	LOCATION	DESCRIPTION
1.	River Amazon	South America	It is the second longest river which flows through Peru, Columbia, Brazil and drains into the Atlantic Ocean.
2.	River Mississippi	North America	It forms a bird-foot like a delta at the Gulf of Mexico, River Missouri is an important tributary of it.
3.	River St. Lawrence	North America	It drains into Gulf of St. Lawrence which is an important transport corridor of North America.
4.	River Orange	South Africa	Longest river of South Africa and contains diamond beds along its mouth.
5.	River Congo	Africa	This river crosses the equator twice and drains into the south Atlantic Ocean.
6.	River Nile	Africa	It is the longest river in the world, originates near Lake Victoria and drains in the Mediterranean Sea.
7.	River Rhine	Western Europe	It flows through Germany and Netherlands. It is one of the busiest waterways of Europe.
8.	River Danube	Europe	It passes through Germany, Hungary, Austria, Slovakia, Serbia,

			Romania and drains into the Black Sea.
9.	River Volga	Europe, Russia	It is the longest river in Europe, it drains into the Caspian Sea.
10.	River Tigris	Turkey, Iraq	Cities like Mosul, Baghdad, Basra were located along its banks and it drains into the Gulf of Persia.
11.	River Euphrates	Turkey, Syria, Iraq	Main source of water for Syria. It drains into the Persian Gulf.
12.	River Irrawaddy	Myanmar	Drains into Gulf of Martaban
13.	River Mekong	China, Laos, Cambodia, Vietnam	It is also called 'Danube of the east', and it merges with south china sea.
14.	River Yangtze	China	It originates from the Tibetan plateau and ends in east china sea. It is the longest river in China.

3. Important Lakes of The World

Sr. No.	NAME	LOCATION	FACTS
1.	Titicaca lake	South America	It is the highest navigable lake in the world located in the Andes mountains.
2.	Great bear lake	Canada, North America	It is a big glaciated lake of Canada. The Eskimos of Canada camp here during the summer season.
3.	Great lakes	North America	This comprise of five large lakes of North America such as Lake Superior, Michigan, Huron, Erie, Ontario. Lake Superior is the second largest lake in the world.
4.	Lake Malawi	Central Africa	It is the third largest lake of Africa and borders Tanzania, Mozambique.
5.	Lake Tanganyika	East Africa	It is deepest and second largest lake of Africa.

6.	Lake Victoria	Africa	Largest river of Africa and passes through the equator.
7.	Lake Kainji	Africa	Largest manmade lake of Africa, used for irrigation purposes.
8.	Dead sea	West Asia	It is bordered by Jordan in the east and Palestine, Israel in the west. It is known for high salinity.
9.	Aral Sea	Central Asia	Located between Uzbekistan and Kazakhstan. It is shrinking rapidly in recent years.
10.	Lake Baikal	Russia	It is the largest freshwater lake in Asia and deepest in the world.
11.	Caspian Sea	Eurasia	It is the largest lake in the world and is surrounded by Russia, Kazakhstan, Turkmenistan, Iran and Azerbaijan.

Important Ocean Currents:

Major Ocean Currents of the Atlantic Ocean

Warm currents of the Atlantic Ocean	**Cold Current of the Atlantic Ocean**
1. North Equatorial Current which bifurcates into Antilles Current and Caribbean Current.	**1. Labrador Current -** Originates in the Baffin Bay drifts south eastwards Baffin and Greenland and merges with Gulf stream off New Foundland.
2. South Equatorial Current bifurcates at the Current protruding landmass of northeast Brazil into northern Cayenne Current and the southern Brazilian Current (South Atlantic Ocean).	**2. The Irminger Current** of Greenland Current Flows between Greenland and Iceland and merges with North Atlantic Drift.
3. Gulf stream - One of the strongest ocean system which originates in the Gulf of Mexico. It consists of **(i) Florida Current -** From the Strait of Florida to Cape Hatteras (USA) **(ii) Gulf Stream (cold wall) -** From Cape Hatters to the Grand Bank (Northeast USA) **(iii) North Atlantic Drift -** From the Grand Bank, near New Foundland to western Europe.	**3. Canaries Current -** Continuation of North Atlantic Drift along the western coast of the Iberian Peninsula and North Africa in the southern direction.
4. Counter Equatorial Current - Flows from west to east in between the North and South Equatorial Current.	**4. Falkland Current -** Flows northwards along the eastern coast of South America up to Argentina.
	5. South Atlantic Drift - Under the influence of westerlies at about 400S latitude, Brazilian Current continues as the South Atlantic Current.

	6. Benguela Current - Flows northwards along the western coast of South Africa.

Major Ocean Currents of the Pacific Ocean

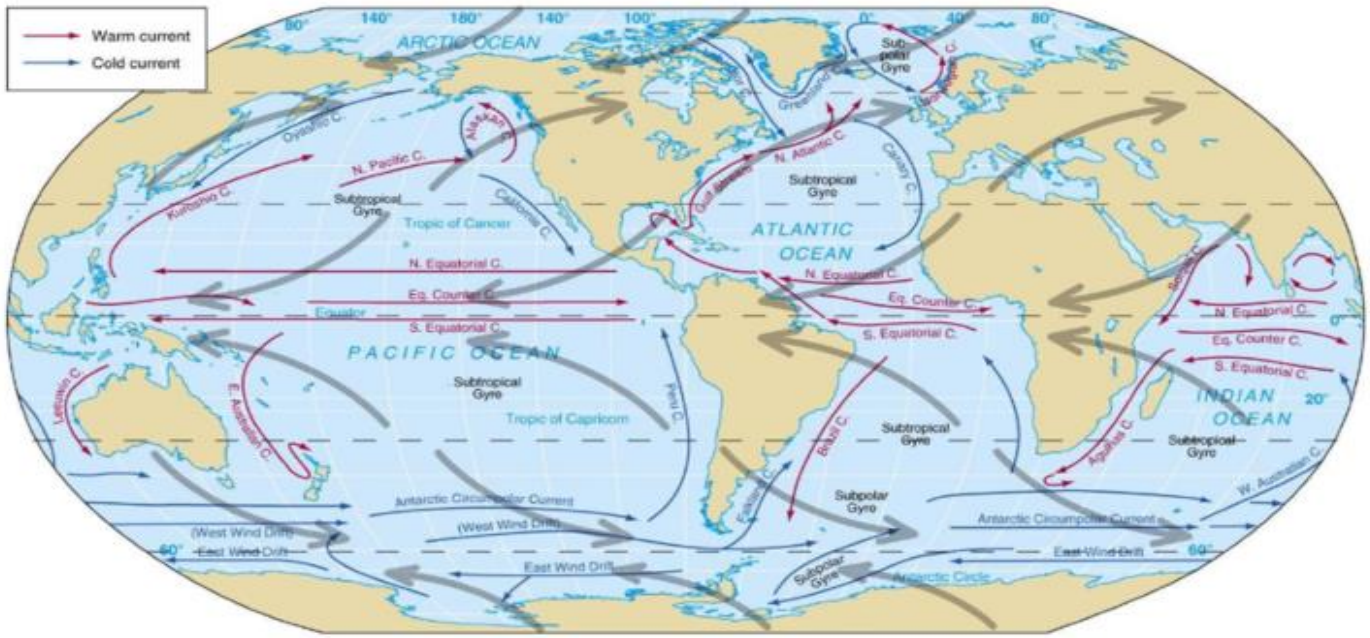
WARM CURRENTS OF THE PACIFIC OCEAN	COLD CURRENTS OF THE PACIFIC OCEAN
1. North Equatorial Current - Flows westwards from the western coast of Mexico to the Philippines.	**1. Oyashio (Kurile) Current -** Bering Current or Alaskan Current and Okhotsk Current meet to form Oyashio Current.
2. South Equatorial Current - Flows westwards in the southern Pacific Ocean and bifurcates into northern and southern branches near new Guinea.	**2. California Current -** Flows along with the western cost of USA and finally merges with North Equatorial Current (Warm) to complete the circulation.
3. Counter Equatorial Current - Flows between north and south Equatorial Current in the opposite direction.	**3. West Wind Drift -** Flows from west to east in the zone of 400-500S latitude under the influence of Westerlies.
4. Kuroshio or Japan Current - Flows from Taiwan to Bering Strait.	**4. Peruvian (Humboldt) Current -** Flows northwards along the western coast of South America is actually the continuation of West Wind Drift.

Major Ocean Currents of the Indian Ocean

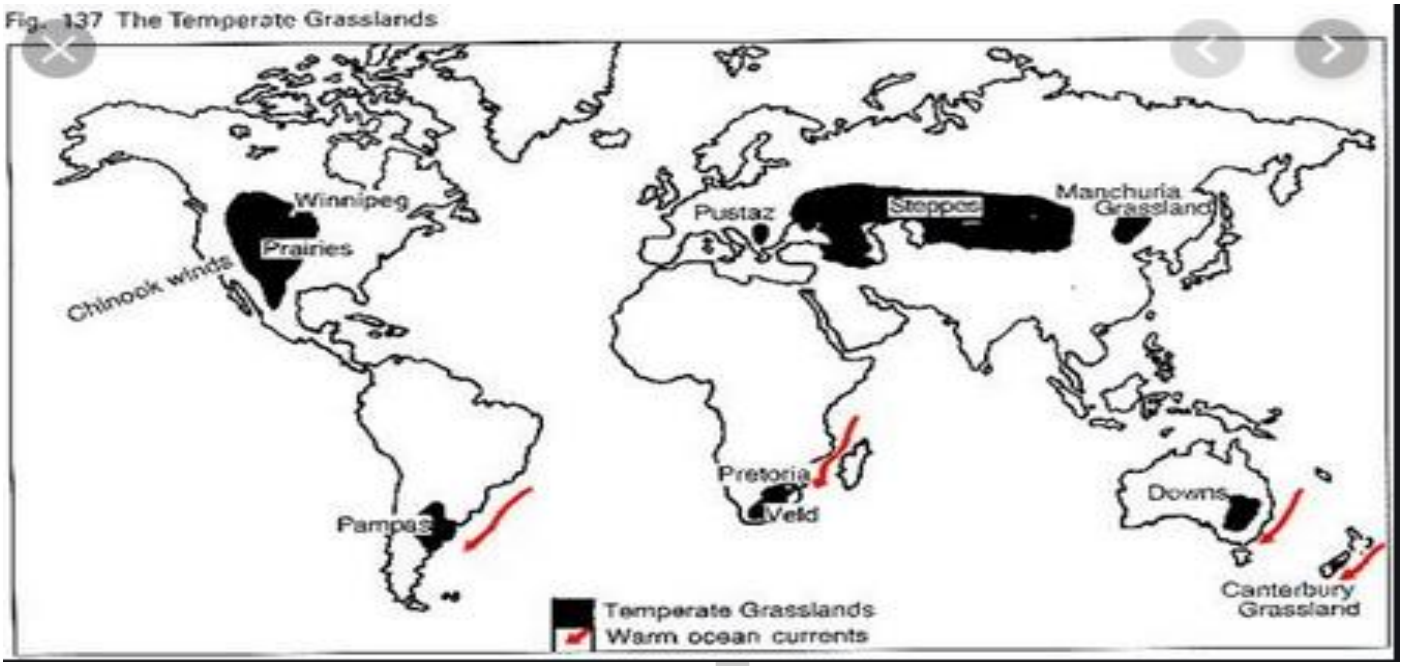
WARM CURRENTS OF THE INDIAN OCEAN

1. Indian Equatorial Current: Flows westwards in the south Indian Ocean, bifurcates at Madagascar and flows are Mozambique and Aughulas Current in the southern direction.
2. South West Monsoon Current: Flows along the coasts of India in an easterly direction.
3. North-West Monsoon Current: Flows along the eastern coasts of India during winter.

Major Ocean Routes of the World



List of temperate Grasslands and their location:



Distribution

- They lie in interiors of continents, bordering deserts and away from the Mediterranean region.
- Placed under the Westerly wind belt.
- In the northern hemisphere, grasslands are entirely continental and extensive.
- In Eurasia, they are called Steppes stretched from shores of Black sea eastwards to foothills of Altai Mountains.
- Grasslands are known by different names as given below:

Region	**Grassland**
Hungary and plains of Manchuria	Pustaz
North America	Prairies
Argentina and Uruguay	Pampas
Northern South Africa	Bush-Veld (more tropical)
Southern South Africa	High Veld (more Temperate)
Murray-Darling basin of Australia	Downs
New Zealand	Canterbury

Hot and Cold Local winds and their locations:

- Local Winds are caused by the local difference in temperature and pressure.
- Local Winds are of four types including hot, cold, conventional, and slope.
- These Winds effects only the smaller areas.
- Local Winds blow during a particular period of the day or year in a smaller area.

- These winds are found in the lowest levels of the troposphere.

- There are many such winds that blow all over the world, some of them are cool, some are warm, some
- wet and some dry.
- **Cold Winds** includes Bore, Mistral, Gregale, Chinook, Purga, etc.
- **Warm Winds** include Zonda, Sirocco, Chinook, Loo, etc.
- **Moist wind** includes Elephanta.
- **Dry wind** includes Calima.

Countries around important water bodies:

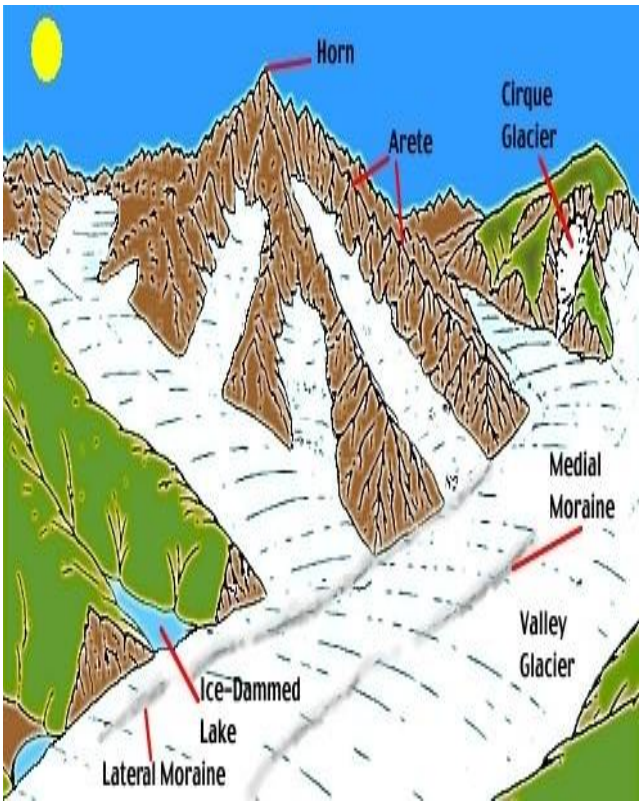
1. **Countries surrounding Caspian Sea**
   Russia, Iran, Azerbaijan, Kazakhstan and Turkmenistan
2. **Countries surrounding Black Sea**
   Ukraine , Russia, Georgia, Turkey, Bulgaria, Romania
3. **Countries surrounding Red Sea**
   Eastern shore: Saudi Arabia. Yemen.
   Western shore: Egypt. Sudan. Eritrea. Djibouti.
4. **Countries surrounding the Adriatic Sea**
   Albania, Bosnia and Herzegovina, Croatia, Italy, Montenegro and Slovenia
5. **Countries surrounding Mediterranean Sea**
   Albania, Algeria, Bosnia and Herzegovina, Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Montenegro, Morocco, Slovenia, Spain, Syria, Tunisia, and Turkey

Landforms: Fluvial, Glacial, Karst, Coastal & Arid

Process	Upper or Youth Stage	Middle or Mature Stage	Lower or Senile Stage
Erosion	Vertical Erosion	Vertical and lateral erosion	Later deposition
Gradient	Steep valley sides – V-Shaped valley	U-Shaped valley	Almost base level

Deposition	Active erosion with very little deposition	Erosion equals deposition	Lot of deposition. Formation of Deltas near river mouth
Landforms	Rapids and waterfalls, V-shaped valleys, gorges, river capture	Meanders formation, ox-bow lakes, interlocking spurs, river cliffs and slip-off slopes	Floodplains, deltas, estuary, meanders and oxbow lakes

Glacial Landforms

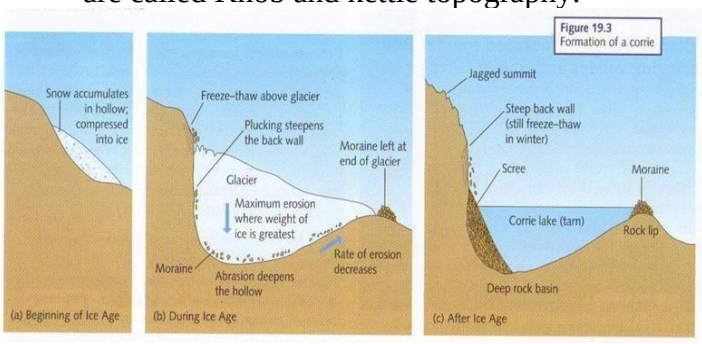


Landforms of Highland Glaciation

1. Corrie, Cirque or Cwm: A steep horseshoe-shaped basin.
2. Aretes or Pyramidal Peaks: When two corries cut back on opposite sides of a mountain, knife-edged ridges are formed called Aretes.
3. Bergschrund: a deep crack at the head of the glacier.
4. U-Shaped glacial troughs: Valley formed due to the downward movement of glaciers.
5. Hanging valleys: A tributary valley 'hangs' above the main valley so that its stream plunges down as a waterfall.
6. Rock basins and rock steps: Excavation of bedrock due to the glacial erosion process
7. Moraines: Pieces of rock fragments which becomes stationary after the glacier melts. They may be lateral moraine, median moraine, terminal moraine etc.

Landforms of Glaciated Lowlands

1. Roche moutonnee: a resistant residual rock hummock.
2. Crag and Tail: a mass of rock with precipitous slope on the upstream side and softer leeward slope.
3. Boulder clay or Glacial till: an unsorted glacial deposit comprising a range of eroded materials forming a monotonous and featureless landform.
4. Erratics: Boulders of varying size transported by the ice and composed of materials entirely different from those of the region.
5. Drumlins: Oval, elongated whale-back hummocks. It is known as the Basket of Eggs topography.
6. Eskers: they are long, narrow, sinuous ridges composed of sand and gravel which mark the former sites of sub-glacial meltwater stream.
7. Terminal moraines: Coarse debris deposited at the edge of the ice sheet.
8. Outwash plains: fluvioglacial deposits washed out from the terminal moraines. They are called Knob and kettle topography.



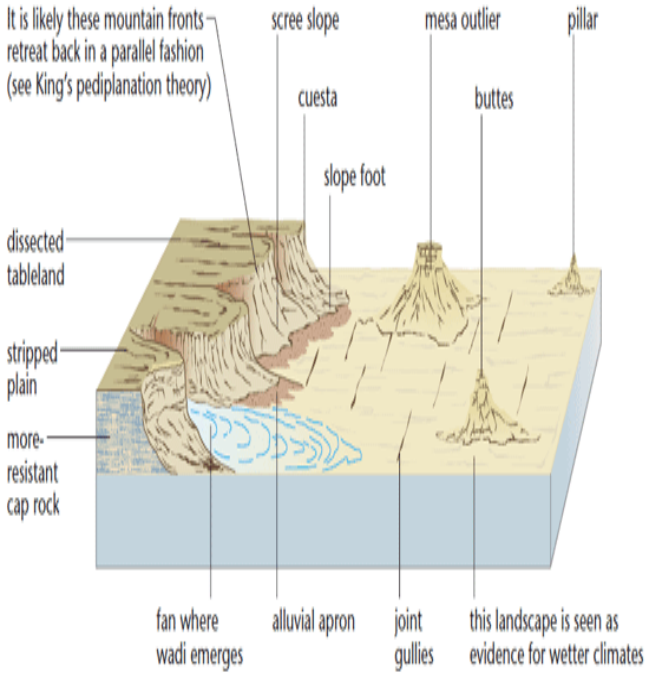
Arid or Desert Landforms

Desert Landscape

1. Hamada or Rocky desert
2. Reg or stony desert
3. Erg or sandy desert
4. Badlands: Hills are eroded into gullies and ravines.
5. Mountain deserts: Dissected desert highlands due to erosion.

Erosional Landforms

1. Deflation hollows: Winds lower the ground by blowing away the unconsolidated materials.
2. Mushroom rocks: A mushroom rock, also called rock pedestal, or a pedestal rock, is a naturally occurring rock whose shape, as its name implies, resembles a mushroom.
3. Inselbergs: isolated residual hills rising abruptly from the level ground.
4. Demoiselles: These are rock pillars which stand as resistant rocks above soft rocks as a result of differential erosion of hard and soft rocks
5. Zeugens: A table-shaped area of rock found in arid and semi-arid areas formed when more resistant rock is reduced at a slower rate than softer rocks around it under the effects of wind erosion
6. Yardangs: Yardang, a large area of soft, poorly consolidated rock and bedrock surfaces that have been extensively grooved, fluted, and pitted by wind erosion. The rock is eroded into alternating ridges and furrows essentially parallel to the dominant wind direction.
7. Ventifacts or dreikanter: these are pebbles faceted by sand-blasting.



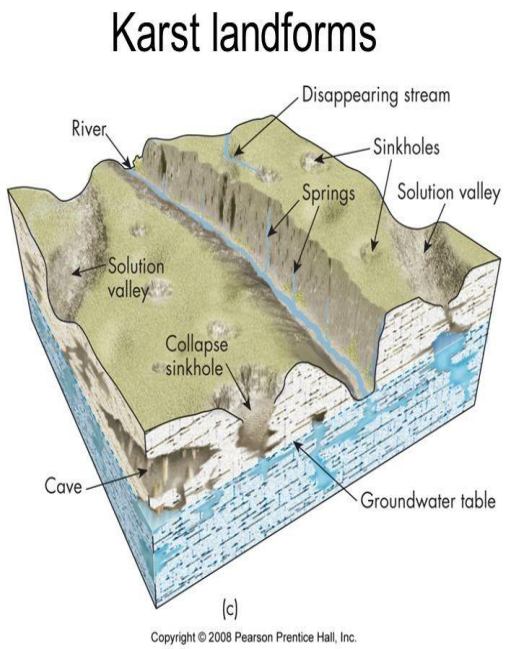
Depositional landforms

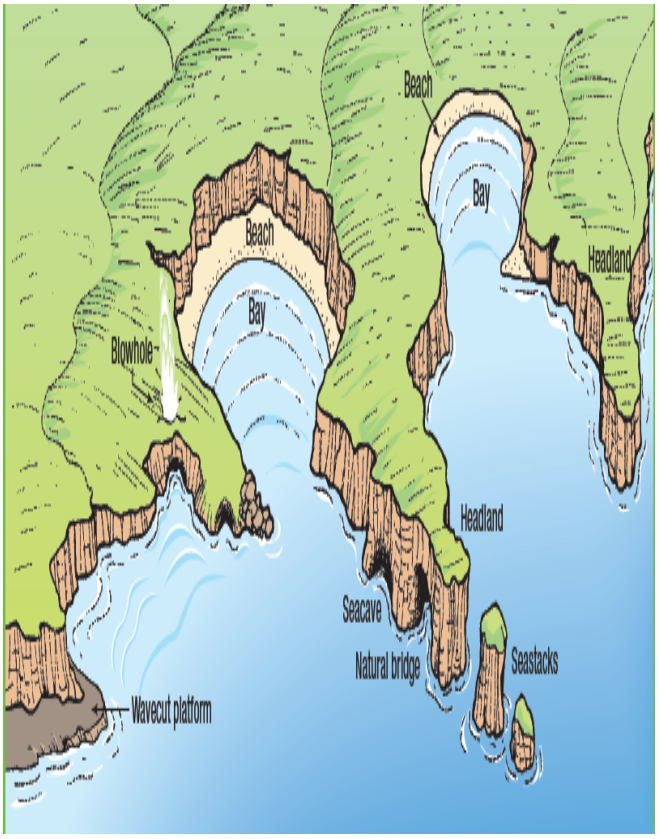
1. Dunes: Dunes are hills of sand formed by the accumulation of sand and shaped by the movement of winds.
    1. Barchans: Crescent-shaped dunes occurring transversely to the wind direction.
    2. Seifs: Longitudinal dunes, which are long, narrow ridges of sand, often over a hundred miles long lying parallel to the direction of prevailing winds.
2. Loess: the fine dust blown beyond the desert limits is deposited on neighbouring lands as loess.
3. Bolsons: It is a semiarid, flat-floored desert valley or depression, usually centred on a playa or salt pan and entirely surrounded by hills or mountains. It is a type of basin characteristic of basin-and-range terrain
4. Playas: an alkali flat or sabkha, a desert basin with no outlet which periodically fills with water to form a temporary lake.
5. Pediments: a broad, gently sloping expanse of rock debris extending outwards from the foot of a mountain slope, especially in a desert.

6. Bajadas: A bajada consists of a series of coalescing alluvial fans along a mountain front. These fan-shaped deposits form from the deposition of sediment within a stream onto flat land at the base of a mountain

Karst Topography

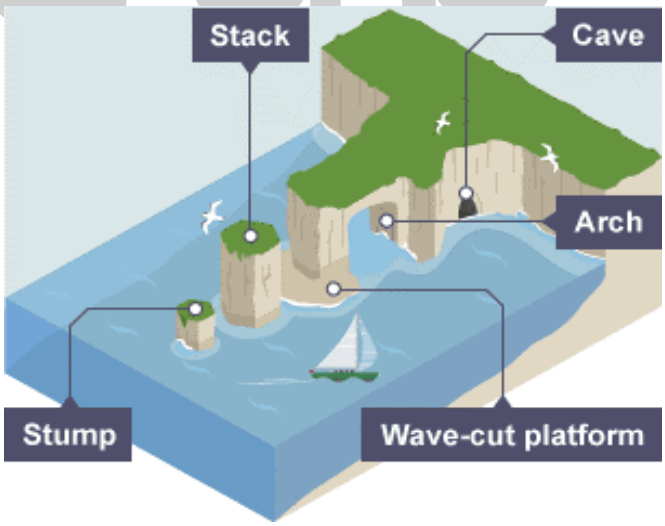
- Grykes/Clints: Clints are the blocks of limestone that constitute the paving, their area and shape are directly dependent upon the frequency and pattern of grykes. Grykes, or scailps, are the fissures that isolate the individual clints
- Swallow holes/Sink Holes (Dolines or Uvalas): A sinkhole is a depression or hole in the ground caused by some form of collapse of the surface layer.
- Stalactites/Stalagmites: A stalactite is an icicle-shaped formation that hangs from the ceiling of a cave, and is produced by the precipitation of minerals from water dripping through the cave ceiling. A stalagmite is an upward-growing mound of mineral deposits that have precipitated from water dripping onto the floor of a cave.
- Caverns: Large-scale features where caves are formed due to the dissolution of limestones. May include Poljies.





Erosional Features

1. Capes and Bays: On exposed coasts, softer rocks are worn back into inlets, coves or bays due to erosion while the harder rocks persist as headlands, promontories or capes.



2. Cliffs and wave-cut platforms:
3. Cave, arch, stack and slump
4. Geos and gloups: Where a cave roof collapses, a narrow inlet or geo is formed.

Coastal Landforms

Depositional Features

1. Beaches: Sands and gravels loosened from the land are moved by waves to be deposited along the shore as beaches.
2. Spits and bars: Deposition of material piling up into a ridge forming a spit with one end attached to the land and the other end projecting into the sea. When the ridge of shingle is formed across the mouth of a river, it is called a bar.

3. Marine dunes and dune belts: Due to on-shore wind's force, a large amount of coastal sand is driven landwards forming marine dunes.

- Coastline of Submergence
  1. Ria coasts: Formed in upland coastal regions where the mountains run in right angles to the sea where the lower valley is submerged due to deglaciation.
  2. Fiord coasts: Submerged U-shaped glacial troughs.
  3. Dalmatian coasts: Longitudinal coasts where mountains run parallel to the coast.
  4. Estuarine coasts: In submerged lowlands, the mouths of rivers are drowned so those funnel-shaped estuaries are formed.
- Coastline of Emergence
  1. Uplifted lowland coast: Smooth, gently sloping coastal lowland is formed with shallow lagoons, salt-marshes and mudflats.
  2. Emergent upland coast: Faulting or earth movement thrust up coastal plateau so that whole region is raised, with consequent emergent features such as a steep cliff, deep off-shore waters etc.

Top Mineral Producer in India (State-wise) and other Countries

Mineral	Type	Mines	Top Producers (States)	Top Producers (Countries)	Top Reserves (States)
IRON ORE	Metallic	Barabil – Koira Valley(Orissa) Bailadila Mine (Chattisgarh) Dalli-Rajhara(CH) – the largest mine in India	1. Orissa 2. Chattisgarh 3. Karnataka	1. Australia 2. Brazil 3. China 4. India	1. Orissa 2. Jharkhand 3. Chattisgarh
MANGANESE	Metallic	Nagpur-Bhandara Region (Maharashtra) Gondite Mines, Khondolite deposits (Orissa)	1. Madhya Pradesh 2. Maharashtra	1. China 2. Gabon 3. South Africa 5. India	1. Orissa 2. Karnataka 3. Madhya Pradesh
CHROMITE	Metallic	Sukinda Valley (Orissa) Hasan Region (Karnataka)	1. Orissa 2. Karnataka 3. Andhra Pradesh	1.South Africa 2.India 3.Russia	1. Sukinda Valley (OR) 2. Guntur Region (AP)
NICKEL	Metallic	Sukinda Valley (Orissa) Singhbhum Region (Jharkhand)	1. Orissa 2. Jharkhand	1. Phillippines 2. Russia 3. Canada	1. Orissa 2. Jharkhand 3. Karnataka

COBALT	Metallic	Singhbhum Region(Jharkhand) Kendujhar (Orissa) Tuensang (Nagaland)	1. Jharkhand 2. Orissa 3. Nagaland	1.Democratic Republic of Congo 2. China 3. Canada	
BAUXITE	Metallic	Balangir(Orissa) Koraput (Orissa) Gumla(Jharkhand) Shahdol (Madhya Pradesh)	1. Orissa 2. Gujarat	1. Australia 2. China, 3. Brazil	1. Junagarh (GJ) 2. Durg (CH)
COPPER	Metallic	Malanjkhand Belt (MP) Khetri Belt(Rajasthan) Kho-Dariba(Rajasthan)	1. Madhya Pradesh 2. Rajasthan 3. Jharkhand	1. Chile 2. China 3. Peru	1. Rajasthan 2. MP 3. Jharkhand
GOLD	Metallic	Kolar Gold Field (Karnataka) Hutti Gold Field (Karnataka) Ramagiri Mines (Andhra Pradesh) Sunarnarekha Sands (Jharkhand)	1. Karnataka 2. Andhra Pradesh	1. China 2. USA 3. South Africa	1. Bihar 2. Rajasthan 3. Karnataka
SILVER	Metallic	Zawar Mines (Rajasthan) Tundoo Mines (Jharkhand) Kolar Gold Fields (Karnataka)	1. Rajasthan 2. Karnataka	1. Mexico 2. Peru 3. China	1. Rajasthan 2. Jharkhand
LEAD	Metallic	Rampura Aghucha (Rajasthan) Sindesar Mines (Rajasthan)	1. Rajasthan 2. Andhra Pradesh 3. MP	1. China 2. Australia 3. USA	1. Rajasthan 2. Madhya Pradesh
TIN	Metallic	Dantewada (Chhattisgarh)	Chhattisgarh (only state in India)	1. China 2. Indonesia 3. Peru	Chhattisgarh
MAGNESIUM	Metallic	Chalk Hills (Tamilnadu) Almora (Uttarakhand)	1. Tamil Nadu 2. Uttarakhand 3. Karnataka	1. China 2. Russia 3. Turkey	1. Tamil Nadu 2. Karnataka
LIMESTONE	Non-Metallic	Jabalpur (Madhya Pradesh) Satna (Madhya Pradesh) Cuddapah (AP)	1. Rajasthan 2. Madhya Pradesh	1. China 2. India	1. Andhra Pradesh 2. Rajasthan 3. Gujarat
MICA	Non-Metallic	Gudur Mines (Aandhra Pradesh) Aravalis (RaJasthan) Koderma (Jharkhand)	1. Andhra Pradesh 2. Rajasthan 3. Orissa	1. India 2. Russia	
DOLOMITE	Non-Metallic	Bastar, Raigarh (Chhattisgarh) Birmitrapur (Orissa)	1. Chhattisgarh 2. Andhra Pradesh	1. India	1. Chhattisgarh 2. Orissa

		Khammam Region (Aandhra Pradesh)			
ASBESTOS	Non-Metallic	Pali (Rajasthan) – largest mine Cuddapah (Andhra Pradesh)	1. Rajasthan 2. Andhra Pradesh 3. karnataka	1. Russia 2. China	1. Rajasthan 2. Andhra Pradesh
GYPSUM	Non-Metallic	Jodhpur, Bikaner, Jaisalmer-Rajasthan	1. Rajasthan 2. Tamil Nadu 3. Gujarat	1. China 2. USA 3. Iran	1. Rajasthan 2.Tamil Nadu 3. J & K
DIAMOND	Non-Metallic	Majhgawan Panna Mines (MP) – only active diamond mine in India	1. MP – only diamond producing state	1. Russia 2. Bostwana 3. Democratic Republic of Congo	
COAL	Non-Metallic	Korba Coalfield, Birampur-Chhattisgarh Jharia Coalfield, Bokaro Coalfield, Girdih – (Jharkhand) Talcher field – (Orissa) Singaruli coalfields (Chhattisgarh) - Largest	1. Chhattisgarh 2. Jharkhand 3. Orissa	1. China 2. USA 3. India	1. Jharkhand 2. Orissa 3. Chhattisgarh
PETROLEUM	Non-Metallic	Lunej, Ankleshwar, Kalol–Gujarat Mumbai high Maharashtra – largest oil field Digboi–Assam–Oldest oil filed in India	1. Maharastra 2. Gujarat	1. Russia 2. Saudi Arabia 3. USA	1. Gujarat 2. Maharastra
URANIUM	Atomic	Jaduguda mine (Jharkhand) Tummalapalle mine (Andhra Pradesh) – largest mine Domiasiat Mine (Meghalaya)	1. Andhra Pradesh 2. Jharkhand 3. Karnataka	1. Kazakhstan 2. Canada 3. Australia	1. Jharkhand 2. Andhra Pradesh 3. Karnataka
THORIUM	Atomic		1. Kerala 2. Jharkhand 3. Bihar	1. Australia 2. USA 3. India	1. Andhra Pradesh 2. Tamil Nadu 3. Kerala

List of Major Straits of the World

Sr. No.	Strait Name	Remarks
1	PALK STRAIT	It connects the Bay of Bengal with the Gulf of Mannar.

2	STRAIT OF GIBRALTAR	It connects the Atlantic Ocean with the Mediterranean Sea and separates Gibraltar and Spain in the north from Morocco in the south.
3	DUNCAN PASSAGE	It is a strait separating Rutland to the North and Little Andaman to the south.
4	NINE DEGREE CHANNEL	This Channel connects Laccadive Islands of Kalapeni, Suheli Par & Maliku Atoll.
5	TEN DEGREE CHANNEL	It separates the Andaman Islands from the Nicobar Islands in the Bay of Bengal.
6	STRAIT OF HORMUZ	It lies between UAE and Oman on the south-west and Iran on the north-east. It connects the Persian Gulf with the Gulf of Oman. It is strategically very important as it controls the oil trade from the Gulf countries.
7	STRAIT OF BAB-EL-MANDAB	It connects the Red Sea with the Gulf of Aden and separates Asia from Africa.
8	MALACCA STRAIT	It separates Peninsular Malaysia from Sumatra island of Indonesia. It connects the Pacific Ocean to the Indian Ocean. It provides a shorter route from the Andaman Sea to the South China Sea and therefore is the busiest waterway of the world.
9	SUNDA STRAIT	It connects the Java Sea to the Indian Ocean and separates Java island of Indonesia from its Sumatra island.
10	BERING STRAIT	It separates Russia and Alaska and connects the East Siberian Sea in the Arctic Ocean with the Bering Sea in the Pacific Ocean.
11	ORANTO STRAIT	Connect the Adriatic Sea with the Ionian Sea and separates Italy from Albania.
12	BOSPHORUS STRAIT	Connects the Black Sea with the Sea of Marmara. It is the world's narrowest navigable strait.
13	DARDANELLES STRAIT	It lies between the Asian Turkey and European Turkey and connects the Aegean Sea with the Sea of Marmara. It is a vital link of transportation between the Black Sea and the Mediterranean Sea.
14	LA PAROUSES STRAIT	It lies between the Sakhalin island and Hokkaido island of Japan and connects the Sea of Okhotsk with the Sea of Japan.

15	STRAIT OF TARTARY/TARTAR	It separates Russian Island Sakhalin from Mainland Asia. It connects the Sea of Okhotsk in the north to the Sea of Japan in the south.
16	TSUGARU STRAIT	It lies between Hokkaido and Honshu in northern Japan and connects the Sea of Japan to the Pacific Ocean.
17	TAIWAN STRAIT OR FORMOSA STRAIT	It lies between Taiwan (Republic of China) and Mailand China (People's Republic of China). It connects South China Sea with the East China Sea.
18	MOZAMBIQUE STRAIT	It lies in the Indian Ocean between Mozambique from Madagascar.
19	YUCATAN STRAIT	It lies between Mexico and Cuba and connects the Gulf of Mexico with the Caribbean Sea.
20	FLORIDA STRAIT	It lies between the Florida state of the USA and Cuba.
21	HUDSON STRAIT	It connects the Hudson Bay (Canada) with the Labrador Sea.
22	DAVIS STRAIT	It connects the Baffin Bay with the Atlantic Ocean.
23	COOK STRAIT	It lies between the North and the South islands of New Zealand and connects the Tasman Sea with the South Pacific Ocean.
24	BASS STRAIT	It separates Tasmania from the Australian mainland.
25	TORRES STRAIT	It lies in the Pacific Ocean, between Cape York Peninsula of Australia and Papua New Guinea
26	MAGELLAN STRAIT	It separates Mainland South America from Tierra Del Fuego (an archipelago off the southern-most tip of the South American Mainland)
27	DOVER STRAIT	It lies in the narrowest part of the English Channel, connecting it with the North Sea. It separates Britain from Continental Europe.
28	NORTH CHANNEL	It separates Ireland from Scotland and connects the Irish Sea with the Atlantic Ocean.

Climatology: Classification of Clouds

Types of Clouds

Various kinds of clouds exist. They vary in size, shape, or colour from each other.

They are basically classified into 2 types:

1. Based on their shape
2. Based on their altitude

Clouds on the basis of there shapes:

1. Cirrus
2. Cumulus
3. Stratus

Cirrus Clouds:

- Cirrus is an atmospheric cloud generally characterized by thin, wispy strands. It derives its name from the Latin word cirrus, which means a ringlet or curling lock of hair.

Cumulus Clouds:

- Cumulus clouds have flat bases and are as "puffy", "cotton-like" or "fluffy" in appearance.
- Their name derives from the Latin cumulo-, meaning heap or pile.

Stratus Clouds:

- Stratus clouds have a uniform foundation of horizontal layers. The word "stratus" is derived from the Latin prefix "strato-", meaning "layer".
- The term stratus represents flat, hazy, featureless clouds of low altitude varying in colour from dark grey to white.

Clouds on the basis of their altitude:

1. Low Clouds
2. Middle Clouds
3. High Clouds

Low Clouds

- They are situated below 6,500 feet or 2,000 meters.
- Low clouds are also known as Stratus Clouds.
- They appear dense, dark, and rainy (or snowy) and can also be cottony white clumps interspersed with blue sky.

Middle Clouds

- They develop between 6,500 feet and cirrus level or from 2000 to 6000 metres.
- They are known as “Alto” clouds.
- They frequently indicate an approaching storm.
- They may sometimes produce Virga, which is a type of rain or snow that does not reach the ground.

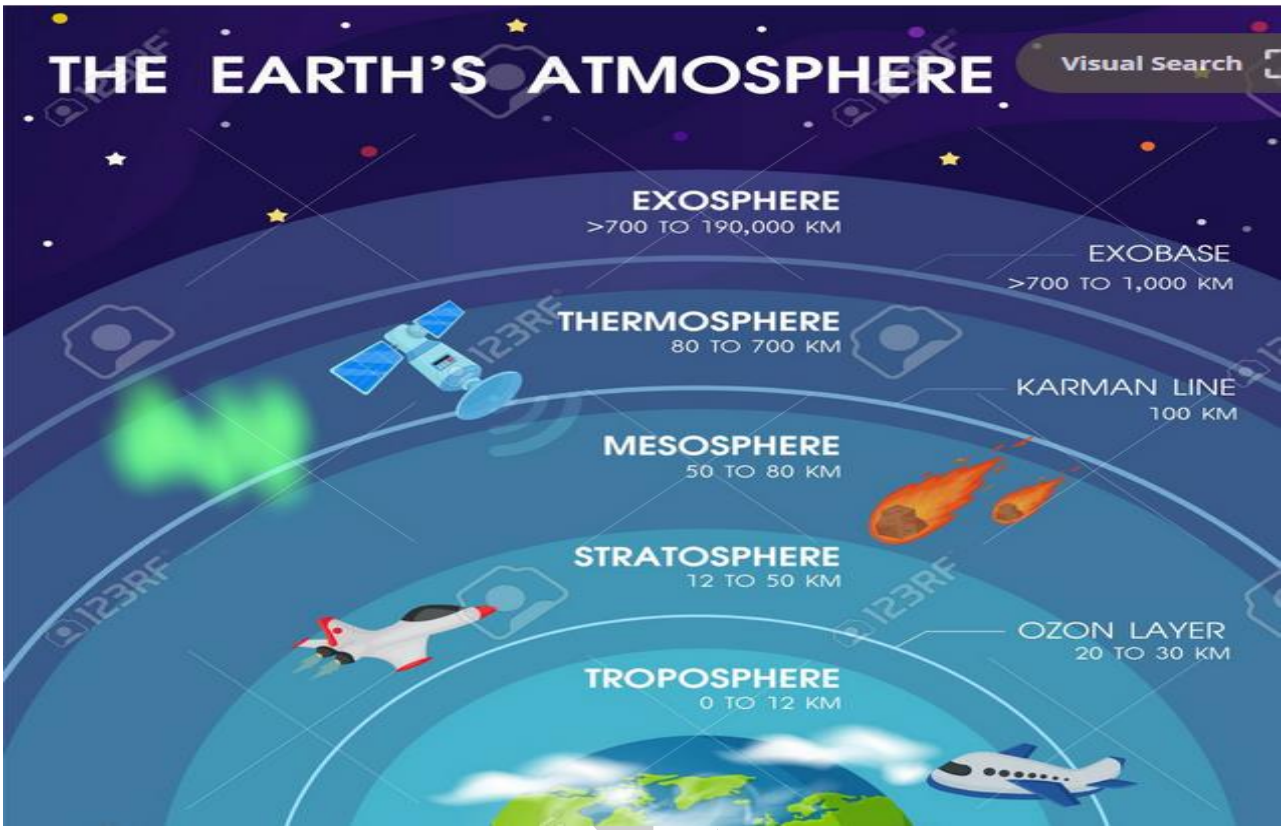
High Clouds

- They are situated above 6000 metres or 20,000 feet.
- They are widely known as Cirrus Clouds.
- They usually have a thin structure and are made up of ice.
- They do not produce rain and hence indicate fair weather.

Climate and its Factors

The Atmosphere

- Gases and vapours form the atmosphere. When they receive solar energy, it gives rise to ‘Climate’. Thus, the climate is defined as the *average atmospheric conditions of an area over a considerable period of time*. When this consideration of atmospheric condition is about certain place at certain time then it is called weather.
- There are five layers of the atmosphere. Those are:



Elements of climate

1. Temperature
2. Precipitation
3. Rainfall
4. Pressure and planetary winds
5. Land and sea breezes
6. Cyclonic activity

Temperature

Temperature decides the following factors-

- Amount of water vapour, the moisture-carrying capacity of the air.
- Rate of evaporation and condensation, governing degree of stability of the atmosphere.
- Relative humidity affecting nature and types of cloud formation and precipitation.

Factors that affect temperature:

1. Latitude – Temperature diminishes from equatorial regions to poles because of the earth's inclination. Direct rays travel a shorter distance and heat up smaller surface whereas oblique rays travel a longer distance and heat up large area.
2. Altitude – Temperature of air decreases with increasing height above sea level. This rate of decrease in temperature with increasing altitude is called as 'Lapse rate'. This rate is not constant. The lapse rate is greater by day than at night, greater on elevated highlands than on level plains.
3. Continentality – Land surface gets heated more quickly than water surface because of the higher specific heat of the water. (Specific heat is energy required to raise the temperature of giving volume by 1 degree Fahrenheit)
4. Ocean currents and winds – Both transport their heat or coldness into adjacent regions. On-shore winds carry ocean currents landwards thereby affecting the temperature of an area. Local winds also change temperature according to their own temperature.
5. Slope, shelter and aspect – Steep slope show a rapid change in temperature than a gentle slope. Sheltered slope (north facing) has less temperature than sunny slope (south-facing).
6. Natural vegetation and soil – Thick vegetation has less temperature than open spaces. Colour of soil (light or dark) give rise to slight variation in temperature.

Precipitation

- When condensation occurs at ground level, haze, mist or fog are formed.
- When condensation of water vapour takes place in the atmosphere at a temperature below freezing point, snowfall occurs.
- When moist air ascends rapidly cooler layers of the atmosphere, water droplets freeze and fall to the earth as hail or hailstone.
- Frozen raindrops melt and refreeze forming sleet.

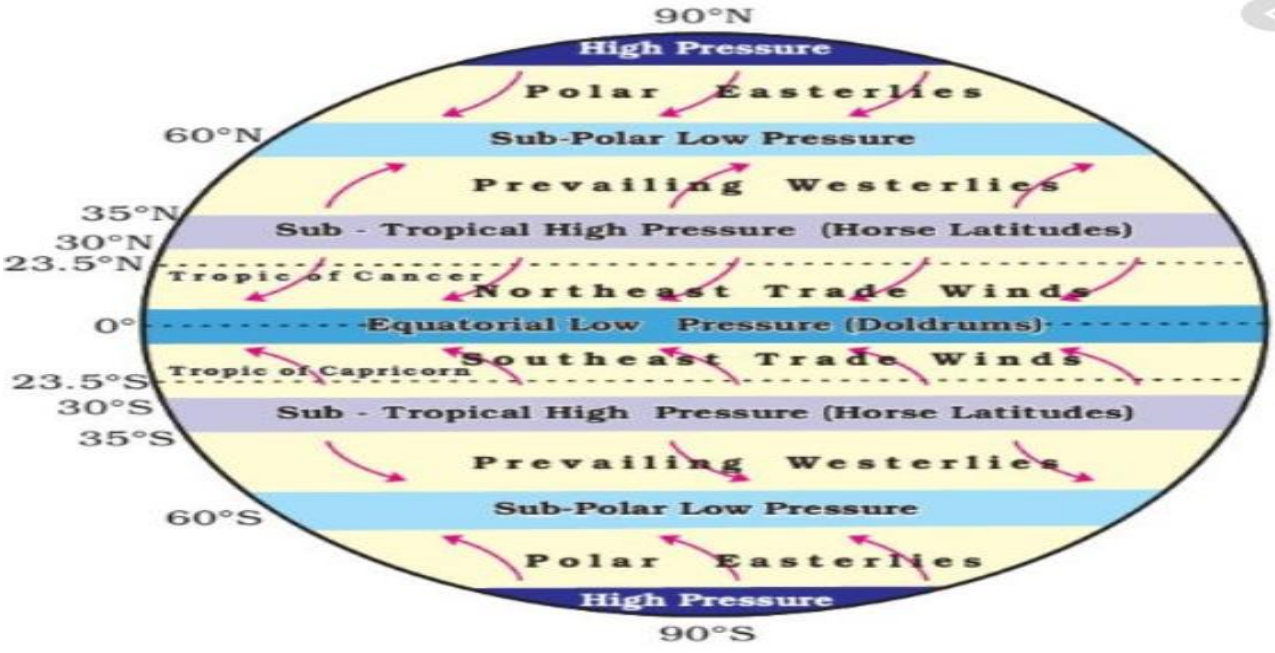
Rainfall

- Convectional rain: When earth surface gets heated by conduction, it comes into contact with air. This heated air contains the capacity to hold moisture. This air rises up and cools down. When saturation point is reached, rainfall occurs. In regions with high relative humidity, this moisture carrying capacity is huge, resulting in torrential downpours. Convection current goes through the process of expansion, cooling, saturation and finally condensation.
- Orographic rain: When moist air ascends the windward side of a mountain barrier, it cools down until complete saturation and orographic clouds form. Precipitation occurs on the upwind side. Leeward side acts as a rain shadow area where usually low precipitation occurs.
- Cyclonic or frontal rain: When air masses with different temperatures and different physical properties meet, warmer air rises over cooler air. In ascent, air expands and cools. Condensation takes place in the form of frontal rainfall.

Pressure and planetary winds

World pressure belts: Circulation of air over the surface of the earth caused by the difference in pressure forms pressure belts. Those are:

- Equatorial Low-Pressure Belt- Between 5 degrees north and south, also called as Doldrums. It is the zone of wind convergence.
- Sub-Tropical High-Pressure Belt- Between 30 degrees north and south, also referred to as Horse Latitudes. It is the zone of wind divergence, with cyclonic activity.
- Temperate Low-Pressure Belt- Between 60 degrees north and south, also called as sub-polar low-pressure areas. It is the zone of wind convergence, with anticyclonic activity.
- Polar High-Pressure Belt- At 90 degrees north and south. Here the temperature is permanently low.



Major Pressure Belts and Wind System

Planetary winds

Within the pattern of permanent pressure belts, winds blow from high pressure to low-pressure belts, as planetary winds. Trade winds, westerlies and polar easterlies flow under the effect of Coriolis force.

Land and sea breezes

- Differential heating of land and sea is basic factor responsible for monsoon. Land breeze forms a diurnal rhythm and sea breeze form a seasonal rhythm.

Cyclonic activity

- Tropical cyclones (as named in the Indian ocean), typhoons in China sea (tropical latitudes), hurricanes in West Indian island in Caribbean and tornadoes in Guinea lands of West Africa and southern USA and willy-willies in north-western Australia occurs.

Important facts of Census 2011

Census 2011

- Census is a process of collecting, compiling, analyzing, evaluating, publishing and disseminating statistical data regarding the population of a country.
- It covers demographic, social and economic data.
- It is conducted every 10 years.
- It started in 1871.
- Census 2011 data was released on 31st March 2011 by Union Home Secretary and RGCCI (Registrar General and Census Commissioner of India) of India.
- Census 2011 was the 15th census of India & 7th census after Independence.
- The motto of census 2011 was "Our Census, Our future".
- Registrar General & Census Commissioner under whom census 2011 was conducted – C.Chandra Mouli
- Present Registrar General & Census Commissioner – Shri Sailesh,
- Total Population – 1,210,569,573 (1.21 Billion)
- India in 2nd rank in the population with 17.64%. decadal growth.
- Increase in population during 2001 – 2011 is 181 Million
- Census 2011 was held in two phases:
  - Houselisting & Housing Census (April to September 2010)
  - Population Enumeration (9th to 28th February 2011)
- Number of Administrative Units in Census 2011
  States/UTs 35
  Districts 640
  Sub-districts 5,924
  Towns 7,936
  Villages 6.41 lakh

Facts about districts

- Thane district of Maharashtra is the most populated district of India.
- Dibang Valley of Arunachal Pradesh is the least populated.
- Kurung Kumey of Arunachal Pradesh registered highest population growth rate of 111.01 Percent.
- Longleng district of Nagaland registered negative population growth rate of (-)58.39.
- Mahe district of Puducherry has the highest sex ratio of 1176 females per 1000 males.
- Daman district has the lowest sex ratio of 533 females per 1000 males.
- Serchhip district of Mizoram has the highest literacy rate of 98.76 Percent.
- Alirajpur of MP is the least literate district of India with the figure of 37.22 Percent only.
- North East Delhi has the highest density with the figure of 37346 people per square kilometre.
- Dibang Valley has the least density of 1 person per sq. km

Facts about cities

- Mumbai city of Maharashtra is the most populated city in India.
- Kapurthala city of Punjab is the least populated.
- Kozhikode of Kerala has the highest sex ratio of 1093 females per 1000 males.
- Bhiwandi city of Maharashtra has the lowest sex ratio of 709 females per 1000 males.
- Aizawl city of Mizoram has the highest literacy rate of 98.76 Percent.

- Sambhal of UP is the least literate city in India with the figure of 48 Percent only.
- North East Delhi has the highest density with the figure of 37346 people per square kilometre.

FEATURE	INDIA	TOP 3 STATES	BOTTOM 3 STATE	OTHER FACT
Average annual growth rate	1.64 %	1. Meghalaya (2.49 %) 2. Arunachal Pradesh (2.3 %) 3. Bihar (2.26 %)	1. Goa (.79%) 2. Andhra Pradesh (1.07%) 3. Sikkim (1.17%)	During 2001-2011, as many as 25 States/UTs with a share of about 85% of the country's population registered an annual growth rate of Less than 2%.
Decadal growth rate	17.60%	1. Meghalaya (27.8 %) 2. Arunachal Pradesh (25.9 %) 3. Bihar (25.1 %)	1. Nagaland (-0.5 %) 2. Kerala (4.9 %) 3. Goa (8.2 %)	• Nagaland is only the state that has negative growth rate. • Districts with highest and lowest decadal growth rate were Kurung Kumey and Longleng respectively.
Population Density	382	1. Bihar (1,106 per sq km) 2. West Bengal (1030 per sq km) 3. Kerala (859 per sq km)	1. Arunachal Pradesh (17 per sq km) 2. Mizoram (52 per sq km) 3. J&K (56 per sq km)	• Top 2 Districts: North East (NCT of Delhi) and Chennai • Bottom 2 district: Dibang Valley and Samba.
Population (in terms of numbers)	Total - 1210.19 million Males – 623.7 million (51.54%) Females – 586.46 million (48.46%) Rural population– 833 million Urban population - 377 million	Total 1. Uttar Pradesh (19.9 million, 16.5%) 2. Maharashtra (11 million - 9.28%) 3. Bihar (10 million - 8.6%)	Total 1. Sikkim (6.07 lakh - 0.05%) 2. Mizoram (10.9 lakh - 0.09 %) 3. Arunachal Pradesh (13.8 lakh - 0.11%)	• Top Metros 1. Mumbai (18,394,912) 2. Delhi 3. Chennai • The population of India is almost equal to the combined population of U.S.A., Indonesia, Brazil, Pakistan, Bangladesh and Japan put together (1214.3 million)! • Top 2 Districts: Thane(Maharashtra) and North Twenty Four Parganas (West Bengal) • Bottom 2 Districts: Dibang Valley and Anjaw (Arunachal Pradesh).

Sex ratio	940	1. Kerala (1084) 2. Tamil Nadu (996) 3. Andhra Pradesh (993)	1. Haryana (879) 2. Jammu and Kashmir (889) 3. Sikkim (890)	● Top 2 Districts: Mahe and Almora ● Bottom 2 Districts: Daman and Leh
Fertility rate (2013)	2.3	1. Bihar (3.4) 2. U.P. (3.17) 3. Meghalaya (3.1)	1. Sikkim (1.45) 2. West Bengal (1.64) 3. Tamil Nadu (1.7)	
Literacy Rate	Overall -74% Male – 82.14% Female -65.46	Overall 1. Kerala (93.9%) 2. Mizoram (91.6%) 3. Tripura (87.8%)	Overall 1. Bihar (63.80%) 2. Arunachal Pradesh (67%) 3. Rajasthan (67.11%)	● Highest literacy rate according to Religion – Jain (94 %) > Christian (80%) > Buddhist (74%) ● Top 2 Districts: Serchhip and Aizwal ● Bottom 2 Districts Alirajpur and Bijapur
Work participation rate	Overall (39 %) ● Male (45 %) ● Female (14 %)	1. Mizoram	1. Kerala 2. Goa	
Tribe	550 tribes ● 8.2% of the total Population of India ● 10 million population	Population wise 1. MP (1.5 million) 2. Maharashtra (1.0 million) 3. Gujrat (.89 million) Tribal density wise 1. Mizoram 2. Nagaland 3. Meghalaya	Population wise 1. Punjab (zero) 2. Haryana (zero) 3. Goa (32,000) Tribal density wise 1. Punjab (zero) 2. Haryana (zero)	
State (Area)	32.87 Lakh km2	1. Rajasthan (3.42 Lakh km2) 2. M.P. (3.08 Lakh km2) 3. Maharashtra (3.07 Lakh km2)	1. Goa (3702 km2) 2. Sikkim (7096 km2) 3. Tripura (10,486 km2)	

Urbanization		1. Goa (62%) 2. Mizoram (52%) 3. Tamil Nadu (48%)	1. Himachal Pradesh (10%) 2. Bihar (10.29%) 3. Assam (14%)	Maharashtra has highest no. of cities – 18 in numbers
Child sex ratio	914	1. Mizoram (971) 2. Meghalaya (970) 3. Chhattisgarh (964)	1. Haryana (830) 2. Punjab (846) 3. J&K (859)	The Child Sex Ratio at India level (914) is lowest since Independence
Per Capita Net State Domestic Product at Current Prices (2011-12)	60972 Rs.	1. Goa (1,92,000 Rs) 2. Haryana (1,09,000 Rs) 3. Tamil Nadu (84,000 Rs)	1. Bihar (24,000 Rs) 2. U.P. (29,000 Rs) 3. Jharkhand (32,000 Rs)	

Age structure	Adolescent (36.5 %) Adult (56.7%) Old (6.8 %)	
Major language	Hindi (40%) Bengali (8%) Telugu (7.8%)	
	Language family 1. Indo – European (Aryan – 73%) 2. Dravidian (20%) 3. Austric (Nishad - 1.3%)	
Religion-Percentage of population	Hindu 96.63 crore (79.8 %) Muslim 17.22 crore (14.2%) Christian 2.78 crore (2.3%) Sikh 2.08 crore (1.7%) Buddhist 0.84 crore (0.7%) Jain 0.45 crore (0.4%)	Hindu, Muslim, Christian, and Sikhs are in majority in 28,4,2,1 state respectively.

ENVIRONMENT

Basic Terminology of Environment and Ecology

1. **Abiotic components:** Non-living and inorganic components of an ecosystem constitute the abiotic components like soil, water, air, sunlight, etc.
2. **Amensalism:** It is a type of interaction between the two species where one is harmed and others remain unaffected. For example, penicillin and bacteria.
3. **Atmosphere:** Atmosphere is a physical mixture of atmospheric gases, water vapour and suspended particulates which is surrounding the earth from all the sides. It is bounded to the surface by the gravity of earth.
4. **Autotrophs:** The organisms which produce their own food from inorganic substances like CO2 and water are called autotrophs. They are also known as primary producers.
5. **Auto ecology:** Ecological study of a particular individual or species with respect to the environment is regarded as auto ecology.
6. Benthic animals: The animals which live at the bottom of the water body are benthic animals.
7. Bioaccumulation: It is the process of increase in the concentration of toxic elements within the body of a particular organism (i.e. it refers to how an element first made an entry into the food chain) and in general the concentration of such pollutants become higher in the body of the organism compared to the external environment like air, water etc. Biomagnification is also known as bio amplification; in this, the concentration of the toxicants increases at the successive trophic levels. It is due to the reason that toxic elements cannot be absorbed and simultaneously they get transferred to the successive higher trophic levels resulting in more concentration of toxicants at the higher trophic level.
8. Biodiversity: The Sum total of all plants, animals and microorganisms represent the biodiversity of an ecosystem. It is also represented in terms of interspecies and intraspecies variations of biotic components of an ecosystem.
9. Bio-Geochemical cycles: The circular pathways from which the essential elements like nitrogen, carbon etc. circulate from organisms to the environment and vice versa are called biogeochemical cycles.
10. Biome: Natural forests and grasslands which are connected with climatic regimes or with the distribution of sunshine, temperature and rainfall are known as biomes.
11. Biomass: Amount of living matter present in an organism at a given point of time is known as the biomass of that organism.
12. Biosphere: It is the greatest ecosystem on the surface of the earth and its presence indicates a continuous interaction and interdependence between all three spheres of earth- atmosphere, hydrosphere and lithosphere.
13. Biotic component: Living components of an ecosystem form part of biotic components of the ecosystem.
14. Brood parasitism: A unique form of parasitism in birds where a parasitic bird lays its eggs in the nest of host and let the host incubate them.
15. Carnivores: Animals depending upon herbivores or primary consumers for food and energy are known as carnivores.
16. Climate change: Shifting pattern of weather and climate parameters making it uncertain, unpredictable and fluctuating. This is climate change.
17. Climax: It is the last stage of the process of succession. The species at which the process concludes is known as a climax community.
18. Co-extinctions: It is a situation When a species becomes extinct, the plant and animal species associated with it also become extinct.
19. Composting: Decomposition of organic solid wastes under aerobic conditions

(in presence of oxygen) is known as composting.

20. Commensalism: Type of interaction between the two species When one of the organisms is benefited and others remain neutral in an association. For example, epiphyte and mango; barnacles growing on the back of a whale.
21. Competition: Type of interaction between the two species where both are negatively impacted (harmed). Example- plants and herbivores.
22. Conservation: Judicious use of natural resources (both living and non-living) so as to prevent them from being lost, wasted or extinct.
23. Cryosphere: Area covered by the surface of the earth by ice and glaciers is known as cryosphere.
24. Detrivores: The microorganisms which decompose the detritus are detrivores.
25. Decomposer: Organisms like bacteria, fungi etc. which are involved in bio decomposition of dead plants and animals are known as decomposers.
26. Deciduous: Trees which shed all their leaves for a certain period of time.
27. Demography: Statistical study of the population size of humans.
28. DDT: Organochlorine chemical used as an insecticide/pesticide in agricultural uses. Now, its use has caused havoc due to bioaccumulation.
29. Ecology: Scientific study of the relationship of living organisms with each other as well as with their environment. A.G. Tansley introduced the concept of ecology.
30. Environment: Anything that affects the existence of an organism throughout his lifetime directly or indirectly constitutes the environment.
31. Ecosystem: Ecosystem represents interaction and interdependence between biotic and abiotic components of an area that ensure the flow of mass and energy.
32. Ecosystem services: A wide range of economic, environmental and aesthetic goods and services offered by ecosystem are referred to as ecosystem services.
33. Ecotone: Zone of the junction between two or more diverse ecosystems. For example, estuary, grasslands, etc.
34. Ecotype: A plant or animal species that occupy a particular habitat which is adapted to local environmental conditions.
35. Ecocline: Gradual and continuous change in the composition of the species from one ecosystem to another along an environmental gradient with no clear-cut differences between the two. It is a physical transition zone.
36. Ecological niche: Functional and ecological role played by the organism of an ecosystem. It is the sum total of all relationships of an organism with biotic as well as abiotic elements of its environment.
37. Ecological succession: It is the gradual and fairly predictable change in the composition of the species of a given area.
38. Ecophene: Population which is characterized by the same genotype but different phenotype in a particular habitat is regarded as ecophene.
39. Ecological efficiency/10% law: Rate of transfer of mass and energy from one trophic level to other is just 10% of the previous level. This is 10% energy law which indicates the ecological efficiency of an ecosystem.
40. Ecological footprint: It represents the use and exploitation of natural and environmental resources with respect to the carrying capacity of the environment or the ability of the environment to regenerate.
41. Endemic biodiversity: Biodiversity of a region which is connected with a particular and specific geographical condition having limited distribution on the surface of the earth is called endemic biodiversity.
42. Eutrophication: Overfertilization of water bodies due to excessive concentration of nitrates and phosphates leading to algal bloom is Eutrophication.

43. Euryphagic organisms: The plants and animals that have a wide range of tolerance for food are euryphagic.
44. Eurythermal organisms: The plants and animals that have a wide range of tolerance for temperature are eurythermal.
45. Euryhydric organisms: The plants and animals that have a wide range of tolerance for water are euryhydric.
46. EIA: Analysis of the effects caused by the development projects on the environment is Environmental Impact Assessment (EIA).
47. Ex-situ conservation: When a species is conserved outside the array of its natural habitat, it is known as ex-situ conservation. For example- conservation in the zoo, botanical gardens, etc.
48. Flora: Plant community of a region is the flora of that area.
49. Fauna: Animal community of a region is the fauna of that area.
50. Food chain: Linear and sequential flow of mass and energy in an ecosystem.
51. Food web: A complicated series of interdependent and interconnected food chains. It is also known as a consumer-resource system.
52. Food pyramid: Vertical arrangement of trophic levels of an ecosystem is described as a food pyramid.
53. Gasohol: Gasoline+ alcohol is gasoline. It is used as a fuel for vehicles.
54. Global warming: Low, gradual and irreversible rise in annual temperature of earth due to the rise in the concentration of GHGs is known as Global warming.
55. Greenhouse effect: Due to the absorption of longwave terrestrial radiations inside a glasshouse, temperature inside it becomes more than outside. This is due to the greenhouse effect.
56. Greenhouse gases: The gases like CO2, CH4, CFCs, etc. which are transparent for incoming insolation but opaque for longwave terrestrial radiations cause greenhouse effect in the atmosphere. These are known as GHGs.
57. Gross primary productivity: Entire biomass and energy produced by plants of an ecosystem in a duration of time are described as Gross primary productivity.
58. Habitat: The place where an organism lives. It specifies a particular set of environmental conditions.
59. Herbivores: Animals directly dependent on plants for their food and energy are known as herbivores.
60. Heterotrophs: The organism which cannot synthesise their own food and; depends on plants directly and indirectly for food and energy are called heterotrophs.
61. Heredity: Traits and qualities which are inherited from one generation to another.
62. Homeostasis: It is the state of stability with dynamic equilibrium which is maintained by living things. It is responsible for the optimum functioning of all the systems.
63. Humus: It is the dark organic matter on the top of soil that is formed due to partial degradation of dead leaves and other plants/animal matter by microorganisms.
64. Hydrarch succession: The succession of plants that take place in wetter areas and the successional series progress from hydric to the mesic conditions.
65. In situ conservation: Conservation of plants and animals in their natural habitat.
66. Insecticides: These are the chemicals used to kill the insects/pests that harm agricultural produce.
67. Lotic ecosystem: Freshwater ecosystem with moving water.
68. Lentic ecosystem: Freshwater ecosystem with still or stagnant water.
69. Lithosphere: It is the outermost layer of earth which comprises of crust and upper mantle.
70. Mutualism: It is a symbiotic relationship between the organisms where both are benefitted. For example, lichens.
71. Nitrogen fixation: It is the process of changing atmospheric nitrogen into that form

which is absorbable by the soil like ammonia, with the help of nitrogen-fixing bacteria.

72. Net primary productivity (NPP): NPP of autotrophs is available to animals for their food and energy. It is calculated by deducting the energy consumed by plants in respiration from gross primary productivity. NPP=GPP-energy consumed
73. Omnivores: Animals using a wide range of food and energy resources (both plants and other animals) are classified as omnivores. They are tertiary consumers.
74. PAN (Peroxyacyl Nitrate): It is a secondary pollutant formed in photochemical smog.
75. Pandemic biodiversity: The species and subspecies of plants and animals which are distributed over a large area and in diverse geographical regions constitute pandemic biodiversity.
76. Particulate matter: Suspended particles in air (may be solid or liquid).
77. Parasitism: A type of association where one of the two is harmed and the other is benefitted. Example- human liver fluke is a trematode parasite.
78. Phytoplankton: Primary producers of marine ecosystem which float on the surface of the water are phytoplankton. They are highly sensitive to UV exposure.
79. Pioneer species: The species which invade the bare area or the virgin land.
80. Polar vortex: Clouds in the stratosphere
81. Process of succession: A sequential, orderly and directional change in plant communities in an ecosystem in a duration of time is known as the process of succession. Here, one set of producers get replaced by another set of producers.
82. Primary pollutants: The pollutants which are directly formed or released in the atmosphere like NO_2, SO_2
83. Secondary pollutants: The pollutants which are formed from primary pollutants are secondary pollutants like PAN, nitric acid, etc.
84. Sere(s): Sequence of communities that successively change in a given area are called sere(s).
85. Saprotrophs: Saprotrophs are those organisms which meet their food and energy needs by degrading dead organic matter or the detritus.
86. Sea level rise: Slow, gradual and irreversible rise of mean sea level, permanently submerging coasts and islands is described as sea level rise.
87. Smog: Smog is a condition of fog that has smoke or soot int it. Smog=smoke+fog.
88. Species: Group of organisms which can interbreed over time and space.
89. Standing crop: Living mass of a particular tropic level in a food pyramid.
90. Standing state: The amount of nutrients, such as nitrogen, phosphorus, etc. present in the soil at a given point of time, is referred to as the standing state.
91. Steady-state dynamic equilibrium: It is another name for ecological stability with balance or state of homeostasis.
92. Stenophagic: The plants and animals that have a narrow range of tolerance for food are stenophagic.
93. Stenohydric: The plants and animals that have a narrow range of tolerance for water are stenohydric.
94. Stenothermic: The plants and animals that have a narrow range of tolerance for temperature are stenothermic.
95. Stratosphere: It is an atmospheric layer extending from 20Km to 50Km. It is characterized by the presence of the ozone layer in it (which protects the earth from harmful UV radiations).
96. Troposphere: It is the lowermost layer of the atmosphere extending upto 20Km from the surface of the earth. It is a zone of mixing of air responsible for all weather and climatic conditions.
97. Vegetation climax: The end product of the orderly and directional process of succession is known as vegetation climax which is the ultimate expression of an

ecosystem dominated by large trees in the form of forests.

98. Xerarch succession: Succession of plants in dry areas where successional series progress from xeric to mesic conditions.
99. Xerophytes: The plants connected with dry and semi-dry regions. Here, leaves are transformed into thorns to conserve and preserve water.
100. Zooplanktons: Primary consumers in the marine ecosystem.

Ecological/Biodiversity Hotspots and India

The term 'hot spot' was introduced by N. Myers in 1988 for those geographical regions particularly rich in 'endemic', 'rare' and 'threatened' species found in relatively small areas but facing significant threats to habitat loss.

Presently, there are 36 areas across the globe that qualify as hotspots. They represent 2.4% of the Earth's land surface but support more than half of the world's plant species as endemics — and nearly 43% of bird, mammal, reptile and amphibian species as endemics.

For any area to qualify as a biodiversity hotspot, the following two criteria's must be met:

- The area must contain at least 1,500 species of endemic vascular plants.
- The area must have lost at least 70 per cent of its primary native vegetation.

Biodiversity Hotspots Across the World

The eight hottest hot spots in terms of the above factors are:

1. Madagascar
2. Philippines
3. Sundaland [South East Asia]
4. Brazil's Atlantic Forest
5. Caribbean
6. Indo-Burma
7. The Western Ghats and Sri Lanka
8. Eastern Arc and Coastal Forests of Tanzania/Kenya

There are 4 biodiversity hot spots present in India. They are:

- The Eastern Himalayas [Arunachal Pradesh, Bhutan, Eastern Nepal]
- Indo-Burma and [Purvanchal Hills, Arakan Yoma, Eastern Bangladesh]
- The Western Ghats and Sri Lanka
- Sundalands: Includes Nicobar group of Islands (and Indonesia, Malaysia, Singapore, Brunei, Philippines).

Tiger Reserves in India

Tiger Reserves

- Tiger reserves are administered by the National Tiger Conservation Authority (NTCA).
- Initially, only 9 tiger reserves were covered under the project.
- But today, this number has increased to 50 (list is given at the end of the article).

Important Facts

- Largest Tiger Reserve in India- Nagarjunsagar-Srisailam Tiger Reserve (Andhra Pradesh, Telangana)
- Smallest Tiger Reserve in India- Bor Tiger Reserve (Maharashtra)

STRUCTURE:

- A tiger reserve is demarcated on the basis of 'core-buffer strategy' which includes: (i) Core zone (ii) Buffer zone

PROJECT TIGER

- It was launched in the country in the year 1973 in Palamau Tiger Reserve. The first time project tiger was launched in 1973, at Jim Corbett National Park, Uttrakhand. (in some sources)
- It was done with the help of World Wildlife Fund (WWF) on the basis of the recommendation of a special task-force of the Indian Board for Wildlife.

NATIONAL TIGER CONSERVATION AUTHORITY (NTCA)

- It is a statutory body constituted under the Wild Life (Protection) Amendment Act, 2006.
- It was recommended by Tiger Task Force.
- It is responsible for all the measures and actions taken under the project tiger for the conservation of the tiger.

- Minister for Environment and Forests is its chairperson and Minister of State for Environment and Forests is the vice-chairperson.
- The NTCA / Project Tiger also conducts the country level assessment of the status of tiger, co-predators, prey and habitat once in every four years. It is done using the refined methodology, as approved by the Tiger Task Force.

List of Tiger Reserves in India State-wise

Here is a complete list of Tiger Reserves in India as notified under the Wildlife (Protection) Act, 1972 and amended in 2006.

Sr. No.	Name of Tiger Reserve (Year of creation)	State
1	Bandipur (1973-74)	Karnataka
2	Corbett (1973-74)	Uttarakhand
	Amangarh (buffer of Corbett TR)	Uttar Pradesh
3	Kanha (1973-74)	Madhya Pradesh
4	Manas (1973-74)	Assam
5	Melghat (1973-74)	Maharashtra
6	Palamau (1973-74)	Jharkhand
7	Ranthambore (1973-74)	Rajasthan
8	Similipal (1973-74)	Odisha
9	Sunderbans (1973-74)	West Bengal
10	Periyar (1978-79)	Kerala
11	Sariska (1978-79)	Rajasthan
12	Buxa (1982-83)	West Bengal
13	Indravati (1982-83)	Chhattisgarh
14	Namdapha (1982-83)	Arunachal Pradesh
15	Dudhwa (1987-88)	Uttar Pradesh
16	Kalakad-Mundanthurai (1988-89)	Tamil Nadu
17	Valmiki (1989-90)	Bihar

18	Pench (1992-93)	Madhya Pradesh
19	Tadoba-Andhari (1993-94)	Maharashtra
20	Bandhavgarh (1993-94)	Madhya Pradesh
21	Panna (1994-95)	Madhya Pradesh
22	Dampa (1994-95)	Mizoram
23	Bhadra (1998-99)	Karnataka
24	Pench (1998-99)	Maharashtra
25	Pakke (1999-2000)	Arunachal Pradesh
26	Nameri (1999-2000)	Assam
27	Satpura (1999-2000)	Madhya Pradesh
28	Anamalai (2008-09)	Tamil Nadu
29	Udanti-Sitanadi (2008-09)	Chattisgarh
30	Satkosia (2008-09)	Odisha
31	Kaziranga (2008-09)	Assam
32	Achanakmar (2008-09)	Chattisgarh
33	Dandeli-Anshi (Kali) (2008-09)	Karnataka
34	Sanjay-Dubri (2008-09)	Madhya Pradesh
35	Mudumalai (2008-09)	Tamil Nadu
36	Nagarahole (2008-09)	Karnataka
37	Parambikulam (2008-09)	Kerala
38	Sahyadri (2009-10)	Maharashtra
39	Biligiri Ranganatha Temple (2010-11)	Karnataka

40	Kawal (2012-13)	Telangana
41	Sathyamangalam (2013-14)	Tamil Nadu
42	Mukandra Hills (2013-14)	Rajasthan
43	Nawegaon-Nagzira (2013-14)	Maharashtra
44	Nagarjunsagar Srisailam (1982-83)	Andhra Pradesh
45	Amrabad (2014)	Telangana
46	Pilibhit (2014)	Uttar Pradesh
47	Bor (2014)	Maharashtra
48	Rajaji (2015)	Uttarakhand
49	Orang (2016)	Assam
50	Kamlang (2016)	Arunachal Pradesh

Biosphere reserves in India

What is the Biosphere Reserve?

- 'Biosphere Reserves' are designated natural sites, comprising terrestrial or marine or coastal or combined ecosystems, which promote the conservation of biodiversity and minimizes the conflict between the development and nature conservation.
- 'Biosphere Reserve' is originally an international concept. It was introduced by International Co-ordinating Council (ICC) of UNESCO in Nov.1971 for the first time.

List of Biospheres in India

- Currently, there are 18 notified biosphere reserves in India.
- The list of Biosphere Reserves in India notified chronologically, is given below.

1. **Nilgiri Biosphere**
- This is the first Biosphere of India notified in 1986.
- This spreads over three states Tamil Nadu, Karnataka and Kerala.

2. **Nanda Devi**
- This lies in Uttarakhand state.

3. **Nokrek**
- This biosphere lies in the Garo hills of Meghalaya state.

4. **Great Nicobar**
- This is the only biosphere reserve in India that entirely lies in the Union territory i.e. Andaman and Nicobar

5. **Gulf of Mannar**
- It lies in the Indian part of Gulf of Mannar between India and Sri Lanka i.e. in Tamil Nadu state.

6. **Manas**
- It spreads over part of Kokrajhar, Barpeta, Nalbari districts of Assam.

7. Sundarban
- It lies in part of delta system of Ganges and Brahmaputra rivers in West Bengal state.

8. Simplipal
- It lies in part of Mayurbhanj district of Orissa state.

9. Dibru-Saikhowa

- It spreads over Dibrugarh and Tinsukhia districts of Assam.

10. Dehang- Dibang

- It spreads over part of Siang and Dibang Valley in Arunachal Pradesh state.

11. Pachmarhi

- It lies in central India in the state of Madhya Pradesh.

12. Khangchendzonga

- It is part of Sikkim state and it is the only mixed heritage site in UNESCO's world heritage sites list.

13. Agasthyamalai

- It spreads over eastern part of Kerala state.
- Neyyar, Peppara and Shendurney wildlife sanctuaries are part of this biosphere.

14. Achanakamar- Amarkantak

- It spreads over Dindori, Anupur districts of Madhya Pradesh and Bilaspur districts of Chhattisgarh state.

15. Kachchh

- It lies in the desert area of Gujarat state.

16. Cold Desert

- It spreads over Himachal Pradesh state. Pin Valley National Park and surroundings, Chandratal and Sarchu & Kibber wildlife sanctuaries are part of this biosphere.

17. Seshachalam Hills

- It lies in the Andhra Pradesh district.

18. Panna

- It is the latest added biosphere in 2011.
- It lies in Madhya Pradesh state.

Out of these 18 biosphere reserves from India, there are 11 biosphere reserves which are internationally recognised under World Network of Biosphere Reserves (WNBR) of the Man and Biosphere (MAB) programme of UNESCO.

Man And Biosphere (MAB) Programme

- MAB programme was launched in 1971.
- It is an intergovernmental scientific programme that aims to establish a scientific basis for the improvement of relationships between nature and human.
- Biosphere Reserves are nominated by the national government for inclusion in the world network of biospheres.
- Then the committee of MAB programme recognises the BRs after fulfilling the criteria.
- There are currently 669 sites in 120 countries in World Network of Biosphere Reserves (WNBR) of the Man and Biosphere (MAB) programme.
- Out of these, 10 BRs are from India.

List of Biosphere reserves in MAB Programme

1. Nilgiri Biosphere- Oldest entry from India in the list in 2000
2. Gulf of Mannar
3. Sundarban
4. Nanda Devi
5. Nokrek
6. Simplipal
7. Pachmarhi
8. Achanakamar- Amarkantak
9. Great Nicobar
10. Agasthyamalai- Latest entry from India in the list in 2016
11. Khangchendzonga- Added in 2018

List of National Parks in India

Protected areas of India

- These are defined according to the guidelines prescribed by IUCN (The International Union for Conservation of Nature).
- There are mainly four types of protected areas which are-
  (a) National Park
  (b) Wildlife Sanctuaries
  (c) Conservation reserves
  (d) Community reserves

(a) National Park

- Classified as IUCN category II
- Any area notified by state govt to be constituted as a National Park
- There are 104 national parks in India.
- First national park in India- Jim Corbett National Park (previously known as Hailey National Park)

- No human activity/ rights allowed except for the ones permitted by the Chief Wildlife Warden of the state.
- It covered 1.23 Percent geographical area of India
- Madhya Pradesh has the highest number of National Park i.e. 10
- Largest National Park in India- Hemi National Park (J&K)
- Latest entry: Kuno National Park (MP)- Dec 2018

(b) Wildlife Sanctuaries

- Classified as IUCN category II
- Any area notified by state govt to be constituted as a wildlife sanctuary.
- Certain rights are available to the people. Example- grazing etc.
- There are 543 wildlife sanctuaries in India.
- It covered 3.62 Percent geographical area of India

(c) Conservation reserves

- These categories added in Wildlife (Protection) Amendment Act of 2002.
- Buffer zones between established national parks, wildlife sanctuaries and reserved and protected forests of India.
- Uninhabited and completely owned by the Government.
- It covered 0.08 Percent geographical area of India

(d) Community reserves

- These categories added in Wildlife (Protection) Amendment Act of 2002.
- Buffer zones between established national parks, wildlife sanctuaries and reserved and protected forests of India.
- Used for subsistence by communities and community areas because part of the land is privately owned.
- It covered 0.002 Percent geographical area of India

Act related to wildlife

- Wildlife Protection Act 1972
- It is applicable to whole India except Jammu and Kashmir which have their own law for wildlife protection.

Project related to wildlife

- Project Tiger 1973
- Operation Crocodile 1975
- Project Rhinoceros 1987
- Project Elephant 1988
- Project Snow Leopard 2009

List of National Park in India

States	National park
Andhra Pradesh	Papikonda National Park
	Sri Venkateswara National Park
Arunachal Pradesh	Mouling National Park
	Namdapha National Park
Assam	Kaziranga National Park

	Dibru-Saikhowa National Park
	Manas National Park
	Nameri National Park
	Orang National Park
Bihar	Valmiki National Park
Chhattisgarh	Indravati National Park
	Kanger Valley National Park
	Guru Ghasi Das (Sanjay) National Park
Goa	Mollem National Park
Gujarat	Gir Forest National Park
	Blackbuck National Park
	Marine National Park, Gulf of Kutch
	Vansda National Park
Haryana	Kalesar National Park
	Sultanpur National Park
Himachal Pradesh	Pin Valley National Park
	Great Himalayan National Park
	Inderkilla National Park
	Khirganga National Park
	Simbalbara National Park
Jammu & Kashmir	Dachigam National Park
	Hemis National Park
	Kishtwar National Park
	Salim Ali National Park

Jharkhand	Betla National Park
Karnataka	Dandeli National Park
	Nagarhole National Park (Rajiv Gandhi National Park)
	Bandipur National Park
	Bannerghatta National Park
	Kudremukh National Park
	Anshi national park
Kerala	Pambadum Shola National Park
	Eravikulam National Park
	Mathikettan Shola National Park
	Silent Valley National Park
	Anamudi Shola National Park
	Periyar National Park
Madhya Pradesh	Bandhavgarh National Park
	Pench National Park
	Kanha National Park
	Panna National Park
	Madhav National Park
	Mandla Plant Fossils National Park
	Pench National Park
	Sanjay National Park
	Satpura National Park
	Van Vihar national park
	Kuno Nationla Park

Maharastra	Sanjay Gandhi National Park
	Chandoli National Park
	Navegaon National Park
	Tadoba National Park
	Gugamal national park
Manipur	Keibul Lamjao National Park
	Sirohi National Park
Meghalaya	Balphakram National Park
	Nokrek National Park
Mizoram	Murlen National Park
	Phawngpui Blue National Park
Nagaland	Ntangki National Park
Odisha	Simlipal National Park
	Bhitarkanika National Park
Rajasthan	Keoladeo National Park
	Sariska National Park
	Ranthambore National Park
	Mukundra Hills (Darrah) National Park
	Desert National Park
Sikkim	Khangchendzonga National Park
Tamil Nadu	Mudumalai National Park
	Mukurthi National Park
	Indira Gandhi (Annamalai) National Park
	Guindy National Park

	Gulf of Mannar Marine National Park
Telangana	Kasu Brahmananda Reddy National Park
	Mahavir Harina Vanasthali National Park
	Mrugavani National Park
Tripura	Bison(Rajbari) National Park
	Clouded Leopard National Park
Uttarakhand	Rajaji National Park
	Jim Corbett National Park
	Gangotri National Park
	Valley of Flowers National Park
	Govind Pashu Vihar
	Nanda Devi National Park
Uttar Pradesh	Dudhwa National Park
West Bengal	Sunderbans Wildlife Sanctuary

	Jaldapara National Park
	Buxa National Park
	Neora Valley National Park
	Singalila National Park
	Gorumara National Park
Andaman and Nicobar	Mahatma Gandhi Marine (Wandoor) National Park
	Middle Button Island National Park
	Mount Harriet National Park
	North Button Island National Park
	Rani Jhansi Marine National Park
	Saddle Peak National Park
	South Button Island National Park
	Campbell Bay National Park
	Galathea Bay National Park

RAMSAR Sites in India

Ramsar Convention

- Ramsar Convention is an only intergovernmental treaty which gives a solid framework to the nations for the conservation and use of wetlands and their resources and helps to protect such unique ecosystems.
- It is also known as the "Convention on Wetlands". It was adopted in the Iranian city of Ramsar on 2nd February 1971 and came into force on 21 December 1975.
- So, 2nd February is celebrated as "World Wetlands Day" every year.
- Currently, 169 countries are a party to this convention. There are 2289 wetland sites, covering an area around 225399512 hectors, designated under this convention.
- The secretariat of Ramsar convention is located in Gland, Switzerland.

List of RAMSAR Sites in India

- Currently, there are 38 sites in 16 states designated under the Ramsar List. India has highest number of Ramsar sites in south Asia. These are given below

1. Jammu and Kashmir
   - Hokera Wetland
   - Surinsar- Mansar lakes
   - Tsomoriri
   - Wular Lake
2. Himachal Pradesh
   - Chandertal Wetland.
   - Pong Dam Lake
   - Renuka Wetland
3. Punjab
   - Harike Wetland
   - Kanjli Wetland
   - Ropar
   - Keshopur-Miani
   - Beas Conservation Reserve
   - Nangal
4. Rajasthan
   - Keoladeo National Park (1/10/1981)-Oldest entry in the list.
   - Sambhar Lake
5. Uttar Pradesh
   - Upper Ganga River (Brijghat to Narora stretch)
   - Nawabganj
   - Parvati Agra
   - Saman
   - Samaspur
   - Sandi
   - Sarsai Nawar
6. Madhya Pradesh
   - Bhoj Wetland
7. Gujarat
   - Nal Sarovar (2012)
8. Andhra Pradesh
   - Kolleru Lake
9. Kerala
   - Ashtamudi Wetland
   - Sasthamkotta Lake
   - Vembanad- Kol Wetland
10. Tamil Nadu
    - Point Calimere Sanctuary
11. Odisha
    - Chilika Lake (1/10/1981) - Oldest entry in the list.
    - Bhitarkanika Mangroves
12. West Bengal
    - East Calcutta Wetlands
    - Indian Sunderban
13. Assam
    - Deepor Beel
14. Tripura
    - Rudrasagar Lake
15. Manipur
    - Loktak Lake
16. Maharashtra
    - Nandur (state's first)
17. Uttarakhand
    - Asan Conservation Area (state's first)

Other Ramsar Sites in India

- Nandur Madhameshwar bird sanctuary.
  - It lies in Nashik district of Maharashtra.
  - It is known by the name of Bharatpur of Maharashtra due to the reason that

it receives a large number of migrated birds like that of Bharatpur in Rajasthan.
    - It is one and only Ramsar site in Maharashtra.
- Keshopur-Miani community reserve.
    - It is situated in Gurdaspur district of Punjab.
    - It lies in the middle of Ravi and the Beas river.
    - It is the first community reserve of India which got notified.
    - The management is done by both the locals along with the Forest Department which eventually, resulted in better conservation.
    - The migratory birds can be seen over here.
- Beas Conservation Reserve.
    - It also lies in Punjab.
    - It stretches from Harike to Talwara Conservation Reserve and is 185 kms in length.
    - It is renowned due to the fact that it is successful in the reintroduction of Gharials.
    - As the banks of a river are very fertile in nature, and hence, proves to be fertile grounds for the ecosystem.
- Nangal wildlife sanctuary.
    - It is located in the Roopnagar district near the Sutlej river.
    - Different variety of species of both the migratory birds along with the residents can be seen over here.
    - Many of the threatened species including the Indian Pangolin can be seen.
- Nawabganj bird sanctuary.
    - It is located in the Unnao district of U.P.
    - It is also known by the name of Chandrashekhar Azad Bird Sanctuary.
    - Many national along with the migratory birds can be seen in this sanctuary.
    - Some of them are Garganey Teal, Mallard, Little Grebe, Wigon, etc.
- Parvati Aranga bird sanctuary.
    - Parwati and Aranga are the two lakes which are connected and are apart by 1.5 Km.
    - It is considered as a potential ecotourism site in the sense that it can provide facilities of bird conservation awareness.
- Saman bird sanctuary.
    - It is situated in Bhogav region of Manipuri district, Uttar Pradesh.
    - It was in 1990 when it was notified so as to protect the population of cranes in the area.
    - It also includes Storks.
- Samaspur Bird sanctuary.
    - It is situated in Raibarelli district of U.P.
    - It is famous for the preservation of bird species along with the migratory birds.
    - More than 250 species of birds can be seen over here.
    - It includes Vultures, Kingfishers, Teel, etc. which are also the permanent residents of this sanctuary.
- Sandi bird sanctuary.
    - It is located in the Hardoi district of U.P.
    - It is also listed as an important bird area by the Bombay natural society.
- Sarsai Nawar Lake.
    - It is situated in Etawah, U.P.
    - It consists of two lakes which attract White Ibis, Sarus cranes, along with the other birds in large numbers.
    - A large population of threatened species of Sarus Cranes, the world's tallest flying birds can be seen over here.

- It is also considered as small unprotected Wetland.

Montreux Record

- Out of these 27 sites, currently, 2 sites in India are included in the Montreux Record.

1. Keoladeo National Park, Rajasthan (1990) – first site to be included in this list
2. Loktak Lake, Manipur (1993)

- Chilika lake, Odisha was included in the list in 1993 but was removed in 2002.
- Montreux Record is a register of wetlands sites on the List of Wetlands of International Importance where changes in ecological character have occurred, are occurring, or likely to occur.
- Ecological character of a Ramsar site may degrade because of technological developments, pollution or other human interference.

Environmental Conventions and Protocols Notes

Convention	Year	Purpose	Remarks
Ramsar Convention	1971	for the conservation and sustainable utilization of wetlands	· Known as Waterfowl convention. · India is part of it. · There are currently 27 Ramsar sites · in India
Stockholm Declaration	1972	International protection of the environment	· UNEP was the result of it.
Convention on International Trade in Endangered species of Wild flora and fauna (CITES)	1973	Control or prevent international commercial trade in endangered species or products derived from them.	· Known as Washington Convention · Legally binding
Convention on Migratory Species (CMS)	1979	Convention on the Conservation of Migratory Species of Wild Animals	· Also known as the Bonn Convention · It is under the aegis of United Nations Environment Programme (UNEP)
Nairobi Declaration	1982	for achieving sustainable developments	· 10th anniversary of Stockholm)

Vienna convention	1985	for the protection of the ozone layer	· It does not include legally binding reduction goals
Montreal Protocol	1987	To control Ozone-depleting Substances	· It is a protocol to the Vienna Convention for the Protection of Ozone Layer · Universal treaty (Ratified by all UN countries) · Legally binding · Target only ozone depleting substances (Not GHG i.e. Hydro Fluorocarbons)
Brundtland Report	1987	Sustainable Development	· gave the concept of "sustainable development"
Earth Summit/ United Nations Conference on Environment and Development (UNCED)/ Rio Declaration	1992	Environment conservation & Development	· It had 27 principles · Three legally binding agreements were opened for signature: (i) CBD (ii) UNFCC (iii) UNCCD
Agenda 21	1992	Sustainable Development	· It is a product of Earth Summit, 1992 · Agenda 21 refers to the 21st Century. · Non-binding
UNFCCC	1992	Reducing greenhouse gas emissions to combat global warming.	· Environmental treaty produced at the Earth Summit, 1992. · Secretariat: Bonn, Germany · legally non-binding · Kyoto Protocol was negotiated under this framework.
Convention on Biological Diversity (CBD)	1992	Three main goals: 1. Conservation of biological diversity (or biodiversity);	· Legally binding · USA has signed but not ratified · The two protocols to CBD are: (a) Cartagena Protocol on Biosafety, 2000 (b) Nagoya Protocol (Biodiversity Accord), 2010

		2. Sustainable use of its components; 3. Sharing the benefits of genetic resources fairly and equitably	
UNCCD	1994	Convention to Combat Desertification	· Headquarter: Bonn, Germany · Only convention that came out from direct recommendations of Rio Agenda 21 · Legally Binding · Canada withdrew

Kyoto Protocol (COP 3)	1997	to fight global warming by reducing greenhouse gas concentrations	· Negotiated under UNFCC · Came into force in 2005 · Binding targets to Annex I countries · Mechanisms under protocol: (a) Clean Development Mechanism (CDM) (b) Emission Trading (c) Joint Implementation (JI) · This protocol applies to follow GHGs (Annex A): (a) Carbon Dioxide (CO2) (b) Methane (CH4) (c) Nitrous Oxide (NO2) (d) Sulphur Hexafluoride (SF6) (e) Hydrofluorocarbons (HFCs) (f) Perfluorocarbons (PFCs) · The Protocol is based on the principle of shared (Common) but differentiated responsibilities. · It places the obligation on developed countries to reduce current emissions on the basis that they are historically responsible for the current levels of greenhouse gases in the atmosphere. · Annex I countries: industrialized countries and economies in transition · Annex II countries: developed countries which pay for costs of developing countries · Non-Annex I countries: Developing countries · India is Non-Annex party to UNFCC. · There are two commitment periods (i) 2008 – 2012 (ii) 2013 – 2020 Note: The second commitment period was agreed on in 2012, known as the Doha Amendment to the protocol.

Rotterdam Convention	1998	Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	· UN Treaty
Cartagena Protocol	2000	Biosafety	· Protecting biological diversity from potential risks posed by living modified organisms resulting from modern biotechnology.
Stockholm Convention	2001	Eliminate or restrict the production and use of persistent organic pollutants	· UN Treaty · US is not a party to this treaty · Intergovernmental Forum on Chemical Safety (IFCS) and the International Programme for Chemical Safety (IPCS) prepared a list, known as the Dirty Dozen.
REDD & REDD+	2005	Reducing emissions from deforestation and forest degradation in developing countries	· Negotiated under UNFCC since 2005. · UN-REDD was launched in 2008. India did not participate in it. · REDDD+ (Defined in Bali Action Plan, 2007, CoP13) · REDD+ extends to (a) Sustainable Forest Management (b) Conservation of Forests (c) Enhancement of carbon sinks
Nagoya Protocol	2010	Access to genetic resources and a fair and equitable sharing of benefits arising from their use of the Convention on Biological Diversity	· It is a supplementary agreement to the CBD.

Rio+20	2012	Conference on Sustainable Development	· 20th Anniversary of Rio Earth Summit 1992.
Paris Agreement (COP 21)	2015	Climate Change	· It will come into force by 2020. · Not legally binding. Aims ● This century, global temperature rises well below 2 degrees Celsius above circa-industrial level. ● Pursue efforts to limit the temperature upsurge even further to 5 degrees Celsius. Indian NDCs · Greenhouse gas emissions per unit of GDP- by 33 to 35 per cent below 2005 levels by the year 2030. · By 2030, 40 percent of its energy would be generated from non-fossil fuels. · Increase its forest cover to create an additional carbon sink equivalent to 2.5 to 3 billion tons of carbon dioxide by 2030. Note: Recently the US has withdrawn from it.
Kigali Amendment	2016	Reduce Ozone Layer Depletion	· It amends the 1987 Montreal Protocol. · Its aims to reduce Hydrofluorocarbons (HFCs) by roughly 80-85 Percent by late 2045. · It will be binding on member countries from 2019.

Coral Reefs in India: Introduction, Types, Formation, Locations

Coral Reef

Coral Reefs are elementary sedimentary rocks which are located above the sea and oceanic bed of continental shelf and mid-oceanic ridges. These organic sedimentary rocks are formed on the platform of shelf and ridges through a combined process which includes sedimentation, compaction, cementation and solidification of the skeleton of coral polyps.

Coral Polyps are marine animals of tropical and subtropical seas and oceans (tiny fleshy sea anemones polyps) living in shallow water by maintaining a symbiotic relationship with the microscopic plant (algae)- Zooxanthellae. Zooxanthellae have photosynthetic capabilities, they

provide food to corals and in return, the polyps provide protection to the zooxanthellae.

Types of Coral Reefs and their distribution

1. Fringing Reef: These reefs evolve and develop on the continental shelf and are connected to the coastline.
   Location: Gulf of Mannar, Gulf of Kutchchh, the coastline of Andaman and Nicobar Islands are covered with fringing reefs.
2. Barrier Reef: Barrier reefs are located offshore on the continental shelf. They are away and parallel to the coastline. A lagoon is located between the coastline and the barrier reef.
   Location: Great Barrier reef along the North Eastern coast of Australia is an example.
3. Atoll Reef: Atolls are located on mid-oceanic ridges. These are circular or elliptical reefs surrounded by sea from all sides with a shallow lagoon in the centre.
   Location: Maldives, Lakshadweep represent Atolls

Coral Bleaching

When corals are in stress, they expel zooxanthellae and that why to appear white. Ultimately, due to lack of food, corals also die.

Discolouration of Coral Reefs due to the disturbed symbiotic relationship between coral polyps and algae and adverse changes in the marine ecosystem and ecology due to human interferences is known as coral bleaching.

NATIONAL ENVIRONMENT ORGANISATION

Animal Welfare Board of India:

- It is an advisory and statutory body on laws of animal welfare and to promote it.
- It was set up in 1962, according to section 4 of Prevention of Cruelty to Animals Act, 1960.
- It is first of its kind in the world, headquartered in Ballabhgarh (Faridabad, Haryana) and pioneered or guided by Mrs Rukmini Devi Arundale.
- The board consist of 28 members, for a period of 3 years.
- Some of its functions are:
  - To advise the central government on the amendment of the cruelty of animals.
  - To advise the central government of any local authority on improvements in the design of the vehicle to reduce the burden on animals.
  - Provide all types of measures like sheds, food, water and veterinary assistance,
  - To maintain slaughterhouse to reduce the pain of animals and take all steps to ensure that unwanted animals are destroyed by the local authority using a less painful method.
  - To encourage financial assistance and grant for making facilities like shelter home, hospital and medicals and give financial assistance to any local animal organisations.
  - Give education relating to human nature of animal and promote animal welfare.

National Biodiversity authority:

- It was created in 2003 under the Biodiversity act 2002.
- It is an autonomous and statutory body for advisory and regulatory functions under government for conservation, sustainable use of resources and sharing of resources.
- Some of the objectives are:
  - Prior approval for intellectual property rights in research in biological resources or knowledge obtained from India.
  - Protection of knowledge of local people through registration of knowledge.
  - It advises the central government relating to conservation and sustainable and equitable use of benefits.
  - Advises to the state government on selecting areas as heritage sites which are important biologically.
  - Without permission, no one can transfer the knowledge and/or grant in

biological resources. NBA gives approval for transfer.

Note: State biodiversity board work as local level biodiversity management committee. It gives advises on biological management and right use of benefits from the environment and promotes conservation.

Wildlife Crime Control Bureau:

- It is a statutory body which is constituted under the Wildlife Protection Act, 1972 to prevent illegal activities like smuggling and poaching.
- Some of the functions are:
    - Collection of intelligence and establishment of centralized wildlife crime data bank.
    - Implementation of provisions of act and obligations under various protocols and conventions.
    - Assistance to different authority in foreign countries under international organisations.
    - Developing infrastructure and building scientific and professional investigations.

Central Zoo Authority:

- Constituted under amendment of Wildlife Protection Act in 1991 by adding a new section for Zoos and constituted authority by the central government.
- Following are the functions of authority in the act:
    - Decide minimum standards for zoos and ensure all services to take care of animals.
    - Identify endangered species for better protection of it. Exchange and loaning of animals for breeding purposes.
    - Organise training of zoo personnel and coordinate research and educational programs and maintain all the data about different species.

Wildlife Trust of India:

- It is a non-profit government organisation to conserve nature especially critically endangered species and threatened habitats with the help of different communities.
- Functions through local communities and government on a range of projects for preventions and rehabilitation of wildlife.

National Ganga River Basin Authority:

- Constituted in 2009 under the Environment (Protection) Act, 1986. It is a body for planning, coordinating and financing for both centre and state.
- The main functions include:
    - Conservation and reduction of pollution in the Ganga River and using comprehensive planning and management.
    - Development of the river basin is the core approach for management. All the activities and measure are aimed at reducing pollution and relevant to river ecology.
    - Management of minimum ecology flow. Infrastructures like sewerage, catchment area and protection against flood.
    - Investigation and research project for improving the quality of water and creating public awareness to use water conservation practices.
    - Monitor and review of all the programmes and activities.

Central Pollution Control Board:

- It is a statutory body established under the Water (Prevention and Control of Pollution) Act 1974.
- It provides technical services to the Ministry of Environment and Forests under the provisions of the Environment (Protection) Act, 1986.
- It Co-ordinates the activities of the State Pollution Control Boards by providing technical assistance and guidance and also resolves disputes among them.
- Some of the functions are:
- Advises the central government on any matter related to pollution in water and air pollution, and plan and execute a nationwide program to prevent it.

- Plan and organise training programs for personnel related to the prevention of water and air pollution.
- Collect technical and statistical data for better implementation of programs. Prepare manuals and guidelines and create public awareness.

National Tiger Conservation Authority:

- On the recommendation of the Tiger Task Force by the Prime Minister of India Project Tiger and many Tiger reserves in India.
- Helping the state and the central government in the management of tiger reserves.
- Some of the key functions are:
    - To approve a conservation plan prepared by the state government. Provide management guidelines and measures addressing man and animal conflict.
    - Provide information related to the estimation of population of tiger, natural prey, habitat status, and disease outbreak and mortality survey.
    - Program for skill development for forest personnel.

Forest Survey of India:

- Established in 1981 under the union ministry of Environment, forest and Climate Change.
- Monitoring of changing the situation of land and forest resources and use it for national planning, conservation, management and preservation of forest resources.
- Key functions are:
    - Prepare state of Forest Report biennially for assessment of the country's forest cover. Develop a database for forest and non-forest areas.
    - To prepare thematic maps using aerial photographs. Act and functions as a nodal agency collection, compilation and storage of spatial database on forest resources.
    - Strengthen research and development infrastructure and training of forest personnel in the application of technologies like remote sensing and GIS etc.
    - To support the state forestry department in survey mapping and inventory.

National Board of Wildlife:

- Constituted under the Wildlife Protection Act. Prime minister Chairman of the board and vice chairman is union minister of environment and forest.
- Some of the functions are:
    - Deal with Environment impact assessment projects.
    - Recommendation on the setting of areas like a national park and wildlife sanctuaries and decide all the activities under protected areas.
    - Frame policies for the protection of wildlife and prevent illegal trade and poaching. For altering the tiger reserves state needs approval from this body.
    - Publish a report on the state of wildlife in India.

National Green Tribunals:

- Created under the National Green Tribunal Act, 2010 for handling all the cases related to environmental issues.
- It can have 20 members each from the judicial background and expert members.
- It has the power of the civil court and guided by the principle of natural justice.
- Appeals against the order of NGT have to be made to Supreme Court within 90 days and the cases under NGT have to be disposed within 6 months.

Genetic Engineering Advisory Committee:

- Established according to the Rules for Manufacture, Use, Import, Export and Storage of Hazardous Microorganisms/Genetically Engineered Organisms or Cells 1989' in accordance with the Environment Protection Act, 1986 and works under Dept of Biotechnology, Ministry of Environment, Forests and Climate change

- Approves filed trails for genetically modifies crops and can take punitive action for non-compliance.
- Appraise the activities including large scale use of catastrophic micro-organisms and industrial production from an environmental perspective.

About Acid Rain

- The acid rain is a form of precipitation which may be fog or snow in which excessive acid like sulphuric or nitric acids are present.
- The rainwater with a PH of less than 5.5 is called acid rain.
- It can be harmful to plants, aquatic animals and human beings.
- The two gases which are mainly responsible for causing acid rain are – Oxides of Sulphur (SO2) and Oxides of Nitrogen (NO2).
- When SO2 and NO2 present in access amount in the atmosphere mixes or reacts with rainwater, they form sulphuric acid and nitric acid, respectively. These acids decrease the PH value of rain to less than 5.5 and make it acidic.

Sources of Acid Rain

(a) Sulphur

Natural sources:

- Seas and oceans,
- Volcanic eruptions,
- Biological processes in the soil

Man-made sources:

- Burning of coal
- Petroleum products
- Smelting of metal sulfide ores
- Industrial production of Sulfuric acid

(b) Nitrogen

Natural sources:

- Lightening,
- Volcanic Eruption and
- Biological Activity

Anthropogenic sources:

- Forest fires
- Combustion of oil, coal, and gas

(c) Formic Acid

(d) Other Acid

What is the Ozone hole?

- Ozone molecules in the atmosphere are produced over tropics and then spread enveloping the earth's atmosphere.
- But due to prevailing stratospheric winds, it is transferred towards the poles. When the concentration of ozone is reduced at a particular place, it is considered as an Ozone hole.
- In other words, one can say that the damaged area of the Ozone layer is known as the Ozone hole. Its concentration is measured in Dobson units. The largest ozone hole is above Antarctica.

Ozone layer's thickness varies geographically, it is thinner at the equator and thicker near the poles. Wherever, the layer thins, the harmful radiations – UV rays pass through it and reach the earth's surface. Based on the wavelength absorbed, the UV radiations are of three types:

1. UV-C (280-100nm) is entirely screened out by a combination of dioxygen and ozone).
2. UV-B (315-280nm) majorly screened out by ozone. But the part of it passes which helps form Vitamin D.
3. UV-A (400-315 nm) is transparent to all. It reaches the earth's surface completely.

The UV radiation is also harmful not only to humans but also to the plants and animals.

How is the Ozone (O_3) formed?

- Ozone is produced naturally in the stratosphere when highly energetic solar radiation strikes molecules of oxygen, O2, and cause the two oxygen atoms to split apart in a process called photolysis. Ozone (O_3) is made up of three layers of oxygen.
- The layer formed by Ozone is known as the Ozone layer. If a freed atom collides with another O2, it joins up, forming ozone O3.
- The concentration of the ozone layer is nearly 10 ppm and in the Earth's atmosphere, it is present in about 0.3 ppm.
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Some of the important international programmes

1. **Vienna Conference**

- It took place in Vienna, Austria in 1985.
- The ozone hole was first discovered during this time.
- It was signed for the protection of the ozone layer.
- It does not include legally binding reduction goals.

1. Saving the Ozone layer Conference

- This happened in London, 1985.
- It dealt with the withdrawal of all the ozone-depleting substances.

1. Helsinki Conference

- It took place in May 1989.
- To revise the Montreal Protocol, the Helsinki Conference happened.
- There was an agreement to eliminate CFCs

Montreal Protocol

- It took place in 1987.
- It is a protocol to the Ozone Layer Vienna Convention.
- This was signed by 197 countries so as to minimize the use of ozone-depleting substances.
- Targets only ozone-depleting substances (Not GHG i.e. Hydro Fluorocarbons)
- All the developed countries decided to reduce the use of CFC's. Regarded as the Universal treaty (Ratified by all UN countries)
- Montreal Protocol is considered as the first treaty in the history of the United Nations which achieved universal ratification.
- It has helped in pausing the depletion of the Ozone layer.
- Legally binding

Kigali Agreement

- It was signed in 2016 to Reduce Ozone Layer Depletion
- It amends the 1987 Montreal Protocol.
- Its objective is to decrease hydrofluorocarbons (HFCs) by approximately 80-85 per cent by the end of 2045.
- It is a legally binding agreement between the signatory parties with non-compliance measures.
- The Kigali Amendment to the Montreal Protocol is legally binding and came into force from January 1, 2019.
- India has ratified this agreement.

Environment Pollution: Introduction, Causes & Types

What is Environmental Pollution?

- Environment Pollution is the addition of contaminants into the natural environment that causes detrimental effects to nature, natural resources and mankind.
- Any unnatural and negative changes in all the dimensions like chemical, physical and biological characteristics of any component of the ecosystem i.e. air, water or soil which can cause harmful effects on various forms of life and property is called environmental pollution.

Types of Environment Pollution:

AIR POLLUTION:

- Air pollution is the presence of one or more disadvantageous content in such quantity and for such duration, as it is catastrophic, or tend to be catastrophic, to human health and welfare, animal or plant life.
- It is the contaminants of air by the discharge of detrimental substances.

Some of the air pollutants, their sources, and effects:

Name of the pollutants	Sources	Health effects
Nitrogen oxides	Industries, vehicles and power plants	Problems in the lungs, respiratory systems and causes asthma and bronchitis.

Carbon monoxide	Emission and burning of fossil fuels	Severe headache, irritation to mucous membrane, unconsciousness and death.
Carbon dioxide	Burning of fossil fuels	Vision problem, severe headache and heart strain.
Suspended particulate matter	Vehicular emission and burning of fossil fuels.	Lung irritation reduces development of RBC and pulmonary malfunctioning.
Sulphur oxide	Industries and power plant	Irritation in eyes and throat, allergies, cough etc.
Smog	Industries and vehicular pollution	Respiratory and eye problems
Hydrocarbons	Burning of fossil fuels	Kidney problems, irritation in eyes, nose and throat, asthma, hypertension and carcinogenic effects on lungs.
Chlorofluorocarbons	Refrigerators, emission from jets	Depletion of ozone layer, global warming

WATER POLLUTION

- Addition of certain substances such as organic, inorganic, biological and radiological to the water, which degrades the water quality and makes it unhealthy for use.
- Water pollution is not only confined to surface water but also spread to groundwater, sea, and ocean.

Sources

Point sources: These are directly pointed towards the water bodies from the source of origin of pollution and are thus easy to regulate.

Non-point sources: These sources are related to many diffuse sources and are thus difficult to regulate.

Some of the sources are:

- Industrial and community wastewater: Industries like mining, iron and steel, pharmaceuticals, food processing, soap and detergent and paper and pulp.
- Agricultural sources, thermal pollution (discharge of hot water by thermal power plants cause deficiency of dissolved oxygen in water) and underground water pollution.
- Marine pollution: river discharge, manmade pollution and oil spills etc.

SOIL POLLUTION

- Addition of unwanted substances to the soil which negatively affects physical, chemical and biological properties of soil and reduces its productivity is called soil pollution.
- The factors which disturb the biological balance of the soil and deteriorate the quality, texture, and mineral content are called soil pollutants.
- Use of fertilizers, pesticides, insecticides, dumping of solid waste, deforestation, and pollution due to urbanization and other anthropogenic substances causes soil pollution.

Sources

- Industrial waste: lead, cadmium, mercury, alkalies, organic substances, and chemicals.
- Agricultural waste: fertilizers, pesticides, insecticides, and manures.
- Discarded materials and radioactive elements and plastic bags.

Biogeochemical cycles

Importance of biogeochemical cycle:

1. It allows the transfer of molecules from one locality to another.
2. It enables the transformation of matter from one form to another.
3. It facilitates the storage of elements. Elements stored in their natural reservoir and released to organisms in small consumable amounts.
4. In case of any imbalance, it helps the ecosystem to restore it. It may take a few days or a few years.
5. It links biotic and abiotic elements of ecosystems.

Biogeochemical cycles are sometimes called nutrient cycles because they involve the transfer of compounds that provide support to living organisms. Two important components of the cycle are:

1. Reservoir pool- atmosphere or rocks storing a large number of nutrients.
2. Cycling pool- short storage of carbon in the form of plants and animals.

Elements transported by biogeochemical cycle have been categorised as:

1. Microelements- The elements which are required in smaller quantities are referred to as microelements. For example, boron (used mainly by green plants), copper (used by some enzymes) and molybdenum (used by nitrogen-fixing bacteria).
2. Macroelements- The elements which are required in larger amounts are referred to as macronutrients. For example, carbon, hydrogen, oxygen, nitrogen, phosphorus, sulphur.

Types of Biogeochemical Cycles:

1. Gaseous cycles: Gaseous cycles include transportation of matter through the atmosphere. Gaseous cycles are: Carbon cycle, Nitrogen cycle and Water Cycle
2. Sedimentary cycles: Sedimentary cycles include transportation of matter through the ground to water means lithosphere to the hydrosphere. Sedimentary cycles are Phosphorus cycle and the sulphur cycle.

Carbon cycle

The carbon cycle is a biogeochemical cycle where the carbon and its compounds are continuously exchanged between the three spheres of earth, i.e. hydrosphere, lithosphere and atmosphere (collectively called as biosphere).

Major carbon sinks of our Earth

- In the form of organic molecules in living and dead organisms in the biosphere.
- As the gaseous carbon dioxide in the atmosphere.
- As organic matter in soils.
- As fossil fuels and sedimentary deposits like limestone, dolomite and chalk etc.
- As dissolved atmospheric carbon dioxide in the oceans and as calcium carbonate shells in marine organisms.

Processes involved in the Carbon Cycle

- Photosynthesis: Ecosystem gains most of their carbon dioxide from the atmosphere. Most of the autotrophs have a mechanism that allows for absorption of this gas into their cells. With the help of water and energy from solar radiation, these organisms use photosynthesis to chemically convert the carbon dioxide to sugar molecules.
- Respiration: Carbon released from the ecosystem as carbon dioxide gas by the process of respiration. It involves the breakdown of the carbon-based organic molecule into carbon dioxide and some other by-product in both plants and animals.
- Detritus food chain contains a number of organisms whose primary role is to decompose organic matter. Partially decomposed organic matter becomes part of the soil carbon storage pool.
- Ultimately organic material in the soil becomes part of soil constituents, water and carbon dioxide which return to the atmosphere. This flow accounts for most of the carbon from the atmosphere but not all.
- Diffusion: Carbon dioxide enters into the water by this method. Once it is dissolved in water it can remain as it is or can convert into carbonate or bicarbonate. When carbon dioxide enters the ocean, carbonic acid is formed.

- Certain organisms fix bicarbonate with calcium to form calcium carbonate. This is used to make hardbodies such as shells and corals. When such organisms die their remains accumulate as carbonate-rich deposits to the ocean floor.

Hydrological cycle (Water cycle)

The water cycle is defined as continuous circulation of water from the earth to atmosphere and vice versa which is powered by the energy of the sun. It shows storage and movement of water between biosphere, lithosphere and hydrosphere.

Major Water Sinks

Water can be stored in any of the reservoirs like atmosphere, oceans, lakes, rivers, soils, glaciers, snowfields and groundwater.

Processes involved

- The processes involved in the movement of water from one reservoir to another are-
  - Evaporation, condensation, precipitation, deposition, runoff, infiltration, sublimation, transpiration, melting and groundwater flow.
- The driving source of energy for the water cycle is solar radiation or solar energy.
- Evaporation and precipitation are the main processes involved in the water cycle.
- Some of the processes are discussed below:
  - Evaporation- Water from ocean, lakes, ponds, rivers and streams evaporates by sun's heat and energy. Water remains in vapour state in air and forms cloud.
  - Transpiration- Evaporation through the plant surface due to solar energy is known as transpiration. Plants also transfer a huge amount of water in the atmosphere through transpiration.
  - Precipitation- Cloud meets with the cold air in the mountains and above forest regions and condenses to form rain precipitates.
  - Condensation- It is the process by which water vapours in the atmosphere gets converted into liquid droplets.
  - Runoff: Water discharged from the surface is known as runoff. If it is discharged through rivers, it is known as river runoff.

The ocean supplies most of the evaporated water. On average 84% of water loss from the oceans through evaporations while 77% gained by precipitation. Water from runoff, streams and river covers the 7% to balance evaporation deficit of oceans. On land, evaporation is 16% and precipitation is 23%.

Nitrogen Cycle

The main processes involved in the nitrogen cycle-

Nitrogen fixation

It involves the conversion of gaseous nitrogen into ammonia, which can be used by plants. It can be done by following methods-

- Atmospheric fixation- This is done by lightening, combustion and volcanic activity.
- Industrial fixation- This is done in industries at high temperature and high-pressure where nitrogen molecule is broken into atomic nitrogen and combines with hydrogen to form ammonia. This is also known as Haber's Process.
- Bacterial fixation- Symbiotic and free-living bacterias can combine atmospheric or dissolved nitrogen to form ammonia. Rhizobium in roots of the leguminous plant is a symbiotic bacterium and nostac, acetobacter is an example of free-living bacteria.

Note: Symbiotic relationships are those relationships where both the organisms are benefitted from each other. The classic example of symbiotic relationship can be seen as Lichen which shows mutualism between algae and fungi.

Nitrification

The process in which ammonia is converted into nitrates and nitrites by Nitrosomonas and Nitrococcus bacteria respectively. Nitrobacter can convert nitrate into nitrites.

Assimilation

Nitrogen fixed by plants is converted into organic molecules such as DNA, RNA etc. which forms plant and animal tissues.

Ammonification

- Nitrogenous waste products such as urea and uric acid produced by living organisms,

waste products and dead remains of organisms are converted back into inorganic ammonia by the bacteria.

- Ammonifying bacterias like Clostridium, Pseudomonas, Streptomyces etc. help in this process.

Denitrification

- The conversion of nitrates back into gaseous nitrogen is called denitrification. This process is the reverse of nitrogen fixation.
- This can even lower the fertility of soil because nitrogen, which is essential for the growth of plants, is removed from the soil and is lost to the atmosphere.

Phosphorous cycle

The transport and chemical transformation of phosphorus through the lithosphere, hydrosphere and biosphere are called phosphorus cycle.

The atmosphere does not play a significant role in the movement of phosphorus because phosphorus or phosphorus-based compounds are solids available in normal ranges of temperature and pressure of the earth. Most of the phosphorus remains within rocks, sediments, sand and the ocean floor with a fraction in living biomass. Phosphorus moves along trophic levels in an ecosystem by plant growth, herbivores and carnivores.

Sulphur cycle

Sulphur is used in the process of proteins and vitamins production. Proteins consist of amino acids that contain sulphur atoms like thiophene. When sulphur is dissolved in water, plants absorb them. Animal consume these plants so that they take up enough sulphur to maintain their health.

- Most of the earth's sulphur tied up in the rocks and salts or buried deep in the ocean in oceanic sediments.
- Sulphur can also be found in the atmosphere. It enters the atmosphere by both natural and human sources.
- Natural sources can be volcanic eruptions, bacterial processes and evaporation from water or decaying organisms.
- Human activities mainly from industrial purposes where sulphur dioxide and hydrogen sulphide gases are emitted on a wide scale.
- When sulphur dioxide enters the atmosphere it reacts with oxygen to produce sulphur trioxide or with other chemicals to make sulphur salts. Sulphur dioxide also reacts with water to produce sulphuric acid. All these particles react with rain and fall back onto Earth as acid deposition.
- The particles then are absorbed by plants again and are released back into the atmosphere and then sulphur cycle will start over again.

The entire Earth biosphere is a closed system so that nutrients are neither imported nor exported from the biosphere. The biogeochemical cycle also referred to as the cycle of nature because they link together all organisms and abiotic component.

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INDIAN POLITY

Historical Evolution of Indian Constitution

The Company Administration

Regulating Act - 1773

(1) The post of 'GOVERNOR' was now made 'GOVERNOR-GENERAL' and Bengal was the first province to have Warren Hastings as the first Governor-General. He was assisted by an executive council of four members.
(2) The Supreme Court at Calcutta was established with one chief justice and three other judges. Sir Elijah Impey was the Chief Justice.

Pitt's India Act – 1784

(1) Created another body- 'BOARD OF CONTROL' to manage political affairs in India. COURT OF DIRECTORS kept on managing commercial affairs though.
(2) Thus, companies' possessions were for the first time called 'British possessions in India' and the commercial wing was headed by the court of directors and political wing headed by the board of control.
(3) The Act was introduced by the then British Prime Minister William Pitt.

Charter Act – 1813:

(1) Ended the monopoly of the trading rights of British East India Company and allowed other companies to participate in trading activities with India.

Charter Act – 1833

(1) Created the post of 'GOVERNOR GENERAL OF INDIA' in place of Governor-General of Bengal. The presidencies of Madras and Bombay were taken away with their respective legislative powers and were made subordinate to the Presidency of Calcutta. William Bentick was the first Governor-General of India.
(2) This act completely ended the commercial activities of the company. The company existed but it became a purely administrative and a political organization.

Charter Act – 1853

(1) Established a separate Governor General's Legislative council.
(2) Introduced and open system of competition for Indians into Civil Services. Macaulay committee was formed (1854) for this purpose. Satyendra Nath Tagore became the first Indian to qualify that service in 1863.

The Crown Administration

Government of India Act of 1858

(1) Also known as Act for Good Government of India.
(2) Abolished the British East India Company. Abolished the Mughal administration as well.
(3) Abolished the Governor General's post and created a new post Viceroy. Lord Canning became the first Viceroy of India.
(4) Also created a new office – Secretary-of-State for India and a 15-member council to assist him. He was a member of British parliament.

Indian Councils Act 1861

(1) Expanded the viceroy's executive council. Made provisions for him to nominate some Indians as non-official members. Lord Canning nominated the Raja of Benaras, the Maharaja of Patiala and Sir Dinkar Rao.
(2) New Legislative councils for Bengal (1862), North Western Frontier Province (1866) and Punjab (1897) were established.

Indian Councils Act 1892

(1) Power of discussing the budget was given to the legislative council in the then India.
(2) Expanded the councils and some members could be nominated to both Central as well as Provincial Legislative Councils.

Indian Councils Act 1909

(1) Also known as Morley-Minto reforms.
(2) The number of members in the Central Legislative council was increased from 16 to 60.
(3) Satyendra Prasad Sinha became the first Indian to be nominated as a law member to the Viceroy's Executive Council.
(4) The communal electorate was introduced. Muslims were given separate representation to elect their representatives. Hence, Minto is also referred to as 'Father of Communal Electorate'.

Government of India Act 1919

(1) Also called as Montague-Chelmsford reforms and it came into effect in 1921.
(2) Central and provincial subjects or lists were introduced where they could frame laws in their respective lists. Provincial subjects were further divided into transferred and reserved. Thus, this act introduced *diarchy*.
(3) Introduced Bicameralism and direct elections.

Government of India Act 1935
(1) Provided for the establishment of an All-India Federation with provinces and princely states as units. The Federation never came into being as princely states did not join it.
(2) Abolished diarchy in the provinces and introduced 'provincial autonomy' in its place. But in centre, it introduced diarchy; however that never came into being.
(3) Introduced bicameralism in provinces as well extended separate electorates to depressed classes as well.
(4) Established RBI and a federal court at the centre.

Indian Independence Act 1947
(1) Partition Plan or the Mountbatten Plan (3rd June 1947) was to give effect to partition of the country and Atlee's declaration (20th February 1947) to provide independence to the Nation.
(2) Created two independent dominions of India and Pakistan, ended British rule and authorised the two independent Nations' constituent assemblies to frame their respective constitutions.
(3) The Indian independence bill got the royal assent on 18th July 1947.

Making of the Indian Constitution

1. It was **M.N Roy** who proposed the idea of an independent constituent assembly for India in 1934.
2. The constituent assembly was formed as per the guidelines suggested by the Cabinet Mission Plan, 1946. The mission was headed by Pethick Lawrence and included two other members apart from him – Stafford Cripps and A.V Alexander.
3. The total strength of the assembly was 389. However, after partition only 299 remained. It was partly elected and partly nominated.
4. The elections to form the assembly took place in July-August 1946 and the process was completed by November 1946. The first meeting of the assembly took place on 9th December 1946 and was attended by 211 members.
5. Dr. Sachhidanand Sinha became the temporary President of the assembly following the French practice.
6. On 11th December 1946, Dr. Rajendra Prasad and H.C Mukherji were elected as President and Vice-President respectively.
7. Sir B.N Rau was appointed as the constitutional advisor to the assembly.
8. On 13th December 1946, Pt. Nehru moved the Objectives resolution which later went on to become the Preamble of the constitution in slightly modified form. The resolution was unanimously adopted on 22nd January 1947.
9. The Constituent Assembly ratified India's membership of the commonwealth in May 1949. Also, it adopted the National Song and National Anthem on 24th January 1950. Adopted the National Flag on 22nd July 1947.
10. The assembly met for 11 sessions, took 2 years, 11 months and 18 days to frame up the final draft, sat for 141 days in total and the draft constitution was considered for 114 days. Total amount incurred was around rupees 64 lakhs.
11. Some **important committees of the constituent assembly** along with their respective chairpersons are as follows:

- **Union Powers Committee - Jawahar Lal Nehru**
- **Union Constitution Committee - Jawahar Lal Nehru**
- **Provincial Constitution Committee - Sardar Patel**
- **Drafting Committee - B.R Ambedkar**
- **Rules of Procedure Committee - Dr. Rajendra Prasad**
- **Steering Committee - Dr. Rajendra Prasad**
- **Flag Committee - J.B. Kripalani**

12. The following were the members of the Drafting Committee-

- **Dr. B.R Ambedkar (Chairman)**
- **Alladi Krishnaswamy Ayyar**

- **Dr. K.M Munshi**
- **N. Gopalaswamy Ayyangar**
- **Syed Mohammad Saadullah**
  N Madhava Rau
- **TT Krishnamachari**

13. The final draft of the constitution was adopted on 26th November 1949 and it contained 8 schedules, 22 parts, and 395 articles.

VARIOUS SOURCES OF THE INDIAN CONSTITUTION

1. **Government of India Act of 1935-** Federal Scheme, Office of the governor, Judiciary, Public Service Commissions, Emergency provisions and administrative details.
2. **British Constitution-** Parliamentary government, Rule of Law, legislative procedure, single citizenship, cabinet system, prerogative writs, parliamentary privileges, and bicameralism.
3. **US Constitution-** Fundamental rights, independence of the judiciary, judicial review, impeachment of the president, removal of Supreme Court and high court judges and post of vice-president.
4. **Irish Constitution -** Directive Principles of State Policy, the nomination of members to Rajya Sabha and method of election of the president.
5. **Canadian Constitution -** Federation with a strong Centre, vesting of residuary powers in the Centre, the appointment of state governors by the Centre, and advisory jurisdiction of the Supreme Court.
6. **Australian Constitution -** Concurrent List, freedom of trade, commerce and intercourse, and the joint sitting of the two Houses of Parliament.
7. **Weimar Constitution of Germany -** Suspension of Fundamental Rights during Emergency.
8. **Soviet Constitution (USSR, now Russia) -** Fundamental duties and the idea of justice (social, economic and political) in the Preamble.
9. **French Constitution -** Republic and the ideals of liberty, equality, and fraternity in the Preamble.
10. **South African Constitution -** Procedure for amendment of the Constitution and election of members of Rajya Sabha.
11. **Japanese Constitution -** Procedure established by Law.

THE PREAMBLE

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 26th day of November 1949, do HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.

1. The term ‘preamble’ refers to the introduction or preface to the Constitution. It’s a kind of summary or essence of the Constitution.
2. The American Constitution was the first, to begin with, a preamble.
3. N.A Palkiwala has termed preamble as ‘the identity card of the constitution’.
4. The Preamble is somewhat based on the ‘Objectives Resolution’ moved by Nehru in the Constituent Assembly.
5. The Preamble has been amended only once so far, that is by 42nd Amendment Act of 1976. Three words were added by that amendment – SOCIALIST, SECULAR, INTEGRITY.
6. The Preamble reveals four ingredients or components:
7. Source of the authority of the Constitution: The Preamble states that the Constitution derives its authority from the people of India.
8. Nature of Indian State: It declares India as a sovereign, socialist, secular democratic and republican polity.
9. Objectives of the Constitution: To provide justice, liberty, equality and fraternity to the citizens of India.
10. Date of adoption of the Constitution: 26th November 1949.
11. In *Berubari Union* case (1960) - the Supreme Court said that the Preamble isn’t a part of the Constitution.

12. In *Kesavananda Bharati* case (1973) - the Supreme Court rejected the earlier opinion and held that Preamble *is* a part of the Constitution.
13. The Preamble is neither a source of power to legislature nor a prohibition upon the powers of the legislature. Provisions in the preamble are non-enforceable in the court of law, that is, it's non-justiciable.

THE UNION & ITS TERRITORY

1. **Article 1** declares India, that is, Bharat as a 'Union of States'.
2. **Article 2** empowers the Parliament to 'admit into the Union of India, or establish, new states on such terms and conditions as it thinks fit'. Thus, Article 2 grants two powers to the Parliament: (a) the power to admit into the Union of India new states; and (b) the power to establish new states.
3. **Article 3** relates to the formation of or changes in the existing states of the Union of India. In other words, Article 3 deals with the internal re-adjustment *inter* se of the territories of the constituent states of the Union of India.

CITIZENSHIP

1. The Constitution confers the following rights and privileges on the citizens of India (and denies the same to aliens):
● Rights conferred under Articles 15, 16, 19, 29 & 30.
● Right to vote in elections to the Lok Sabha and state legislative assembly.
● Right to contest for the membership of the Parliament and the state legislature.
● Eligibility to hold certain public offices, that is, President of India, Vice-President of India, judges of the Supreme Court and the high courts, governor of states, attorney general of India and advocate general of states.
3. No person shall be a citizen of India or be deemed to be a citizen of India if he has voluntarily acquired the citizenship of any foreign state **(Article 9)**.
4. Every person who is or is deemed to be a citizen of India shall continue to be such citizen, subject to the provisions of any law made by Parliament **(Article 10)**.
5. Parliament shall have the power to make any provision with respect to the acquisition and termination of citizenship and all other matters relating to citizenship **(Article 11)**.
6. The five modes of acquisition of citizenship as per the citizenship act are (a) By Birth (b) By Descent (c) By Registration (d) By Naturalization (e) By acquisition of any other territory into the Indian Union.

- The Government of India provides citizenship to the people residing in the area that is acquired by a notification. Person occupying such area do not automatically become citizen of Indian on an acquisition of territory.

7. Loss of Citizenship is by – Termination, Renunciation and Deprivation.
8. India provides for single citizenship.
9. PIO- A person registered as PIO card holder under the Ministry of Home Affairs' scheme dated 19-08-2002.
10. OCI- A person registered as Overseas Citizen of India (OCI) under the Citizenship Act, 1955. The OCI scheme is operational from 02-12-2005.

Fundamental Rights

● Fundamental Rights have been described as the Magna Carta of India.
● The concept has been taken from the US' bill of rights. Earliest known evidence of rights was also present in ancient India, Iran etc.
● Following are the articles related to the fundamental rights-

- ✓ **Article 12- Definition of the State**
- ✓ **Article 13- Laws inconsistent with part-3 or Fundamental Rights**

Right to Equality (Article 14- Article 18)

- ✓ **Article 14**-Equality before the law
- ✓ **Article 15**-Prohibition of discrimination on the grounds of religion, race, caste, sex. Or place of birth
- ✓ **Article 16**- Equality of opportunity in matters of public employment.
- ✓ **Article 17-** Abolition of the untouchability
- ✓ **Article 18-** Abolition of titles

Right to Freedom (Article 19- Article 22)

- ✓ **Article 19-** Guarantees to all the citizens of India
  - Right to freedom of speech and expression
  - Right to assemble peacefully and without arms
  - Right to form associations or unions
  - Right to move freely throughout the territory of India
  - Right to reside and settle in any part of the territory of India
  - Right to practice any profession or to carry on any occupation, trade, and business
- ✓ **Article 20-** Protection in respect of conviction for offences
- ✓ **Article 21-** Protection of life & personal liberty
- ✓ **Article 21A-** Right to Education
- ✓ **Article 22-** Protection against arrest and detention in certain cases

Right Against Exploitation (Article 23-Article 24)

- ✓ **Article 23-** Prohibition of traffic in human beings and forced labour
- ✓ **Article 24-** Prohibition of employment of children in factories and mines for under the age of 14

Right to Freedom of Religion (Article 25-Article 28)

- ✓ **Article 25-** Freedom of conscience and free profession, practice and propagation of religion
- ✓ **Article 26-** Freedom to manage religious affairs
- ✓ **Article 27-** Freedom as to pay taxes for promotion of any particular religion
- ✓ **Article 28-** Freedom from attending religious instruction

Cultural & Educational Rights (Article 29-Article 30)

- ✓ **Article 29-** Protection of interest of minorities
- ✓ **Article 30-** The right of minorities to establish and administer educational institutions

Right to Constitutional Remedies (Article 32)

- ✓ **Article 32-** Right to move the Supreme Court for the enforcement of fundamental rights including the writs of **(i) *habeas corpus,* (ii) *mandamus,* (iii) prohibition, (iv) *certiorari,* and (v) *quo warranto***.

- ❖ **Habeas Corpus:** It means "to have the body of". This writ is used to enforce the fundamental right of individual liberty against unlawful detention against both private and public authorities.

- ❖ **Mandamus:** It means "We command". This writ is used by the court to order the public official who has failed to perform his duty or refused to do his duty, to resume his work. This writ is not available against the private individuals.

- ❖ **Prohibition:** It means "We Forbid". A court that is higher in position issues a Prohibition writ against a court that is lower in position to prevent the latter from exceeding its jurisdiction. This writ is available only against judicial and quasi-judicial bodies.

- ❖ **Certiorari:** It means "To be Certified". This writ is issued by a court higher in authority to a lower court or tribunal ordering them either to transfer a case pending with them to itself or squash their order in a case. It is used as both cure and prevention.

- ❖ **Quo Warranto:** It means "By what Authority". Supreme Court or High Court issue this writ to prevent illegal usurpation of a public office by a person.

● Article 33 deals with the power of Parliament to modify the fundamental rights.
● Article 34 deals with Martial Law
● Article 35 deals with legislation required to deal with fundamental rights
● Fundamental Rights which are available **only to citizens - 15, 16, 19, 29 and 30.**

● Fundamental Rights those are available to both citizens as well as non-citizens – 14, 20, 21, 21A, 22, 23, 24, 25, 26, 27 and 28.

Directive Principles of the State Policy

Some Important Articles in DPSPs are:

a. To promote the welfare of the people by securing a social order permeated by justice— social, economic and political—and to minimise inequalities in income, status, facilities and opportunities (Article 38).

b. To secure (a) the right to adequate means of livelihood for all citizens; (b) the equitable distribution of material resources of the community for the common good; (c) prevention of concentration of wealth and means of production; (d) equal pay for equal work for men and women; (e) preservation of the health and strength of workers and children against forcible abuse; and (f) opportunities for healthy development of children (Article 39).

c. To promote equal justice and to provide free legal aid to the poor (Article 39 A). This was added by 42nd constitutional amendment act, 1976.

d. To secure the right to work, to education and to public assistance in cases of unemployment, old age, sickness and disablement (Article 41).

e. To make provision for just and humane conditions for work and maternity relief (Article 42).

f. To take steps to secure the participation of workers in the management of industries (Article 43 A). Also added by 42nd constitutional amendment act, 1976.

g. To organise village panchayats and endow them with necessary powers and authority to enable them to function as units of self-government (Article 40).

h. To promote cottage industries on an individual or co-operation basis in rural areas (Article 43).

i. To prohibit the consumption of intoxicating drinks and drugs which are injurious to health (Article 47).

j. To prohibit the slaughter of cows, calves and other milch and draught cattle and to improve their breeds (Article 48).

k. To secure for all citizens a uniform civil code throughout the country (Article 44).

l. To provide early childhood care and education for all children until they complete the age of six years (Article 45). Also, amended by the 86th constitutional amendment act, 2002.

m. To separate the judiciary from the executive in the public services of the State (Article 50).

n. To promote international peace and security and maintain just and honourable relations between nations; to foster respect for international law and treaty obligations, and to encourage settlement of international disputes by arbitration (Article 51).

Fundamental Duties

Following is the list of FDs:

(a) To abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;
(b) To cherish and follow the noble ideals that inspired the national struggle for freedom;
(c) To uphold and protect the sovereignty, unity and integrity of India;
(d) To defend the country and render national service when called upon to do so;
(e) To promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities and to renounce practices derogatory to the dignity of women;
(f) To value and preserve the rich heritage of the country's composite culture;
(g) To protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures;
(h) To develop scientific temper, humanism and the spirit of inquiry and reform;
(i) To safeguard public property and to abjure violence;

(j) 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; and
(k) To provide opportunities for education to his child or ward between the age of six and fourteen years. **This duty was added by the 86th Constitutional Amendment Act, 2002.**

President of India

(1) Article 52 – There shall be a President of India
(2) Article 53 – the Executive power of the Union: The executive power shall be vested in the President and shall be exercised by him either directly or through officers' subordinate to him.
(3) He is the supreme commander of the defence forces in India.
(4) Though he's only the constitutional head, or titular head, de *jure head* or nominal executive or just a symbolic head.

Important Articles related to the President:

Articles	**Provisions**
Article 52	The President of India
Article 53	Executive power of the Union
Article 54	Election of the President
Article 55	Manner of Election of President
Article 56	Term of office
Article 57	Eligibility for re-election
Article 58	Qualifications of President's office
Article 59	Conditions of President's office
Article 60	Oath and Affirmation by President
Article 61	Procedure for impeachment

Election of the President
1. The President shall be elected by the members of an ELECTORAL COLLEGE consisting of:
(a) The Elected MPs
(b) The Elected MLAs of the states
(c) The Elected MLAs of National Capital Territory of Delhi (added by 70th Amendment Act, 1992 and with effect from 1-06-1995) and Union territory of Puducherry.

2. Thus**, nominated members of parliament and legislative assemblies and members of legislative councils do not participate in the presidential election.**
3. The election is held in accordance with the system of proportional representation by means of single transferable vote and voting is done by secret ballot.
4. All doubts and disputes arising out of the Presidential elections are decided into and enquired by the Supreme Court whose decision is final.
5. The elections are monitored and conducted by the Election Commission of India.

Impeachment of the President (Article 61)

1. He is impeached for the 'Violation of the Constitution'. However, **the term is NOT defined in the constitution**.
2. The charges can be preferred by either house of the parliament. However, a 14-days' notice shall be served to the President before the acceptance of such a resolution.
3. Also, that notice must be signed by at least one-fourth members of the total members of that house which initiated the charges.
4. After the acceptance of that bill in that house, that impeachment bill must be passed by the majority of 2/3rd of the total membership of that house.
5. Then that bill goes in another house which should investigate the charges and the President shall have the right to appear and to be represented at such an investigation.
6. If another house sustains the charges and finds the President of violation, and passes that resolution by 2/3rd of the total membership of that house, the President stands removed from the date the resolution is so passed.
7. Hence, impeachment is a quasi-judicial process. And though, the **nominated members of Parliament do not participate in his election, they take part in the impeachment** process. Also, states' legislatures do not have a role in the impeachment process.

Important Powers of the President:

Veto Powers

The President of India has three types of Veto powers, namely

1. **Absolute Veto**- Withholding the assent to the bill. The bill then ends and does not become an Act. Example- in 1954, Dr. Rajendra Prasad withheld his assent to the PEPSU Appropriation Bill. Also, in 1991 R. Venkataram withheld his assent to the MPs Salaries, allowances bill.
2. **Suspensive Veto**- Returning the bill for reconsideration. In 2006, President APJ Abdul Kalam used the suspensive veto in the office of profit bill. However, the President can return the bill for reconsideration to the legislature only once, after which he has to give his consent.
3. **Pocket Veto**- Taking no action on the bill sent to the President. There's no time limit provided in the constitution within which the President has to give his assent or sign the bill. Hence, he has a 'bigger pocket' than the American President. In 1986, President Zail Singh applied Pocket Veto to Indian Post Office Amendment bill.

Judicial Powers:

President has the power to grant Pardon, Reprieve, Respite, Remit, Commute the sentence of a convicted person.

- **Pardon:** It absolves the offender from all sentences and punishment.
- **Reprieve:** It means a temporary suspension of the execution of the sentence.
- **Remission:** It reduces the amount of sentence without changing its character.
- **Respite:** It leads to awarding of a lesser sentence in some special cases. E.g. in case of a pregnant woman
- **Commutation:** It substitutes one form of punishment for another of a lighter character.

Note:

- ✓ The judicial power of the President extends to cases where the sentence has been awarded by court martial and in the cases where punishment is a death sentence. The judicial power of Governor does not extend to both these cases.

Legislative Powers:

The legislative powers of the President are as follows:

1. The President summons the houses of the Parliament at least twice a year at the place of his choice.
2. He nominates 12 members to the Rajya Sabha.
3. Some bills such as follows need President's recommendation for their introduction into the Parliament:
   - A bill for formation of new states or alteration of boundary of existing states.
   - A money Bill
   - A Finance Bill
   - A bill involving taxation or distribution of financial resources to states.
   - A state bill that seeks to restrict freedom of trade.

Vice-President of India

Important Articles related to Vice-President:

Article	Provisions
Article 63	The Vice-President of India
Article 66	Election of Vice-President
Article 67	Term of office
Article 69	Oath and Affirmation by the Vice-President

● The Vice-President shall be ex-officio Chairman of the Council of States and shall not hold any other office of profit.
● The first Chairperson of the Rajya Sabha - Dr. Sarvepalli Radhakrishnan
● Provided that during any period when the Vice-President acts as President or discharges the functions of the President under article 65, he shall not perform the duties of the office of Chairman of the Council of States and shall not be entitled to any

salary or allowance payable to the Chairman of the Council of States under article 97.
● This is the second most important function of the V.P. He can act as the President in case of the death, impeachment, resignation or otherwise of the President of India. However, he can act as the president only for a maximum period of six months (question asked) within which a new president has to be elected.
● The V.P gets the salary, allowance etc. of the President when he acts as the president, not as the chairperson of the Rajya Sabha.
● The **salary, emoluments etc. of the chairperson of the Rajya Sabha is mentioned in the second schedule** of the Constitution of India.

Article 66: Election of Vice-President

● The Vice-President of India is elected by an electoral college consisting of: **Elected and nominated members of both house (Lok Sabha and Rajya Sabha)** of parliament. (MLAs are not included)
● Vice-President of India is elected by proportional representation system by means of the single transferable vote.
● Voting in Vice-President election is done by secret ballot.
● A candidate to be elected to the office of Vice-President, He/she must secure a fixed quota of Votes.
● All disputes related to the election of Vice-President are inquired into and decided by the supreme court whose decision is final.

Eligibility Criteria for Vice-President
● He/she should be the citizen of India
● He/she has completed the age of 35 years.
● He/she should be qualified for the member of Rajya Sabha
● Does not hold any office of profit under union, state or local authority.
● However, for this purpose, the President, Vice-President, Governor of a State and a Minister of the Union or a State, are not held to be holding an office of profit. (An office of profit is an office that would give its occupant the opportunity to gain a financial advantage or benefit).

Removal of Vice-President

- Vice-President can be removed by a resolution of Rajya Sabha passed by a majority of all the then members of Rajya Sabha and agreed to by Lok Sabha.
- A 14 days day notice needs to be given to the Vice-President.
- Procedure of removal of Vice-President cannot be initiated in Lok Sabha.

Parliament of India
Organization of the Parliament
1. The Parliament consists of the President, the Lok Sabha and the Rajya Sabha.
2. Lok Sabha is the Lower House (First Chamber or Popular House) and Rajya Sabha is the Upper House (Second Chamber or House of Elders).

Composition of Rajya Sabha
1.Under Article 80, The maximum strength of the Rajya Sabha is fixed at 250, out of which, 238 are to be the representatives of the states and union territories (elected indirectly) and 12 are nominated by the president.
2. At present, the Rajya Sabha has 245 members. Of these, 229 members represent the states, 4 members represent the union territories, and 12 members are nominated by the president.
3. The Fourth Schedule of the Constitution deals with the allocation of seats in the Rajya Sabha to the states and union territories.
4. The representatives of states in the Rajya Sabha are elected by the elected members of state legislative assemblies. The seats are allotted to the states in the Rajya Sabha are based on their population.

Composition of Lok Sabha
1. The maximum strength of the Lok Sabha is fixed at 552. Out of this, 530 members are to be the representatives of the states, 20 members are to be the representatives of the union territories and 2 members may be nominated by the president from the Anglo-Indian community.
2. At present, the Lok Sabha has 545 members.
3. The representatives of states in the Lok Sabha are directly elected by the people from their respective constituencies.
4. The voting age was reduced from 21 to 18 years by the 61st Constitutional Amendment Act, 1988.

Qualification, disqualifications to be an MP

1. Eligibility

(a) Citizen of India.
(b) Minimum age – 30 years in Rajya Sabha and 25 years in Lok Sabha.
(c) He must possess other qualifications prescribed by Parliament. (Hence, the Representation of People Act, 1951).

2. Criteria for disqualifying an MP:

Only the following criteria are mentioned in the constitution for disqualification of an MP.
(a) If he holds any office of profit under the Union or state government
(b) If he is of unsound mind and stands so declared by a court.
(c) If he is an undischarged insolvent.
(d) if he is not a citizen of India or has voluntarily acquired the citizenship of a foreign state or is under any acknowledgement of allegiance to a foreign state; and
(e) If he is so disqualified under any law made by Parliament (RPA, 1951).

3. The Constitution also lays down that a person shall be disqualified from being a member of Parliament if he is so disqualified on the ground of defection under the provisions of the Tenth Schedule.
Note: Under the tenth schedule a MP may be disqualified if:

- He voluntarily gives up the membership of his political party,
- If he abstains from voting in the house contrary to any direction given by his party (unless party condones his actions in 15 days)
- An independent member is disqualified if he joins any political party after his election.

4. Double Membership - A person cannot be a member of both Houses of Parliament at the same time.

5. A House can declare the seat of a member vacant if he is absent from all its meetings for a period of sixty days without its permission.

Speaker of the Lok Sabha

1. The Speaker is elected by the Lok Sabha from amongst its members (as soon as may be, after its first sitting). The date of election of the Speaker is fixed by the President.
2. The Speaker offers his resignation to the Deputy Speaker and he can be removed by a resolution passed by a majority of members of Lok Sabha, however, only after giving him a 14-day notice.
3. He presides over a joint sitting of the two Houses of Parliament. Such a sitting is summoned by the President to settle a deadlock between the two Houses on a bill.
4. He **decides whether a bill is a money bill or not** and his decision on this question is final.
5. Under the Anti-defection law, the authority of the speaker is final on disqualification of a member (subject to judicial review).
6. He can't vote in the first instance, though can vote in the event of a tie. When his removal motion is under consideration, he can take part and speak in the proceedings and can vote as well but not in the case of a tie.

Deputy Speaker

1. The deputy speaker is elected by the members of Lok Sabha from amongst themselves by simple majority of the members present and voting.
2. The speaker and the deputy speaker give their resignation to each other.
3. Deputy Speaker can be removed by a resolution passed by a majority of all the then members of the house after serving a 14-day notice to him.

Speaker Pro-tem

1. As soon as a new Lok Sabha is elected, the President appoints a Speaker Pro-tem who is usually the senior most member of the house.
2. His functions include administering the oath to new speaker and preside over the election of the speaker.

Attorney-General for India

1. Attorney-General is not a member of Parliament or the Council of Ministers, but he has a right to take part in the proceedings of either house, but he cannot vote.

2. A person qualified to be a judge of the Supreme Court is appointed the Attorney-General by the President.
3. He holds the office during the pleasure of the President.

Deputy Chairman of Rajya Sabha

1. He is elected by the Rajya Sabha from amongst its members and he remains in the office until the expiry of his term as a member.
2. In the absence of Chairman, Deputy Chairman presides over the functions and proceedings of Rajya Sabha.

Sessions of Parliament

- The Budget Session (February to May
- The Monsoon Session (July to September); and
- The Winter Session (November to December).

The maximum gap between two sessions of Parliament cannot be more than six months
The President summons and prorogues the two houses of parliament.

Important terms related to Sessions of the Parliament:

1. **Prorogation:** A session of the house if terminated by an order called the "Prorogation order" made by the President.
2. **Adjournment sin die:** It means termination of the sitting of the house without specifying or fixing any date for its next sitting. Such order is made by the Presiding order of the house.
3. **Hung Parliament:** When no single party has majority to form the government.
4. **Quorum:** Minimum number of members required to carry out business of the house. There should be **at least one-tenth members present** to conduct the business of the house.
5. **Starred and Unstarred Question:** A starred question is one to which a member desires an oral answer, and an Un-starred question is one to which written answer is desired by the asking member.
6. **Guillotine:** When due to lack of time, demands for grant are put to vote whether they are discussed or not in the house on the last day, it is called Guillotine.

Important points regarding bills:

1. Money and Finance bills can not be introduced in the Rajya Sabha.
2. Money, Finance and an Ordinary Bill under Article 3 can only be introduced only on the recommendation of the President.
3. Constitutional Amendment Bill can be introduced in either house.
4. The President cannot send back a Money Bill for reconsideration of the of Parliament, he shall give his assent to the Money Bill. A Money bill is defined under the Article 110.
5. There is no provision for the joint sitting of two houses for Money Bills and Constitutional Amendment Bill.(So far, Joint Session of the Parliament of India has been called for only three bills that have been passed at joint sessions: the Dowry Prohibition Act, 1961, the Banking Service Commission Repeal Bill, 1978, and the Prevention of Terrorism Act, 2002.)

Types of Amendment Procedures:

1. **By simple majority:**
   Simple Majority means the majority of the members present and voting. i.e. more than 50%. The following Articles are amended under this method:
   - Admission of new states
   - Changes in the names and boundaries of the states.
   - Creation or abolition of legislative councils in the states by the Parliament.
   - Salaries, allowances of President, Governors and Judges of SC and HC.
   - Quorum for Houses
   - Power, Privileges of MPs.
   - Delimitation of Constituencies.

2. **By Special Majority:**
   Under this a bill is passed by each house of the parliament by a majority of the total membership of that house and by a majority

of not less than 2/3rd of the members in the house present and voting. All the Articles of the constitution can be amended by this method except the specific provisions which are mentioned in the Article 368 of the constitution.

3. **By Special majority with ratification by the states:**
   Some federal matters are amended by this method, under this, the bill is required to be passed by the parliament under special majority and needs to be ratified by more than 50% of the states. There is no time limit within which the states must ratify such bills. Following provisions fall under this category:
   - Election and manner of election of the President
   - Extent of executive power of the union (Art.73) and states (Art. 162)
   - Union Judiciary
   - High Courts
   - Legislative relations between the centre and the states
   - 7th schedule
   - Provisions dealing with amendment of the constitution (Art. 368)

Important Parliamentary Finance Committees:

1. **Committee on Public Accounts:**
- The committee on Public Accounts consists of 15 members from Lok Sabha and 7 Members from Rajya Sabha.
- The term of office of the members is not more than 1 year.
- The committee examines: Account showing the appropriation of sums granted by parliament, Annual Financial Accounts of GoI, Reports of CAG.

2. **Committee on Estimates:**
- The Estimates Committee consists of 30 members- all from Lok Sabha- who are elected by the Lok Sabha every year from amongst its members according the principle of proportional representation by means of single transferrable vote.
- Functions: to examine whether the money is well laid out within the limits of the policy implied in the estimates, to suggest the form in which estimates shall be presented to Parliament.

3. **Committee on Public Undertakings**
- The committee consists of 15 members elected from Lok Sabha and 7 Members from Rajya Sabha.
- Functions: to examine the Reports and Accounts of the public undertakings, Reports of CAG, may also examine such matters which may be referred to it by the house or by the speaker.

Provisions under which the Parliament can make laws on state subjects:

1. **Article 249:** If Rajya Sabha passes a resolution with not less than 2/3rd majority, on the ground that it is in national interest, it can allow the parliament to legislate on the state subjects. Such law can be in force of 1 year but can be extended any number of times. It ceases to have effect 6 months after the resolution ceases to be in force.
2. **Article 250:** If a national emergency is declared under Article 352, the parliament has the right to make laws with respect to all the 61 subjects in the state list automatically.
3. **Article 252:** If legislatures of 2 or more states request the parliament to make a law on the state subject, the parliament can do so. However, such law can be amended or repealed only by the parliament. E.g. Wildlife (Protection) Act, 1972.
4. **Article 253:** The Parliament can make laws on the state subjects to comply with any international agreements to which India is a party.
5. **Article 356:** If President's rule is imposed in a state the power of the legislature of the state is exercised by the Parliament.

Emergency Provisions in the Constitution:

There are 3 kinds of emergency mentioned in the constitution:

1. **National Emergency-** Emergency caused by threat to the security of India by war or external aggression or armed rebellion (Article 352).
    - Armed rebellion word replaced the word "internal disturbance" in the 44th Amendment Act, 1978.
    - So far National Emergency has been declared 3 times in india.
    - **Duration: Initially 1 month**, during which it has to be approved by the parliament by a special majority. If parliament approves the proclamation, then it stays in force for 6 months, it can be approved any number of times but **not more than 6 months at a time**.
    - **Revocation:** The proclamation can be revoked by the President at any time, it does not require approval of the Parliament. Also, If not less than **1/10th members** of Lok Sabha issue a notice disapproving the emergency, to the president when Lok Sabha is not in the session, then a special sitting of Lok Sabha has to be held in **the next 14 days to consider such resolution.**
    - **Effects:** The administration is converted to unitary. Parliament can enact laws on subjects in state list.
    - **Effect on Fundamental Rights:**
        - Article 358 states that when emergency is declared on the grounds of war or external aggression (not on the ground of armed rebellion) the six FRs under Article 19 are automatically suspended.
        - The President, under Article 359, may by order, suspend the operation of any of the other FRs when an emergency is declared on the grounds of War or external aggression.
        - However, the FRs under Article 20 (Protection in respect to conviction for offences) and Article 21 (Right to life) cannot be suspended even during a national emergency.

2. **President's Rule:** Emergency caused by failure of constitutional machinery in the state (Article 356)
    - President makes the proclamation with or without the report of the governor.
    - President cannot assume the powers of the High Court
    - **Duration:** Initially for 2 months, after approval of the parliament- 6 months. At a stretch it can be in force maximum for one year. It can be extended beyond on year but in no case beyond 3 year in following cases:
        - An emergency under Article 352 exists,
        - If EC certifies that there is difficulty in holding elections in the concerned state.
    - **Effects:**
        - Council of Ministers headed by CM is dismissed.
        - Assembly is incapable of making laws.
        - There is not effect on the FRs of the people of the state.

3. **Financial Emergency:** Under Article 360, a proclamation is made by the President if he is satisfied that a situation has arisen where financial stability of the India or any of its territory has been threatened.
    - **Duration:** Initially for 2 months, after approval of the parliament it stays in force until it is revoked by the President.
    - **Effects:**
        - Union government may give directions to states regarding financial matters.

- President may ask the states to reduce the salary of all persons in government service.
- All money bills of the states may be asked to be reserved for the consideration of the President.
- President may also direct to reduce salary and allowances of central government employees and judges of SC and HC.

Indian Judiciary

Supreme Court

1. Articles 124 to 147 mentioned in Part V of the Constitution deal with the organisation, independence, jurisdiction, powers, and procedures and so on of the Supreme Court.
2. At present, the strength of the Supreme Court's judges stands at 34 judges (including the chief justice).
3. Originally, the strength of the Supreme Court was fixed at eight (one chief justice and seven other judges).
4. Appointment- The judges of the Supreme Court are appointed by the president. The appointment of the Chief Justice is made by the president after consultation with such judges of the Supreme Court and high courts as he deems necessary. The other judges are appointed by the president after consultation with the chief justice and such other judges of the Supreme Court and the high courts as he deems necessary. The consultation with the chief justice is obligatory in the case of appointment of a judge other than Chief justice.
5. In 2015 the National Judicial Appointments Commission was declared Ultra Vires by the Supreme Court and hence the collegium system still holds the ground mentioned above.
6. **Qualification**- A person to be appointed as a judge of the Supreme Court should have the following qualifications:
(i) He should be a citizen of India.
(ii) (a) He should have been a judge of a High Court (or high courts in succession) for five years, or
(b) He should have been an advocate of a High Court (or High Courts in succession) for ten years; or
c) He should be a distinguished jurist in the opinion of the president.

8. **Oath**- The oath to the judges and CJI is administered by the President or any other person appointed by him for this purpose.
9. **Tenure of Judges** –
A. He holds office until he attains the age of 65 years.
B. He can resign his office by writing to the president.
C. He can be removed from his office by the President on the recommendation of the Parliament.

10. **Removal of Judges-** A judge of the Supreme Court can be removed from his Office by an order of the President. However, he can do so only after an address by Parliament has been presented to him in the same session for such removal. The address must be supported by a ***special majority*** **of each House** of Parliament - a majority of the total membership of that House and a majority of not less than two-thirds of the members of that House present and voting. The grounds of removal are —proved misbehaviour or incapacity.
11. The jurisdiction and powers of the Supreme Court can be classified into- Original Jurisdiction, Writ Jurisdiction, Appellate Jurisdiction, Advisory Jurisdiction, A court of Record and so on.
12. The Constitution has constituted the Supreme Court as the guarantor and defender of the fundamental rights of the citizens.
13. The Supreme Court is empowered to issue writs including *habeas corpus*, *mandamus*, prohibition, *quo-warranto* and *certiorari* for the enforcement of the fundamental rights of an aggrieved citizen.

High Court

1. At present, there are 24 high courts in the country. Out of them, three are common high courts. Delhi is the only union territory that has a high court of its own (since 1966). The other union territories fall under the jurisdiction of different state high courts.

2. Unlike Supreme court the number of judges in High courts is flexible and is decided by the President based on the amount of work before a high court.

3. **Appointment of Judges** The judges of a high court are appointed by the President. The chief justice of the High Court is appointed by the President after consultation with the chief justice of India and the governor of the state concerned. For appointment of other judges, the chief justice of the concerned high court is also consulted. In case of a common high court for two or more states, the governors of all the states concerned are consulted by the president.

- No appointment can be made without conformity with opinion of CJI.
- Under Article 222, President after consultation with CJI (who consults 4 senior most judges of SC and two chief justices of HCs where the transfer is taking place) can transfer a judge from one HC to other.
- The opinion provided by the CJI is binding on the President.

3. **Qualifications of Judges** A person to be appointed as a judge of a high court should have the following qualifications:
A. He should be a citizen of India.
B. (a) He should have held a judicial office in the territory of India for ten years, or
(b) He should have been an advocate of a high court (or high courts in succession) for ten years.

4. **Oath or Affirmation** Oath to the judge is administered by the governor of the state or some person appointed by him for this purpose.

5. **Tenure of Judges** –
A. He holds office until he attains the age of 62 years.
B. He can resign his office by writing to the president.
C. He can be removed from his office by the President on the recommendation of the Parliament.
D. He vacates his office when he is appointed as a judge of the Supreme Court or when he is transferred to another high court.
E. The salaries and allowances of the High Court judges is charged on the consolidated fund of the state, while pensions are charged on the consolidated fund of India.

Note:

- The writ jurisdiction of HC is wider than SC. Under Article 32 SC can issue writs only when fundamental right is infringed, while HC, Under Article 226 can issue writs for the enforcement of fundamental rights as well as other ordinary legal rights.
- SC is bound to issue to issue writs under Article 32, while High Courts issue writs at their discretion.

The Governor

Important Articles related to Governor

Articles	Provisions
Article 153	Governors for states
Article 155	Appointment of Governor
Article 156	Term of office of Governor
Article 157	Qualifications for Appointment as Governor
Article 158	Conditions of Office
Article 159	Oath by the Governor

The Governor is the De Jure executive head at the state level. His position is analogous to that of the President at the centre.

● The Governor is appointed by the president.
● To be appointed as the Governor of any state or two or more states as a person:
(a) Should be a citizen of India.
(b) And should have attained 35 years of age.
(c) He should not hold any office of profit as well.

● Like the President, the governor is also entitled to several immunities and privileges. During his term of office, he is immune from any criminal proceedings, even in respect of his personal acts.
● **The oath** - is administered by the chief justice of the corresponding state high court and in case he's absent, the senior-most judge of that particular court.
● A governor holds office for a term of five years from the date on which he enters upon his office. He holds office until the pleasure of the President, and he offers his resignation to the President.

● He appoints the advocate general of a state and determines his remuneration. The advocate general holds office during the pleasure of the governor.
● He appoints the state election commissioner. However, the state election commissioner can be removed only in the like manner and on the like grounds as a judge of a high court.
● He appoints the chairman and members of the state public service commission. However, they can be removed only by the president and not by a governor.
● He nominates one-sixth of the members of the state legislative council.
● He can promulgate ordinances when the state legislature is not in session. The ordinances must be approved by the state legislature within six weeks from its reassembly. He can also withdraw an ordinance anytime (Article 213).
● He can grant pardons, reprieves, respites, and remissions of punishment or suspend, remit and commute the sentence of any person convicted of any offense against any law relating to a matter to which the executive power of the state extends (Article 161).

Article 371:
Some governors have to discharge certain special responsibilities under Article 371 to 371J. Such special states and respective articles are listed below:

Article	State
Article 371	Gujarat and Maharashtra
Article 371A	Nagaland
Article 371B	Assam
Article 371C	Manipur
Article 371D and 371E	Andhra Pradesh
Article 371F	Sikkim
Article 371G	Mizoram
Article 371H	Arunanchal Pradesh
Article 371I	Goa
Article 371J	Karnataka

Chief Minister and State Council of Ministers

● Chief Minister is the real executive authority (de facto executive). He is the head of the government.
● The total strength of the number of ministers, including the C.M, in the state's CoM should not exceed 15 percent of the total strength of the legislative assembly of that state. However, the number of ministers, including the C.M, in a state should also not be less than 12. This provision was added by the 91st Amendment Act of 2003.
● A member of either House of state legislature belonging to any political party who is disqualified on the ground of defection shall also be disqualified to be appointed as a minister. The provision was also added by the 91st Amendment Act of 2003.

The State Legislature
Organization of the State Legislature
● Most of the states in India have a Unicameral Legislature. Six States have Bicameral Legislature, that is-Telangana, Andhra Pradesh, Maharashtra, Bihar, U.P. and Karnataka.
● The Legislative Council (Vidhan Parishad) is the upper house (second chamber or house of elders), while the Legislative Assembly (Vidhan Sabha) is the lower house (first chamber or popular house). Delhi and Puducherry are the only two UTs that have a Legislative Assembly.

Composition of the State Legislature
● The legislative assembly consists of representatives directly elected by the people based on universal adult franchise. Its maximum strength is fixed at 500 and minimum strength at 60 depending on the population size of the state. However, in the case of Sikkim it is 32; and Goa and Mizoram it's 40.
● The members of the legislative council are indirectly elected. The maximum strength of the legislative council is fixed at 1/3rd of the total strength of the corresponding assembly and the minimum strength is fixed at 40. But an exception being Jammu and Kashmir having 36 members.
● Manner of Election Of the total number of members of a legislative council:

(a) 1/3 are elected by the members of local bodies in the state such as municipalities etc.,
(b) 1/12 are elected by graduates of three years standing and residing within the state,
(c) 1/12 are elected by teachers of three years standing in the state, not lower in standard than secondary school,
(d) 1/3 are elected by the members of the legislative assembly of the state from amongst persons who are not members of the assembly, and

(e) The remainder are nominated by the governor from amongst the persons who have special knowledge or practical experience of literature, science, art, cooperative movement, and social service.

● Thus, 5/6 of the total number of members of a legislative council is indirectly elected and 1/6 are nominated by the governor. The members are elected in accordance with the system of proportional representation by means of a single transferable vote.

Duration of the two Houses

● Analogous to the Lok Sabha, the legislative assembly is also not a permanent chamber. The term of the assembly is five years from the date of its first meeting after the general elections.

● Analogous to the Rajya Sabha, the legislative council is a continuing chamber, that is, it is a permanent body and is not subject to dissolution. But, one-third of its members retire on the expiration of every second year.

Membership of the State Legislature

The Constitution lays down the following qualifications for a person to be chosen as a member of the State legislature.

(a) Citizen of India.

(b) He must be not less than 30 years of age in the case of the legislative council and not less than 25 years of age in the case of the legislative assembly.

He should not have been found guilty as per the provisions of RPA, 1951. In defection case also a member is liable to be disqualified as per the Anti-Defection Act (10th Schedule).

Also, he should not be of unsound mind, he should not hold any office of profit; he isn't declared an un-discharged insolvent etc.

Presiding Officers of State Legislature

● Each House of the state legislature has its own presiding officer. There is a Speaker and a Deputy Speaker for the legislative assembly and Chairman and a Deputy Chairman for the legislative council. A panel of chairmen for the assembly and a panel of vice-chairmen for the council are also appointed.

● The Speaker is elected by the assembly itself from amongst its members.

● Like the Speaker, the Deputy Speaker is also elected by the assembly itself from amongst its members. He is elected after the election of the Speaker has taken place.

● The Chairman is elected by the council itself from amongst its members.

● The Speaker decides whether a bill is a Money Bill or not and his decision on this question is final.

Local Government system in India

Evolution of Panchayati Raj System

● The first Panchayati raj system in India was established by the state of Rajasthan in 1959, in Nagaur district followed by Andhra Pradesh. Thereafter the system was adopted by most of the states. The major concern regarding the local self-government was its architecture, amount of power to be devolved, finances etc. Several committees were constituted by respective union governments to devise a method for the same.

Some of the important committees are:

- Balwant Rai Mehta Committee,1957
  It suggested a 3-tier structure at village, block and district level.

- Ashok Mehta Committee,1977
  It suggested a 2-tier system.

- G V K Rao Committee,1985
  Recommended revival of Panchayati Raj institutions and a 3-tier system.

- L M Singhvi Committee,1986
  Recommended Constitutional status to Panchayati Raj institutions, also recommended setting up a finance commission for Panchayats.

- Thungon Committee,1989
  Recommended Constitutional recognition to Panchayats.

- Gadgil Committee,1988

73rd Amendment Act,1992

This Act has added PART IX to the constitution and consists of provisions from Articles 243-243O. Also, it has added 11th Schedule consisting of 29 items of the Panchayat.

Important Articles added under the Act:

Article	Provisions
243A	Gram Sabha
243B	Three tier system
243D	Reservation of seats
243F	Qualification (Min. age 21 years)
243I	State Finance Commission
243K	State Election Commission

74th Amendment Act, 1992

This Amendment Act inserted a new Part IX A which deals with the administration of Municipalities and Nagar Palikas. It consist of Articles 243P to 243ZG. It also added a new 12th Schedule to the constitution.

Important Articles added under the Act:

Article	Provisions
Article 243R	Composition of Municipalities
Article 243S	Wards Committee
Article 243Q	Duration
Article 243T	Reservation of seats for SC, ST & Women
Article 243V	Qualifications (21 years)

Constitutional Bodies

ELECTION COMMISSION

- Article 324 of the Constitution mentions about the election commission mentioned in part XV.
- The institution of Election Commission presently consists of the chief election commissioner and two other election commissioners, appointed by the President.
- They hold office for a term of six years. The age of retirement is 65 years, whichever comes earlier.
- The first election commissioner of India was Sukumar Sen.
- The administrative expenditure of the Election Commission is NOT charged upon the Consolidated fund of India.
- Commission has advisory jurisdiction in the matters of post-election disqualification of sitting members of Parliament and State Legislatures. The opinion of the commission on all such matters is binding on the President/Governor.
- Political Parties are recognised by the Election Commission. The conditions for recognition of a Party as National Party and State Party are as follows:

National Party:

- **2 % seats in Lok Sabha from at least 3 different states in general election.**
- **In election to Lok Sabha or State Legislature, the party has polled 6 % of total valid votes from at least 4 different states, in addition to winning 4 Lok Sabha.**
- **A party has recognition as a state party in at least 4 states.**

State Party:

- **Secure at least 6% of the valid vote and win at least 2 seats in an assembly election.**
- **Secure 6% valid votes and at least 1 Lok Sabha seat.**
- **Win at least 3% of the seats or at least 3 seats, whichever is more, in a Assembly Election.**
- **Win at least 1 out of every 25 seats from a state in Lok Sabha General Election.**
- **Secure at least 8% of the total valid votes in Assembly or Lok Sabha Elections.**

UNION PUBLIC SERVICE COMMISSION

- Mentioned under articles 315 to 323 in Part XIV of the Constitution (Article 315 mentions about the public service commission for the union and the states).
- The UPSC consists of a chairman and other members appointed by the president of India.
- The term is of six years or the retirement age is 65 years, whichever is earlier.
- The chairman of UPSC (on ceasing to hold office) is not eligible for further employment in the Government of India or a state.

STATE PUBLIC SERVICE COMMISSION

- A State Public Service Commission consists of a chairman and other members appointed by the governor of the state.
- The term of office is 6 years or retirement age is 62 years, whichever is attained earlier. They offer their respective resignations to the governor.
- The chairman and members can be removed only by the President, though they're appointed by the Governor. The ground for removal is same as that of a chairman or a member of the UPSC.
- A JPSC is/can be created by an act of parliament on the request of the respective states, unlike UPSC and SPSC which are constitutional bodies. Hence, a JPSC is a statutory body not a constitutional one.
- The chairman and members of a JSPSC are appointed by the president. The term of office is again six years or the age of retirement is 62 years, whichever comes earlier.

FINANCE COMMISSION

- Article 280 of the Constitution of India provides for a Finance Commission. It is constituted by the president of India every fifth year or at such earlier time as he considers necessary.
- The Finance Commission consists of a chairman and four other members to be appointed by the president. They hold office for such period as specified by the president in his order. They are eligible for reappointment.
- It is majorly an advisory body though and it advises on the distribution of net proceeds of taxes to be shared between the centre and the states and the allocation between the states the respective shares of such proceeds.
- The Chairman of the first finance commission was K.C Neogi and presently it is the 15th F.C. whose chairman is N.K Singh.

NATIONAL COMMISSION FOR SCs

- Mentioned in Article 338 of the Constitution of India.

NATIONAL COMMISSION FOR STs

- Mentioned in Article 338-A of the Constitution of India.

SPECIAL OFFICER FOR LINGUISTIC MINORITIES

- It is mentioned in 350-B in Part XVII of the Constitution.

COMPTROLLER and AUDITOR GENERAL of INDIA

- The Constitution of India (Article 148) provides for an independent office of the Comptroller and Auditor General of India (CAG).
- He is the head of the Indian Audit and Accounts Department.
- He is the guardian of the public purse and controls the entire financial system of the country at both the levels—the Centre and the state.
- This is the reason why Dr. B R Ambedkar said that the CAG shall be the most important Officer under the Constitution of India.
- The CAG is appointed by the president of India by a warrant under his hand and seal.
- He holds office for a period of six years or up to the age of 65 years, whichever is earlier.
- The method to remove CAG is same as that of Supreme court judge.
- He is not entitled to hold any further employment after he retires or is removed, either at the centre or at the state government level.
- The administrative expenses of the office of the CAG, including all salaries, allowances, and pensions of persons serving in that office

are charged upon the Consolidated Fund of India. Thus, they are not subject to the vote of Parliament.

- He audits the accounts related to all expenditure from the Consolidated Fund of India, consolidated fund of each state and consolidated fund of each union territory having a Legislative Assembly.
- He audits all expenditure from the Contingency Fund of India and the Public Account of India as well as the contingency fund of each state and the public account of each state.
- He submits his audit reports relating to the accounts of the Centre to President, who shall, in turn, place them before both the Houses of Parliament (Article 151).
- He submits his audit reports relating to the accounts of a state to the governor, who shall, in turn, place them before the state legislature (Article 151).
- The President lays the reports submitted by CAG before both the Houses of Parliament. The Public Accounts Committee then scrutinizes them and reports the findings to the Parliament.

ATTORNEY GENERAL OF INDIA

- Mentioned in Article 76 of the Constitution of India.
- Titled as the highest law officer in the country.
- Appointed by the President.
- An AGI is one who is qualified to be appointed a judge of the Supreme Court.
- The term is not fixed and he holds office during the pleasure of the President.

ADVOCATE GENERAL OF THE STATE

- The Constitution (Article 165) has provided for the office of the advocate general for the states. He is the highest law officer in the state. Thus he corresponds to the Attorney General of India.
- The advocate general is appointed by the governor. He must be a person who is qualified to be appointed a judge of a high court.

Non-Constitutional Bodies

NITI (National Institution for Transforming India) Aayog

- It is established in 2015 by the government to replace the Planning commission (was based on top-down model).
- It is based on the bottom-up model.
- It is the policy-making body for whole India.
- The Ex-officio chairman of aayog is prime minister.
- Current Vice Chairman of aayog is Rajiv Kumar.
- Permanent members of the governing council- (a) All state Chief Ministers (b) Chief ministers of Delhi and Puducherry (c) Lieutenant Governor of Andaman and Nicobar (d) Vice chairman nominated by the Prime Minister.

NATIONAL DEVELOPMENT COUNCIL

- The National Development Council (NDC) was established in August 1952 by an executive resolution of the Government of India on the recommendation of the first five year plan (draft outline). Like the Planning Commission, it is neither a constitutional body nor a statutory body.
- The NDC is composed of the following members:
    - P.M of India (as its chairman/head).
    - All Union cabinet ministers (since 1967).
    - Chief Ministers of all the states.
    - Chief Ministers/administrators of all the union territories. E. Members of the Planning Commission.

NATIONAL HUMAN RIGHTS COMMISSION

- The NHRC is a statutory (and not a constitutional) body. It was established in 1993 under a legislation enacted by the Parliament, namely, the Protection of Human Rights Act, 1993. This Act was amended in 2006.
- The Act was amended by Protection of Human Rights(Amendment) Bill,2019 to facilitate following provision:

- Now, ex chief justice as well as ex judge of SC can be appointed as the chairperson of NHRC.
- The bill allows 3 members to be appointed of which at least one has to be a woman.
- **Members of NHRC:** The chairpersons of the National Commission for Scheduled Castes, National Commission for Scheduled Tribes, and National Commission for Women, National Commission for Backward Classes, the National Commission for the Protection of Child Rights, and the Chief Commissioner for Persons with Disabilities.
- An ex chief justice of HC or an ex-judge of HC can be appointed chairperson of SHRC.
- The term of office is reduced to 3 years or until the age of 70 whichever is earlier. The 5 year limit for reappointment is also removed.
- Cases relating to human rights violations come under the purview of NHRC.

➢ The chairman and members are appointed by the President on the recommendations of a six-member committee consisting of the prime minister as its head, the Speaker of the Lok Sabha, the Deputy Chairman of the Rajya Sabha, leaders of the Opposition in both the Houses of Parliament and the Central home minister. Further, a sitting judge of the Supreme Court or sitting chief justice of a high court can be appointed only after consultation with the chief justice of India.

CENTRAL INFORMATION COMMISSION

➢ The CIC was established by the Central Government in 2005. It was constituted through an Official Gazette Notification under the provisions of the Right to Information Act (2005). Hence, it is not a constitutional body.

➢ The Commission consists of a Chief Information Commissioner and not-more-than ten Information Commissioners.

➢ They are appointed by the President on the recommendation of a committee consisting of the Prime Minister as Chairperson, the Leader of Opposition in the Lok Sabha and a Union Cabinet Minister nominated by the Prime Minister.

➢ They should be persons of eminence in public life with wide knowledge and experience in social service, science, and technology, mass media, management, journalism, law, or administration and governance.

➢ They should not be MPs or MLAs of any State or Union Territory. They should not hold any other office of profit or connected with any political party or carrying on any business or pursuing any profession.

➢ By an amendment, the term of office and allowances, salaries of Information Commissioners are to be prescribed by the Central government.

CENTRAL VIGILANCE COMMISSION

➢ The CVC is the main agency for preventing corruption in the Central government. It was established in 1964 by an executive resolution of the Central government.

➢ Its establishment was recommended by **the Santhanam Committee on Prevention of Corruption** (1962–64).

➢ Thus, originally the CVC was neither a constitutional body nor a statutory body. In September 2003, the Parliament enacted a law conferring statutory status on the CVC.

➢ The CVC is a multi-member body consisting of a Central Vigilance Commissioner (chairperson) and not more than two vigilance commissioners.

➢ They are appointed by the president by warrant under his hand and seal on the recommendation of a three-member committee consisting of the prime minister as its head, the Union minister of home affairs and the Leader of the Opposition in the Lok Sabha.

- They hold office for a term of four years or until they attain the age of 65 years, whichever is earlier. After their tenure, they are not eligible for further employment under the Central or a state government.

Lokpal and Lokayukta Act

Important Facts

- The Lokpal and Lokayukta is an anti-corruption ombudsman established by the Lokpal and Lokayukta Act, 2013.
- It has the provision of appointing 'Lokpal' at the centre and 'Lokayukta' on every state.
- These are statutory bodies established without any constitutional status.
- The former Supreme Court Judge Justice Pinaki Chandra Ghose is the first Lokpal of India.

Composition of the Lokpal

- The office of Lokpal consists of a chairperson and a maximum of 8 members.
- The Chairman and half of the members should be from legal backgrounds.
- The 50% of the seats are reserved for SC, ST, OBC, minorities or women.

Evolution of Lokpal and Lokayukta in India

- For the first time, an office ombudsman was established in Sweden in 1809.
- The concept of ombudsman developed significantly after the Second World War. The United Kingdom adopted it in 1967.
- In India, this concept was first proposed by the then law minister Ashok Kumar Sen in the early 1960s.
- In 1966 the recommendations of the First Administrative Reforms Commission suggested the setting up of independent authority for looking after the complaint against public functionaries.
- In 2005 the 2nd ARC the chaired by Veerappa Moily also recommended for provision of Lokpal.
- In India for the first time, the Lokpal bill was introduced in the Lok Sabha in 1968 but could be not passed, and till 2011 a total of eight failed attempts were made to pass the Bill.
- Finally, massive pressure from civil societies and demand from the social groups resulted in the passing of the Lokpal and Lokayuktas Bill, 2013.

Criteria for selection of Chairperson

- She/he should be either former Chief Justice of India or Judge of the Supreme Court.
- She/he should be an eminent person with impeccable integrity and outstanding ability with at least 25 years experience in matters related to anti-corruption policy, law, management etc.

Appointment of Chairperson and Members

- The President appoints the chairperson and members on the recommendation of a select committee consisting of the following :-
  - The Prime Minister
  - The Speaker of Lok Sabha
  - The Leader of Opposition in Lok Sabha
  - The Chief Justice of India
  - One eminent jurist appointed by the President

Term of Office

- The Chairman and members of Lokpal hold office for five years or upto the age of 70 yrs.
- The salary, allowances and other condition of service of the chairperson shall be equivalent to the Chief Justice of India, and members are comparable to the Judge of the Supreme Court.
- All expenses are charged from the consolidated fund of India.

Basic Structure of Constitution

Following are the components of the Constitution:

- The supremacy of the Constitution
- Rule of law
- The Sovereign, Democratic and Republican nature of Indian polity
- The principle of Separation of Powers between the executive, legislative and judiciary
- Federal Character of the Constitution
- Unity and integrity of the Nation
- Independence of the Judiciary

- Judicial Review
- Freedom and dignity of the individual
- The Parliamentary system of government
- The balance between Fundamental Rights and DPSP.]
- The principle of equality
- Secular character of the Constitution
- Restriction on amending the power of Parliament.
- Effective access to justice
- Principle of reasonableness
- Free and fair elections
- The Powers of the Supreme Court under Articles 32, 136, 141, 142
- The concept of Welfare State consisting of social and economic justice.

List of Most Important articles of Indian Constitution

1. Article No. 1:- Name and territory of the Union
2. Article No. 3:- Formation of new states and alteration of areas, boundaries or names of existing states
3. Article No. 13:- Laws inconsistent with or in derogation of the Fundamental Rights
4. Article No. 14:- Equality before the law
5. Article No. 16:- Equality of opportunity in matters of public employment
6. Article No. 17:- Abolition of untouchability
7. Article No. 19:- Protection of certain rights regarding freedom of speech, etc.
8. Article No. 21:- Protection of life and personal liberty
9. Article No. 21A:- Right to elementary education
10. Article No. 25:- Freedom of conscience and free profession, practice and propagation of religion 11. Article No. 30:- Right of minorities to establish and administer educational institutions
12. Article No. 31C:- Saving of laws giving effect to certain Directive Principles
13. Article No. 32:- Remedies for enforcement of Fundamental Rights including writs
14. Article No. 38:- State to secure a social order for the promotion of the welfare of the people
15. Article No.40:- Organisation of village panchayats
16. Article No. 44:- Uniform Civil Code for the citizens
17. Article No. 45:- Provision for early childhood care and education to children below the age of 6 years.
18. Article No. 46:- Promotion of educational and economic interests of scheduled castes, scheduled tribes and other weaker sections
19. Article No. 50:- Separation of judiciary from the executive
20. Article No. 51:- Promotion of international peace and security
21. Article No. 51A:- Fundamental Duties
22. Article No. 72:- Powers of President to grant pardons, suspend, remit or commute sentences in certain cases
23. Article No. 74:- Council of Ministers to aid and advise the President
24. Article No. 76:- Attorney-General of India
25. Article No. 78:- Duties of the Prime Minister as respects the furnishing of information to the President, etc.
26. Article No. 110:- Definition of Money Bills
27. Article No. 112:- Annual Financial Statement (Budget) 28. Article No. 123:- Power of President to promulgate ordinances during recess of Parliament
29. Article No. 143:- Power of President to consult Supreme Court
30. Article No. 148:- Comptroller and Auditor-General of India
31. Article No. 149:- Duties and powers of the Comptroller and Auditor-General of India
32. Article No. 155:- Appointment of the Governor
33. Article No. 161:- Power of Governor to grant pardons, etc., and to suspend, remit or commute sentences in certain cases
34. Article No. 163:- Council of Ministers to aid and advise the Governor
35. Article No. 165:-Advocate-General of the state Which British Laws are still used in India
36. Article No. 167:- Duties of Chief Minister with regard to the furnishing of information to the Governor, etc.
37. Article No. 168:- Constitution of Legislatures in the states
38. Article No. 169:- Abolition or creation of Legislative Councils in the states
39. Article No. 170:- Composition of Legislative Assemblies in the states
40. Article No. 171:- Composition of Legislative Councils in the states

41. Article No. 172:- Duration of State Legislatures
42. Article No. 173:- Qualification for membership of the State Legislature
43. Article No. 174:- Sessions of the State Legislature, prorogation and dissolution
44. Article No. 178:- Speakers and Deputy Speaker of the Legislative Assembly 45. Article No. 194:- Powers, privileges, and immunity of Advocate-General
46. Article No. 200:- Assent to bills by the governor (including reservation for President)
47. Article No. 202:-Annual financial statement of the State Legislature
48. Article No. 210:- Language to be used in the State Legislature
49. Article No. 212:- Courts not to inquire into proceedings of the State Legislature
50. Article No. 213:- Power of governor to promulgate ordinances during recess of the State Legislature
51. Article No. 214:- High courts for the states
52. Article No. 217:-Appointment and the conditions of the office of the judge of a High Court
53. Article No. 226:- Power of high courts to issue certain writs
54. Article No. 239AA:- Special provisions with respect to Delhi
55. Article No. 243B:- Constitution of Panchayats
56. Article No. 243C:- Composition of Panchayats
57. Article No. 243G:- Powers, authority and responsibilities of Panchayats
58. Article No. 243K:- Elections to the Panchayats
59. Article No. 249:-Power of Parliament to legislate with respect to a matter in the State List in the national interest
60. Article No. 262:- Adjudication of disputes relating to waters of inter-state rivers or river valleys
61. Article No. 263:- Provisions with respect to an inter-state council
62. Article No. 265:- Taxes not to be imposed save by authority of law 63. Article No. 275:- Grants from the Union to certain states
64. Article No. 280:- Finance Commission
65. Article No. 300:- Suits and proceedings
66. Article No. 300A:- Persons not to be deprived of property save by authority of law (Right to property)
67. Article No. 311:- Dismissal, removal or reduction in rank of persons employed in civil capacities under the Union or a state.
68. Article No. 312:- All-India Services
69. Article No. 315:- Public Service Commission for the Union and for the states
70. Article No. 320:- Functions of Public Service Commissions
71. Article No. 323-A:- Administrative Tribunals
72. Article No. 324:- Superintendence, direction and control of elections to be vested in an Election Commission
73. Article No. 330:- Reservation of seats for scheduled castes and scheduled tribes in the House of the People
74. Article No. 335:- Claims of Scheduled Castes and Scheduled Tribes to services and posts
75. Article No. 352:- Proclamation of Emergency (National Emergency)
76. Article No. 356:- Provisions in case of failure of constitutional machinery in states (President's Rule)
77. Article No. 360:- Provisions as to Financial Emergency.
78. Article No. 365:- Effect of failure to comply with or to give effect to, directions given by the Union (President's Rule)
79. Article No. 368:- Power of Parliament to amend the Constitution and procedure therefore.

INDIAN ECONOMY

List of 5 Year Plans of Indian Economy

1. Visvesvaraya Plan

- The era of economic planning in India started with Visvesvaraya's ten-year Plan.
- Sir M. Visvesvaraya published a book titled "Planned Economy in India" in 1934 wherein he presented a draft to double the national income in a decade.
- He proposed to shift the labor from the agrarian set up to the industries thereby advocating for democratic capitalism (similar to the USA) with emphasis on industrialization. However, there was no follow up of this plan in British Government, it successfully stirred an urge for national planning among the educated citizens of the country.

2. National Planning Committee (NPC)

- It was the first attempt to develop a national plan for India emanated in 1938 with the set-up of NPC under the chairmanship of Jawahar Lal Nehru.
- However, because of the commencement of World War II, the reports of the committee could not be prepared. The papers finally came out after independence in 1948-49.

3. Bombay Plan

- Eight leading industrialists and technocrats formulated a draft titled "A Brief Memorandum Outlining a Plan of Economic Development for India" under the editorship of Purushottamdas Thakurdas in 1944.
- This draft is known as the 'Bombay Plan'.
- The basic objectives of the plan were doubling the output of the agricultural sector and a five-fold growth in the industrial sector in 15 years.
- A key principle of the Bombay Plan was that the economy could not grow without government intervention and regulation.
- Officially the plan was never accepted, however, its ideas were replicated in future economic plans.

4. People's Plan

- People's plan was drafted by M. N. Roy, the communist leader, on behalf of the Post- War Reconstruction Committee of the Indian Federation of Lahore in 1944.
- It was based on 'Marxist Socialism' and gave primacy to agriculture. It advocated for the nationalization of agriculture and all production activities.

5. Gandhian Plan

- The Gandhian Plan was drafted by S. N. Aggarwal, the principal of Wardha Commercial College in 1944.
- The plan articulated a 'decentralized economic structure' for India with 'self-contained villages'.
- Unlike the NPC and Bombay Plan, the plan laid more emphasis on agriculture.
- And wherever industrialization was talked about, it stressed upon promoting cottage and village level industries.

6. Sarvodaya Plan

- This plan was drafted by Jai Prakash Narayan in 1950.
- It was inspired by Gandhi Plan and Vinoba Bhave's principles of self-reliance.
- It laid stressed upon agriculture as well as small and cotton industries.
- It advocated self-sufficiency by curtailing the use of foreign technology and implementing land reforms and decentralized participatory planning.

7. Planning Commission

- After independence, the Economic Programme Committee (EPC) was formed by the All India Congress Committee.
- Pandit J.L. Nehru was its chairman.
- In 1948, this committee recommended the formation of the planning commission.
- It was an extra-constitutional body, charged with the responsibility of formulating five-year plans.

8. National Development Council (NDC)

- It was founded on August 6, 1952. It was presided over by the Prime Minister.

- It is the apex body for decision creating and deliberations on development matters in India.
- It gives the final approval to the Five-Year Plan of India.

Summary of First three Five-year plans

Plans	Time frame	Objective and Remarks
First Plan	1951-1956	· Focus: agriculture, price stability, and infrastructure. · It was based on Harrod Domer model (growth rate of the economy depends upon investment rate and productivity of capital in a positive manner).
Second Plan (target growth: 4.5% Actual growth: 4.27%)	1956-1961	· Focus: rapid industrialization · It was also known as Mahalanobis Plan (advocated planning shift from agriculture to industries). · It laid emphasis on heavy and basic industries. · Also advocated import substitution; export pessimism and overvalue exchanges.
Third Plan (Target growth: 5.6% Actual growth: 2.84%)	1961-1966	· Focus: heavy and basic industry which was then shifted to agriculture (PL480). · Due to two wars- war with China, 1962 and war with Pakistan, 1965 and severe drought of 1965-66; it failed on many fronts.

- 1966-67, 1967-68 and 1968-69 were annual plans. Discontinuation of five-year planning for three consecutive years is regarded as plan holiday.
- Due to the prevailing food crisis, annual plans were primarily focused on agriculture.
- During these plans, the foundation of the green revolution was laid down which included widespread use of HYV (high yielding varieties) seeds, chemical fertilizers and extensive exploitation of irrigation potentials. During these years, the shocks of a third-year plan were absorbed and a five-year planning system was resumed from 1969.

Summary of IV to XII FYPS

Plans	Time Frame	Objective and Remarks
Fourth Plan (Target Growth: 5.7% Actual Growth: 3.30%)	1969-1974	· Focus: Self-sufficiency in food and self-reliance · Objective was to improve domestic food production. · It was aimed at saying no to foreign aid. · First oil shock of 1973, made remittances a major source of foreign exchange reserve.

Fifth Plan (Target Growth: 4.4% Actual Growth: 4.8%)	1974-1979	· Focus: 'removal of poverty' and 'attainment of self-reliance'. · It was drafted and launched by D. D. Dhar. · This plan was terminated in the year 1978. · There were rolling plans for the year 1978-1979 and 1979-1980.
Sixth Plan (Target Growth: 5.2% Actual Growth: 5.4%)	1980-1985	· Focus: poverty eradication and productivity enhancement · Stressed upon modernization of technology. · For the first time, the frontal attack was made on poverty by adopting ambitious poverty eradication programmes (trickle down strategy was discarded).
Seventh Plan (Target Growth: 5.0% Actual Growth: 6.01%)	1985-1990	· Focus: productivity and work i.e. employment generation. · For the first time, the private sector got priority over the public sector. · Due to volatile political situations at the center, two annual plans were commenced for the year 1990-1991 and 1991-1992.
Eighth Plan (Target Growth: 5.6% Actual Growth: 6.8%)	1992-1997	· Focus: 'Plan with a human face' i.e. human resource development. · During this plan, new economic policy was launched with LPG (Liberalization, Privatization, and Globalization). · It gave primacy to human capital and the private sector.
Ninth Plan (Target Growth: 7.1% Actual Growth: 6.8%)	1997-2002	· Focus: 'Growth with justice and equity' · It stressed upon four dimensions: quality of life; generation of productive employment; regional balance and self-reliance.
Tenth Plan (Target Growth: 8.1%	2002-2007	It was aimed to double the per capita income of India in the next 10 years. And to reduce the poverty ratio by 15% by 2012.

Actual Growth: 7.7%)		
Eleventh Plan (Target Growth: 8.1% Actual Growth: 7.9%)	2007-2012	Focus: Faster growth and more inclusive growth.
Twelfth Plan (Target Growth: 8%)	2012-2017	Focus: Faster, more inclusive growth and sustainable growth.

NITI Aayog

- NITI Aayog, the National Institution for Transforming India, is a policy think tank of the Government of India established in 2015.
- It replaced the Planning Commission.
- It has a dual objective of achieving sustainable development goals and to enhance cooperative federalism with 'bottom to top' approach. Its initiatives include
  (a) Action Plan- 3 Years
  (b) Strategy Plan- 7 Years
  (c) Vision Plan- 15

National Income

About National Income

- National Income is usually defined as the total Value of all final goods and services produced in a country in a particular period (Generally one year).
- Following are the measures of National Income-
  (A) GDP (Gross Domestic Product)
  (B) GNP (Gross National Product)
  (C) NNP (Net National Product)
  (D) PI (Personal Income)
  (E) DPI (Disposable Personal Income)

(A) GDP (Gross Domestic Product)-

- GDP is the total value of all final goods and services produced within the geographical boundary of the country during a particular period (Generally one year).
- In this, we consider all goods/ services, produced by both resident citizens and foreign nationals who reside within the boundary of that country.

(B) GNP (Gross National Product)-

- GNP is defined as the total value of the final goods and services produced by Indians in India as well as abroad during a particular period.
- GNP includes the value of goods produced by resident and non-resident citizens of a country whereas the income of foreigners who reside in India is excluded.

(C) Net National Product (NNP)-

- It is calculated by deducting depreciation from Gross National Product (GNP)
- NNP = GNP – Depreciation

Note-
Factor Cost- Cost incurred to produce goods and service
Market price- For calculating market price we add Indirect taxes and deduct subsidies given by the government in Factor cost.

Market Price = Factor cost + Indirect Taxes – Subsidy

- NNP at factor cost = NNP at market price – Indirect taxes + subsidy
- Usually, we called NNP at factor cost as National Income.
- Likewise, NNP at factor cost, we can also calculate GDP at factor cost.

(D) Personal income-

- It is the sum of all the income received by the people of the country in one year. Personal Income = National Income + Transfer payments – Undisclosed profits of corporate + Payment for social security provisions
- Transfer Payments are the payments that are not against any productive work. (Example- Old Age Pension, Unemployment compensation etc.)
- Social Security Provisions- Payment made by employees towards PF, Insurance etc.

(E) Disposable Personal Income-

- Income available to individuals after deducting direct taxes.
- Disposable Personal Income = Personal Income – Direct Taxes

Real Income and Nominal Income-

- If we use base year price for calculating National Income, this is called the real income.
- If we use a particular year (current year) price for calculating National Income, this income is called the Nominal income.

GDP Deflator-

- Used to calculate overall price rise.

Estimation of National Income in India

- In 1868, Dadabhai Naoroji wrote a book 'Poverty and Un British Rule in India'. It was the first attempt at the calculation of National Income.
- The first person to estimate National Income scientifically was Dr V. K. R. V. Rao who estimated national income for the period 1925-29.
- After Independence National Income committee was formed in 1949 under the chairmanship of P.C. Mahalanobis.
- After some years the Central Statistical Organisation (CSO) was formed.

Various Price Indices in India

Price Indices in India

Various weighted price indices are calculated in India.

These are-

1. Wholesale Price Index (WPI)
2. Old Consumer Price Index

(a) Consumer Price Index for Industrial Workers (CPI- IW)

(b) Consumer Price Index for Urban Non- Manual Employees (CPI- UNME)

(c) Consumer Price Index for Agriculture Labourers (CPI-AL)

(d) Consumer Price Index for Rural Labourers (CPI-RL)

3. New Consumer Price Index (Introduced in February 2011)

(a) CPI (Rural)

(b) CPI (Urban)

(c) CPI (Combined)

4. Consumer Food Price Index

Till April 2014, the Inflation rate was measured with the help of WPI (Wholesale Price Index).

Currently, in India inflation rate is measured with the help of Consumer Price Index- combined.

1. Wholesale Price Index

- It measures the change in the price of commodities traded in the wholesale market.
- It is also known as headline inflation.
- Current base year- 2011-12.
- The index basket of the current series has a total of 697 items (117 items for Primary Articles, 16 items for Fuel & Power and 564 items for Manufactured Products.)
- Published by- Economic Advisor, Ministry of Commerce & Industry.

2. Old Consumer Price Index

(a) Consumer Price Index for Industrial Workers (CPI- IW)

- It measures the change in the price of commodities consumed by industrial workers.
- Current base year- 2001
- Published by- Labour Bureau

(b) Consumer Price Index for Urban Non-Manual Employees (CPI- UNME)

- It measures the change in the price of commodities consumed by Non- Manual Employees.
- Published by- CSO (Central Statistics Office, Ministry of Statistics)
- It has been discontinued.

(c) Consumer Price Index for Agriculture Labourers (CPI-AL)

- It measures the change in the price of commodities consumed by agriculture labourers.
- It is a subset of CPI-RL.
- Current base year- 1986-87
- Published by- Labour Bureau
- Used for revising minimum wages

(d) Consumer Price Index for Rural Labourers (CPI- RL)

- It measures the change in the price of commodities consumed by rural labourers (include agriculture labourers, labourers of village and cottage industries).
- Current base year- 1986-87
- Published by- Labour Bureau
- Used for revising minimum wages.

3. New Consumer Price Index (Introduced in February 2011)

(a) CPI (Rural)-

- Current base year- 2012
- Published by- CSO (Central Statistics Office, Ministry of Statistics)

(b) CPI (Urban)-

- Current base year- 2012
- Published by- CSO

(c) CPI (Combined)-

- Current base year- 2012
- Published by- CSO
- Currently, in India inflation rate is measured with the help of Consumer Price Index-combined.

4. Consumer Food Price Index-

- It is a measure of change in retail prices of food items consumed by the people.
- Current base year- 2012
- Published by- CSO

GDP Deflator

- Used to calculate overall price rise.
- Known as implicit price deflator.
- GDP Deflator= (Nominal GDP/Real GDP) × 100
- Here Real GDP- GDP calculated at constant Price
- Nominal GDP- GDP calculated at current Price
- The GDP deflator is the most accurate because it covers all goods and services produced in the economy. The other indices (WPI and CPI) derive from price quotations for select commodity baskets.
- The government does not use it because GDP deflator data comes quarterly (not weekly/monthly basis).

RBI and Monetary Policy

RBI (Reserve Bank of India)

- RBI was established in April 1935 under Reserve Bank of India, 1934.
- On the recommendation of Hilton-Young Commission.
- Central Bank of India which was nationalized in 1949.
- Central office initial was established in Calcutta and later moved to Mumbai in 1937.
- Official Directors- Governors and not more than four deputy governors.
- RBI performs his function under the guidance of the Board of financial supervision.

Other facts related to Reserve Bank of India

- The first governor of RBI- Sir Osborne Smith
- The first governor of RBI after nationalization- C. D. Deshmukh
- First women Deputy Governor of RBI - K.J.Udeshi.
- RBI Emblem: Tiger and Palm tree

What is Monetary Policy?

- The policy made by the central bank (Reserve Bank of India) to control the money supply in the economy.

MPC (Monetary Policy Committee)

- The Monetary Policy Committee of India is a committee of the Reserve Bank of India that is responsible for fixing the benchmark interest rate in India.
- Section 45ZB of the amended RBI Act, 1934 provides for an empowered six-member monetary policy committee (MPC) to be constituted by the Central Government to determine the interest rate that is required to achieve the inflation target.

- The MPC is required to meet at least four times in a year.
- Six-membered MPC is headed by RBI governor Urjit Patel.
- The Members of the Monetary Policy Committee appointed by the Central Government shall hold office for a period of four years.

Various tools/instruments of monetary policy

These can be divided into quantitative and qualitative instruments.

Quantitative instruments

1. Open Market Operations (OMO)

- This method refers to the buy and sells of securities, bills and bonds of government by RBI in the open market to expand or contract the amount of money in the banking system.
- When RBI purchases Government securities, liquidity increases (because RBI is paying that party some money to buy that security or RBI is pouring additional money into the system).
- On the reverse, when RBI sells Government securities, liquidity decreases (because those players are giving their cash to RBI to purchase the securities.)

2. Liquidity Adjustment Facility (LAF)

- Liquidity adjustment facilities (LAF) is also a tool used by RBI to control the short-term money supply.
- Liquidity adjustment facilities (LAF) has two instruments namely Repo rate and Reverse Repo Rate.
- **Repo Rate:** The interest rate at which the Reserve Bank provides loans to commercial banks by mortgaging their dated government securities and treasury bills.
- **Reverse Repo Rate:** The interest rate at which the Reserve Bank borrows from commercial banks by mortgaging its dated government securities and treasury bills.
- While repo rate injects liquidity into the system, the Reverse repo absorbs the liquidity from the system.

3. Marginal Standing Facility (MSF)

- It is a loan facility for banks to borrow from the Reserve Bank of India in an emergency when inter-bank liquidity dries up completely.

How is MSF different from Repo rate?

- MSF loan facility was created for commercial banks to borrow from RBI in emergency conditions when inter-bank liquidity dries up and there is a volatility in the overnight interest rates.
- To curb this volatility, RBI allowed them to deposit government securities and get more liquidity from RBI at a rate higher than the Repo rate.

4. Reserve Ratio (SLR, CRR)

- SLR (Statutory liquidity ratio): All commercial banks in the country are required to keep a given percentage of their demand and time deposits (Net demand and time liabilities or NDTL) as liquid assets in their vault itself.
- It prevents the bank from lending all its deposits which is too risky.
- Note: Net Demand and Time Liabilities (NDTL) mainly consist of Time liabilities and Demand liabilities.

Time liabilities include:

(1) Money deposited in Fixed deposits (FD)
(2) Cash certificates
(3) gold deposits etc.

Demand liabilities include:

(1) Money deposited in the savings account
(2) Money deposited in the current account
(3) Demand drafts etc.

Cash Reserve Ratio (CRR): The Cash Reserve Ratio is the amount of funds that the banks are bound to keep with the Reserve bank of India as a certain percentage of their Net Demand and Time Liabilities (NDTL). Bank cannot lend it to anyone. Bank earns no interest rate or profit on this.

What happens when CRR is reduced?

- When CRR is reduced, this means banks required to keep fewer funds with RBI and resource available to banks for lending will go up.

5. Bank Rate

- The bank rate is the rate which is fixed by RBI at which it re-discounts bills of exchange and government securities held by commercial banks.
- It is also known as the discount rate.

Bill of exchange- is a financial document that assures payment of money by the purchaser to the seller for goods purchased.

Differences between Repo rate and Bank rate: Repo Rate is a short-term measure on the other hand Bank Rate is a long-term measure.

Qualitative instruments

1. Credit rationing

- In this, RBI controlled the maximum amount of credit flow to a certain sector.
- RBI may also make compulsory for the banks to provide certain fractions of their loans to certain sectors such as priority sector lending etc.

2. Selective Credit control

- Selective credit control is a tool in the hands of Reserve Bank of India to restrict bank finance against sensitive commodities.

3. Margin Requirements

- RBI can prescribe margin against collateral. For instance, lend only 70 Rs. for 100 Rs. value Property, margin requirement being 30%. If RBI raises margin requirements, customers will be able to borrow less.

4. Moral suasion

- Moral Suasion refers to a method of request, a method of advice by the RBI to the commercial banks to take certain measures as per the trend of the economy.

5. Direct Action

- RBI issues certain guidelines from time to time based on the current situation in the economy.
- These guidelines should be followed by banks. If any bank violates these guidelines RBI penalizes them.

Different type of Unemployment

Unemployment

- It is a situation in which people are ready and willing to work at the existing rate of wages but still, they cannot get work.
- Measurement unemployment and employment are done by NSSO (National Sample Survey Organization) in India.
- NSSO divide people into the following three categories -
  (a) Working people (engaged in an economic activity)
  (b) Not working (looking for work)
  (c) Neither working nor looking for work
  People in category (a) are called workforce.
  People in category (b) are called unemployed.
  People in categories (a) and (b) are called Labour force.
  People in category (c) are called not in the Labour force.
  Number of unemployed = Labour force – Workforce
- Unemployment data in India are kept under the Ministry of Labour and Employment.

Types of Unemployment

1. **Structural Unemployment**
- Caused by structural change.
- Example- technological change, growing population etc.

2. **Frictional Unemployment**
- When people shift from one job to another and remain unemployed during this interval period.

3. **Cyclical Unemployment (Demand Deficient Unemployment)**
- When people are thrown out from the job due to a decrease in demand.
- Example- recession

4. **Disguised Unemployment**
- In this type of employment, people are employed but their marginal productivity is zero.
- Example- One man is engaged in some agriculture work, his friend joins him but the productivity of both remains same. His friends come under disguised unemployment.

5. **Educated Unemployment**
- If one educated person is not able to get a suitable job suited to his qualification.
- Example- Engineering graduate is getting clerk post instead of engineer post.

6. **Open Unemployment**
- A condition in which people do not find any work to do.
- It includes both skilled and unskilled people.

7. **Under Unemployment**

- When people obtain work but their efficiency and capability are not utilized at their optimum and they contribute to the production up-to a limited level.

8. Voluntary Unemployment

- In this type of unemployment, jobs are available but individuals want to remain idle.
- Example- lazy people, people who have ancestor property do not want to earn.

9. Natural Unemployment

- 2 to 3 % unemployment is considered natural and cannot be eliminated.

10. Chronic Unemployment

- Caused due to the long-term unemployment present in the economy.

11. Seasonal Unemployment

- In this type of unemployment, people are unemployed for a few months of the year.
- Example- Farmers

Inflation (Types and Effects)

Inflation

- The general rise in the price level of goods and services.
- It is estimated as the percentage rate of change in price index over the reference time period.
- Currently in India inflation rate is measured with the help of the Consumer Price Index-combined (Base year- 2012).
- Till April 2014, the Inflation rate was measured with the help of WPI (Wholesale Price Index).
- Rate of Inflation= (Current period price index-Reference period price index)/(Reference Period Price Index)×100

Type of Inflation

Based on the rate of rising in Inflation

1. Creeping Inflation
   - Price rise at the very small rate (< 3 %)
   - It is considered safe and essential for the economy.
2. Walking or Trotting Inflation
   - Price rise at moderate rate (3 % < Inflation < 10 %)
   - Inflation at this rate is a warning signal for the Economy.
3. Running Inflation
   - Price rise at high rate (10 % < Inflation < 20 %)
   - It affects the economy adversely.
4. Hyperinflation or Galloping Inflation or Runway Inflation
   - Price rise at very high rate (20 % < Inflation < 100 %)
   - This situation brings the total collapse of the Economy.

Based on the causes

- Demand Pull Inflation: When Inflation arises due to higher demand for goods and services over the limited supply.
- Cost-Push Inflation: When Inflation arises due to higher input cost (Example- raw material, wages etc.) for goods and services over the limited supply.

Other definitions

1. Deflation
   - It is opposite to Inflation.
   - Reduction of general level of price in an economy.
   - In this price index measured is negative.
2. **Stagflation:** When stagnation and inflation coexist in the economy.
3. **Stagnation:** low national income growth and high unemployment.
4. **Disinflation**
   - When the rate of Inflation is at a slower rate.
   - Example:
     If the Inflation of last month was 4 % and the rate of inflation in the current month is 3 %.
5. **Reflation:**
   - Deliberate action of government to increase the rate of inflation to redeem the economy from a deflationary situation.
6. **Core Inflation:**
   - It is a measure of price rise in the economy excluding the price rise of some products (whose price is volatile and temporary in nature.

Measures to control Inflation

1. **Credit control**
   - It is used by RBI.
2. **Increase in Direct Taxes**

- Due to the increase in direct taxes, people have less money available to them and low demand from them leads to a lower price.

3. **Price Control**
   - By fixing the maximum price limit by authorities.
4. **Trade measures**
   - Maintain proper supply in the economy by export and import of goods and services.

Poverty in India

Poverty

- A condition in which section of society is unable to fulfil its basic necessities of life.
- It is of two types-
  (a) Absolute Poverty
  (b) Relative Poverty

(a) **Absolute Poverty**

- In this, we calculate an aggregate value (a figure expressing per capita consumer expenditure) of the minimum quantity of commodities which are necessities of life.
- The population whose level of income (or expenditure) is below this aggregate value is Below Poverty Line (BPL).
- In this measure of poverty, we expressed the number of poor as a proportion of the total population. This measure also is known as the headcount ratio.
  Example: 13 Percent of People are BPL.
- Why we prefer consumption expenditure method instead of income-
  In per capita income we cannot separate dependent people (children, senior citizens etc.) who are consuming but not earning. So, for correct data calculation, we prefer the consumption expenditure method instead of income.

(b) **Relative Poverty**

- In this type of poverty, a person may be above Below Poverty Line but happens to be poor in comparison with the other person whose income is above his income/consumption.
- In this type of poverty calculation, income/consumption distribution of the population in different percentile groups is estimated and compare them.
- It provides inequality present among the total population.
- Quintile ratio is one of the measures of inequality.
  Quintile Income Ration= Average income of richest 20 Percent/ Average income of poorest 20 persons

Poverty estimation in Independent India

(A) Dr. V.M. Dandekar and Nilantha Rath (1968-69)

- Fixed desired minimum nutrition = 2250 calories/day
- In Rural, money required to purchase this amount of nutrition- 170 Rs. / year
- In Urban, money required to purchase this amount of nutrition- 271 Rs. / year
- Using this reference, they found that 40 Percent of rural resident and 50 Percent of urban residents were below the below poverty line in 1960-61.

(B) Planning commission expert group

- Poverty line concept was first introduced by the planning commission working group of the planning commission in 1962.

(i) Alagh Committee

- **Chairman-** Y K Alagh
- Till 1979 poverty estimation was done on the basis of lack of income, but in 1979 Y K Alagh Committee adopted a new approach based on household per capita consumption expenditure basis.
- This committee defines the first poverty line in India.
- Daily consumption fixed by the committee in Rural= 2400 calories/day
  Daily consumption fixed by the committee in Urban= 2100 calories/day
  Note- In rural India value of consumption was put high because of physical labour they undergo.

(ii) Lakdawala Committee

- Formed in 1989.
- Chairman- D.T. Lakdawala
- Submitted report in 1993.

- Daily consumption fixed by the committee in Rural= 2400 calories/day
  Daily consumption fixed by the committee in Urban= 2100 calories/day
- The committee used CPI-IL and CPI-AL for estimation of Poverty
  Note- CPI-IL (Consumer Price Index for Industrial Labourers)
  CPI-AL (Consumer Price Index for Agriculture Labourers)

(ii) Tendulkar Committee

- Formed in 2005.
- Chairman- Suresh D. Tendulkar
- Submitted its report in 2009.
- Changed calorie based estimation to nutrition, health and other expenditure based
- Introduce a new term Poverty Line Basket (PLB) which is the basket of all goods selected to determine poverty.
- Consumption quantity fixed the same for both rural and urban people but price differs-
  Daily per capita expenditure for Rural- Rs. 27
  Daily per capita expenditure for Urban- Rs. 33

(iii) Rangarajan Committee

- Formed in June 2012.
- Chairman- Rangarajan
- Submitted its report in June 2014.
- Again, adopted the calorie-based approach which was used in past.
- Daily per capita expenditure for Rural- Rs. 33
  Daily per capita expenditure for Urban- Rs. 47

History of Banking in India (Before & After Independence)

Phases of Indian Banking System

The advancement in the Indian banking system is classified into 3 distinct phases:

1. The Pre-Independence Phase i.e. before 1947
2. Second Phase from 1947 to 1991
3. Third Phase 1991 and beyond

1. The Pre-Independence Phase i.e. before 1947

- This phase is characterized by the presence of a large number of banks (more than 600).
- Banking system commenced in India with the foundation of Bank of Hindustan in Calcutta (now Kolkata) in 1770 which ceased to operate in 1832.
- After that many banks came but were not successful like:

(1) General Bank of India (1786-1791)
(2) Oudh Commercial Bank (1881-1958) – the first commercial bank of India.

Whereas some are successful and continue to lead even now like:

(1) Allahabad Bank (est. 1865)
(2) Punjab National Bank (est. 1894, with HQ in Lahore (that time))
(3) Bank of India (est. 1906)
(4) Bank of Baroda (est. 1908)
(5) Central Bank of India (est. 1911)

- While some others like Bank of Bengal (est. 1806), Bank of Bombay (est. 1840), Bank of Madras (est. 1843) merged into a single entity in 1921 which came to be known as Imperial Bank of India.
- Imperial Bank of India was later renamed in 1955 as the State Bank of India.
- In April 1935, Reserve Bank of India was formed based on the recommendation of Hilton Young Commission (set up in 1926).
- In this time period, most of the banks were small in size and suffered from the high rate of failures. As a result, public confidence is low in these banks and deposit mobilization was also very slow. People continued to rely on the unorganized sector (moneylenders and indigenous bankers).

2. The second phase from 1947 to 1991

- Broadly the main characteristic feature of this phase is the Nationalization of the bank.
- With the view of economic planning, nationalization emerged as the effective measure.
- Need for nationalization in India:

(a) The banks mostly catered to the needs of large industries, big business houses.
(b) Sectors such as agriculture, small-scale industries and exports were lagging behind.
(c) The poor masses continued to be exploited by the moneylenders.

- Following this, in the year 1949, 1st January the Reserve Bank of India was nationalized.

- Fourteen commercial banks were nationalized on 19th July 1969. Smt. Indira Gandhi was the Prime Minister of India, during in 1969. The following banks are nationalized:

1. Central Bank of India
2. Bank of India
3. Punjab National Bank
4. Bank of Baroda
5. United Commercial Bank
6. Canara Bank
7. Dena Bank
8. United Bank
9. Syndicate Bank
10. Allahabad Bank
11. Indian Bank
12. Union Bank of India
13. Bank of Maharashtra
14. Indian Overseas Bank

Six more commercial banks were nationalized in April 1980. These are mentioned below:

1. Andhra Bank
2. Corporation Bank
3. New Bank of India
4. Oriental Bank of Commerce
5. Punjab & Sindh Bank
6.Vijaya Bank.

- Meanwhile, on the recommendation of Narasimham committee, Regional Rural Banks (RRBs) were formed on Oct 2, 1975. The objective behind the formation of RRBs was to serve the large unserved population of rural areas and promoting financial inclusion.
- With a view to meet the specific requirement from the different sector (i.e. agriculture, housing, foreign trade, industry) some apex level banking institutions were also setup like:(a) NABARD (est. 1982)

(b) EXIM (est. 1982)
(c) NHB (est. 1988)
(d) SIDBI (est. 1990)

Impact of Nationalization

- Improved efficiency in the Banking system – since the public‘s confidence got boosted.
- Sectors such as Agriculture, small and medium industries started getting funds which led to economic growth.
- Increased penetration of Bank branches in rural areas.

3. Third phase 1991 and beyond

- This period saw a remarkable growth in the process of development of banks with the liberalization of economic policies.
- Even after nationalization and the subsequent regulations that followed, a large portion of masses is untouched by the banking services.
- Considering this, in 1991, the Narasimham committee gave its recommendation i.e. to allow the entry of private sector players into the banking system.
- Following this, RBI gave license to 10 private entities, out of which few survived the market demands, which are- ICICI, HDFC, Axis Bank, IndusInd Bank, DCB.
- In 1998, the Narsimham committee again recommended entry of more private players. As a result, RBI gave license to the following newbies:

(a) Kotak Mahindra Bank (2001)
(b)Yes Bank (2004)

Points to Note

1. Allahabad Bank, established in 1865 – Allahabad Bank is the oldest Public Sector Bank in India having branches all over India and serving the customers for the last 145 years.
2. Imperial Bank of India was later renamed in 1955 as the State Bank of India.
3. Punjab National Bank is the first bank purely managed by Indians, which was established in Lahore in 1895.
4. First Truly Swadeshi bank – Central Bank of India is called India’s First Truly Swadeshi bank, which was established in 1911 and wholly owned and managed by Indians.
5. Union Bank of India was inaugurated by Mahatma Gandhi in 1919.
6. Osborne Smith was the first governor of the Reserve Bank.
7. CD Deshmukh was the first Indian to be the governor of the Reserve Bank.
8. The first Indian bank to open an overseas branch is Bank of India. It established a branch in London in 1946.

9. State Bank of India has the maximum number of overseas branches.

Money Market- Banking System in India

The banking structure is divided into many parts like Capital Market, Money Market etc.

Money Market

- In this, borrowing and lending of funds take place up to 1 year.
- It is used for short-term credit.
- It includes Reserve Bank of India, Commercial Banks, Cooperative Banks, Regional Rural Banks, some NBFC's etc.

Composition of Money Market

Indian Money market consists of organised sector and unorganized sector. But here, we will put a focus on the organised sector.

Organised Sector:

It is divided into two categories:

A. Banking

Classification of Banks based on the schedule of RBI Act 1934

All banks (Commercial Banks, RRB, Cooperative Banks) can be classified into scheduled and non-scheduled banks.

1. Scheduled Banks

- Banks are listed in the second schedule of RBI Act, 1934.
- Eligible for obtaining loans from RB on Bank Rate.

2. Non- Scheduled Banks

- Banks that are not listed in the second schedule of RBI Act, 1934.
- Generally, not eligible for obtaining loans from RBI.
- Keep CRR with itself, not with RBI.

Commercial Banks

- It is divided into two parts i.e. Public and Private Sector Banks.
- Regulated under Banking Regulation act 1949.
- They can accept deposits, can provide loans and other financial services to earn the profit.

(a) Public Sector Banks

- In these banks, the majority of shares (more than 50%) are held by the Government.
- Currently, in India, there are 21 Public sector banks after the merger of SBI with their associate banks and Bhartiya Mahila Bank (BMB).
- The Nationalisation of banks was done by government in two stages:
  The first stage of nationalization took place in July 1969, in which fourteen banks were nationalized.
  The second stage of nationalization of Banks took place in April 1980, in which six banks were nationalized.
  Objectives of Nationalization of Banks:
  1. Reducing Private Monopolies
  2. Social Welfare
  3. Expansion of Banking Facilities
  4.Focus on Priority Sector Lending

(b) Private Sector Banks

- In these banks, the majority parts of shares are not held by the government.
- Private sector banks consist of both Indian Banks as well as foreign banks.
- Private banks which were set up before 1990 (liberalisation of the economy) are categorised as Old Banks.
- Private banks which were set up after 1990 (liberalisation of the economy) are categorised as New Banks.
- Local Area Banks- Private Banks which are allowed to operate in the limited area called local area banks and registered under the companies act, 1956. The minimum capital required for these banks is Rs. 5 crores.

Regional Rural Banks

- Established under RRB Act, 1976.
- Regional Rural Banks are set up by public sector banks.
- The objective of RRBs is to increase credit flow to rural areas.
- After the Kelkar committee's recommendations in April 1987, no new RRBs have been opened.

Cooperative Banks

- Established with the aim of funding agriculture, cottage industries etc.

- Can perform both deposits and lending activities.
- NABARD (National Bank for Agriculture and Rural development) is the apex body of the cooperative sector in India.

Composition of Cooperative Banks

1. Rural Cooperative Credit Institutions

(a) Short Term Structure

- Lend up to one year.
- It is further divided into a three-tiered setup.

(i) State Cooperative Bank: Apex body for cooperative banks in the state.
(ii) Central or District Cooperative Banks: Operate at the district level.
(iii) Primary Agriculture Credit Societies: Operate at the village level.

(b) Long-Term Structure

- Lend for more than one year to twenty-five years.
- It is divided into two-tiered setup:
  (i) State Cooperative Agriculture and Rural Development Banks and
  (ii) Primary Cooperative Agriculture and Rural Developments Banks

2. Urban Cooperative Credit Institutions

- Set up in urban and semi-urban areas.
- Lend to small businesses and borrowers.

B. Sub Markets

- Sub Market, market to generate resources for investment and to meet the shortage of money for regular activities.
- The government, Financial Institutions and Industries take part in the submarket.

The composition of the Sub Market-

(i) Call Money Market

- Known as Short Notice Market.
- Generally used for inter-bank borrowing and lending.
- Loans for a range from one to fourteen Days.
- It is also divided into two categories- A. Call market or Overnight Market (Within one Day)
  - B. Short Notice market (up to fourteen days)

(ii) Bill Market or Discount Market

(a) Treasury Bills

- Issued by Government treasury.
- Used for short-term credit.
- Non-interest bearing (Zero Coupon bonds), issued at discount price.

(b) Commercial Bill Market

- Bills other than treasury bills.
- Issued by traders and industries.

(iii) Dated Government Securities

- Used for long-term maturity.

(iv) Certificates of Deposits

- Issued by commercial banks and financial Institution

(v) Commercial Paper

- Issued by corporate, Primary dealers and financial institutions.

Capital Market

Financial Market is the market where borrowing and lending of funds of all individual, institutions, companies and of the government take place. In India, Financial Market can be divided into two main categories-(A) Money Market (B) Capital Market. In this article, we will read the "Basics of Capital market, Stock market, their types, and features"

Money Market

- It is used for short-term credit.
- Generally, we use it for borrowing and lending of money up to 1 year.
- It includes Reserve Bank of India, Commercial Banks, Cooperative Banks, Regional Rural Banks, Some NBFC's etc.

Capital Market

- It is used for long-term credit.
- Generally, we use it for borrowing and lending of money above 1 year.
- It includes Stock exchanges, Housing finance companies, Insurance companies etc.
- All the institutions listed in the capital market are called Non-banking financial companies (NBFC's). But it is not Necessary that all NBFCs are part of the capital market.
  NBFCs

NBFCs is a company registered under the companies act, 1956. It differs from banks in the following aspects-
(i) It cannot accept demand deposits.
(ii) They do not have insurance coverage on their deposits however bank deposits have insurance cover of Deposit Insurance and Credit Guarantee Corporation.

Composition of Capital Market

- It is mainly divided into three categories-
  (A) Securities Market
  (B) Development Financial Institutions
  (c) Financial Intermediaries

(A) Securities Market

- It deals with shares and debt instruments. These instruments are used for fund-raising.
- In shares instruments, we include equity share, preference share, derivatives etc. In these instruments, investors have a partner in the capital, profit and loss.
- In a debt instrument, we include bonds, debentures etc. In these instruments, we need to pay interest to the debt instrument holder regardless of profit or loss.
- Debentures- In this lender lends money to companies with some surety (maybe Plant, machinery etc). But in case of Bonds, the lender lends money to the companies without any surety.
- Shares are mainly of two types- the First one is equity share and the second one is preference share. In equity shares, the holder has claimed over the capital, profit and loss. In Preference shares holder is entitled to have a fixed amount of dividend. In case of the closing of company preference shareholders have the preferential right to get back the capital paid.
- For trading of securities, we have a primary (New issue) and secondary (Old Issue) market.

Primary (New Issue Market)

- In this, securities issued by the issuer and purchased by Public. Purchase of new or fresh securities is carried in this.
- In the primary market, if any company issues shares for the first time, it is called as the Initial Public offering (IPO).
- If any company that has already issued shares, they again issue shares to raise additional funds it is known as Follow-on Public Offering (FPO).

Secondary (Old Issue Market)

- Buying and selling of securities which are already issued in New issue (Primary) market.
- There are two platforms for the trading in this market which are-
  (1) Stock Exchanges (Only listed securities),
  (2) Over the Counter Exchanges (Securities which are not listed on any stock exchange)

Terms used in the securities market

- Declared Price Issue- Fixed price
- Book Building Issue- Price fixes according to demand
- Merchant Banker- Issuer appoints it on behalf of it to carry out fund-raising activities
- Authorised Capital- Maximum amount authorized by higher officials of the company that can be raised by the company
- Issuer Capital- Actual amount issued by the company
- Subscriber Capital- Actual amount subscribed by the public
- Underwriter- It is a financial intermediary who promises to purchase Unsubscribe capital.
- Called up Capital- Company collects the fund in instalments and a portion of money called from Subscriber is called as Called up Capital.
- Paid up Capital- the Actual amount paid by subscribers
- Reserve Capital- Un-demanded of money portion
- Right Issue- In this offer of securities to existing shareholders via FPO.
- Bonus Issue- the issue of shares as against a profit of existing shares
- Sweat Equity Issue- Offer of shares to employees against their hard work for the company

- Cash trading- Sale and purchase of securities on the price of the trading day
- Forward trading- Both buyer and seller signed an agreement to repurchase of securities on pre-agreed price.
- Derivatives- It does not have independent value, it has value only because of underlying securities which need to be traded.
- Demutualisation- Process of transferring of share from brokers to Public

Stock Exchanges

- There are two important stock exchanges in India- NSE and BSE.

National Stock Exchanges (NSE)

- It was established on the recommendation of Pherwani Committee in 1992.
- Nifty and Nifty Junior are the indices of NSE. Nifty measures share price of top 50 and later top 50 by Nifty junior.

Bombay Stock Exchanges (BSE)

- It is Asia's oldest stock exchange and was established in 1875.
- SENSEX (Sensitive Index) is the Index of BSE. SENSEX measures share price movement of top 30 companies.

Depositaries

- In this Investors keep their securities in Demat (Dematerialised) form. Currently, there are two depositories in India.
  (1) NSDL (National Securities Depository Limited)- It is located in Mumbai.
  (2) CDSL (Central Depository Services Limited)- It is also located in Mumbai.

(B) <u>Development Financial Institutions</u>

- They provide a long-term loan, entrepreneurial assistance (technical advice etc).
- Examples of these are- IDBI, EXIM bank etc.

(C) <u>Financial Intermediaries</u>

- RBI regulated
  (1) Asset Finance company
  (2) Loan Company
  (3) Investment Company
- SEBI regulated
  (1) Venture Capital Fund
  (2) Merchant Banking Companies
  (3) Stock Broking Companies

Balance Of Payments

<u>Introduction</u>

- International Monetary Fund (IMF) defines the Balance of Payments (BoP) as a statistical statement that summarizes economic transactions between residents and non-residents during a specific time period.
- The BoP, thus, includes all transactions showing:
  (a) Transactions in goods, services and income between an economy and the rest of the world,
  (b) Change of ownership and other changes in that economy's monetary gold, special drawing rights (SDRs), and financial claims on and liabilities to the rest of the world
  (c) Unrequited transfers- transfer of money in which nothing is expected in return. Example- Foreign aid, debt forgiveness etc.
- These transactions are categorized into
  (i) Current Account
  (ii) Capital Account and Financial Account (capital account is redesignated as capital and financial account)
- The balance of payments is, basically, the record of all international financial transactions made by a country's residents.
- The balance of payments tells us whether the country has a surplus or deficit. It also reveals whether the country produces enough economic output to pay for its growth.

<u>When BoP is deficit it implies</u>

- A balance of payments deficit means the country imports more goods, services and capital than it exports.
- The country must borrow from other countries to pay for its imports.
- In the short-term, that fuels the economic growth. But, in the long-term, the country becomes a net consumer, not a producer, of the world's economic output.
- The country goes into debt to pay for consumption instead of investing in future growth. If the deficit continues for long, the

country gets into the debt trap and might end up selling its assets to pay off its debt.

When BoP is surplus it implies

- A balance of payments surplus means the country exports more than it imports.
- The country basically saves more than it earns. This boosts the capital formation with its additional income. They might even lend outside the country.
- A surplus boosts economic growth in the short term.
- In the long run, the country becomes too dependent on export-driven growth. It must encourage its residents to spend more. A larger domestic market will protect the country from exchange rate fluctuations

BOP Components

- The BoP can be broadly divided into two accounts namely-
  (a) Current Account
  (b) Capital and financial account.

Current Account

- The current account measures the transfer of real resources (goods, services, income and transfers) between an economy and the rest of the world.
- The current account is further subdivided into a merchandise account and invisible account.
- The merchandise account consists of transactions relating to exports and imports of goods.
- In the invisible account, there are three broad categories namely-
  (a) non-factor services such as travel, transportation, insurance and miscellaneous services;
  (b) transfers which do not involve any value in exchange, and
  (c) income which includes compensation for employees and investment income.

Current Account Deficit (CAD)

- Current Account Deficit (CAD) = Trade Deficit + Net Income From Abroad + Net transfers
  Note: Here Trade Deficit= Export-Import
  So we can see here that Trade Deficit and Current Account Deficit both are different and the Trade Deficit is one component of Current Account Deficit.

Capital Account and Financial Account

- The capital and financial account reflect the net changes in financial claims on the rest of the world.
  Note-
  The former balance of payments capital account has been redesigned as the capital and financial account as per the fifth edition of Balance of Payments Manual (IMF).
- The capital account can be broadly broken up into two categories namely-
  (a) Non-debt flows such as direct and portfolio investments
  (b) Debt flows such as external assistance, commercial borrowings, non-resident deposits, etc.
- The financial account records an economy's transaction in external financial assets and liabilities.
- All components are classified according to type of investment or by functional subdivision
  (a) Direct investment
  (b) Portfolio investment
  (c) Other investment
  (d) Reserve assets
- The sum of the current account and capital account indicates the overall balance, which could either be in surplus or in deficit. The movement in overall balance is reflected in changes in the international reserves of the country.

Economic Theory: Microeconomics Notes

IMPORTANT CURVES

1. **LORENZ CURVE:**

- Lorenz curve is a graphical representation of income distribution in the society.
- It was given by Max O Lorentz in 1905. It is used to analyze inequality prevailing in the population.
- In this graph, the cumulative percentage of national income is plotted against the cumulative percentage of households.

- The degree to which the curve sags away from the line of perfect equality is the measure of inequality in society.
- It is given by Gini's coefficient.
- Gini's coefficient: It is the proportion of the shaded region with respect to the area corresponding to the line of perfect equality. Higher the value more is the inequality in society.

2. LAFFER CURVE:

- Laffer curve represents the relationship between tax collection and levied tax rates by the state authorities.
- It states that as the tax rate increases from the low level, tax collection also increases but as the tax rate increases beyond a critical limit, tax collection starts falling.
- This can be due to lower profitability and higher incentive to cheat associated with higher taxes.

3. PHILLIPS CURVE:

- It was given by A. William Phillips, a New Zealand economist.
- According to this, there is an inverse and stable relationship between inflation and unemployment. As one falls, other increase.
- There is also a term which defines the simultaneous existence of high inflation and high unemployment i.e. low growth with high inflation, which is known as stagflation.

4. KUZNETS CURVE:

- Kuznets curve is based on a hypothesis forwarded by an economist Simon Kuznets.
- According to the hypothesis, when a country starts developing, economic inequalities first increases for a period of time but after a threshold when a certain average income is attained, economic inequalities begin to decrease.
- It is thus represented as an inverted U-shaped graph as shown below.
- Similar in the line is the Environment Kuznets curve.

5. ENVIRONMENT KUZNETS CURVE:

- It shows the relationship between economic progress on one hand and environmental degradation over a period of time caused in lieu of that economic progress.
- It says, as the economy starts the journey of development, pollution in first phase increases but with further development of the economy, pollution rates begin to decline.
- And eventually, both economic progress and environment maintenance go hand in hand.

GRESHAM'S LAW

- Gresham's Law states that 'bad money drives out good'.
- It means if in a country there are two currencies, the overvalued currency (cheaper one) will drive the undervalued (precious/expensive one) out of use.
- This is because people start hoarding the undervalued currency as a store of value and eventually, that will be eliminated from circulation.
- This law was named after an English financier, Sir Thomas Gresham (1519-1579).

OPPORTUNITY COST

- Value of the loss incurred on account of the next best alternative/choice forgone, in availing the best alternative/choice available rather than the next best, is known as the opportunity cost of the chosen alternative.
- In simple words, it refers to the value one decides to give up in availing any opportunity.
- Or in other words, what have you lost while opting for an option is the opportunity cost of your choice.

Sr. No.	Articles	Opportunity cost
1.	Free goods like clean air, abundant fresh water, etc.	No
2.	Common goods (in abundant)	No
3.	Common goods (scarce)	Yes
4.	Government expenditure in defence	Yes

5.	Government freebies to citizens	Yes
6.	Public goods like roads, railways, infrastructure, etc.	Yes

- The opportunity cost is considered to be zero for naturally occurring abundant resources like free unpolluted air, water etc. and also for common goods like grazing land, oceans etc.
- For government expenditures, the Opportunity cost is never zero because the authorities always have choices to make.
- So, whatever is chosen, there would exist something forgone as well. Like if the government decides to build a bridge, the government could have spent that price onto increasing more personnel to ensure safety.
- In the case of freebies, for consumers/ citizens, there is no opportunity cost because it is transferred from them to the government.

PRODUCTION POSSIBILITY CURVE:

- With the available amount of resources and technology, the various alternative combinations of production of a set of two goods are plotted to give a production possibility curve.
- It is also known as the Production Possibility Frontier or Transformation curve.
- The curve helps in deciding "what to produce".
- Thus, the curve provides all the production possibilities available, out of which the most economically or physically viable one could be chosen to maximize profit and minimize the losses attached.

Different points on a curve

Point X represents underutilization of resources;
point Y represents infeasible option i.e. non-feasibility of the chosen combination (beyond the capacity);
while points A, B and C represent the full utilization of resources.

If the resources and technology available increases, the curve shifts towards the right and if resources and technology fall short, the curve shifts towards the left.

SUPPLY-DEMAND CURVE:

Supply curve:

- It represents the relationship between the price and quantity of a product produced which the seller is ready to supply in the market, keeping other variables to be constant.
- Herein quantity of the product is plotted horizontally on x-axis and price of the same product on the y-axis.
- It is generally a straight line sloping upward from left to right as shown in the graph. This is so because price and quantity of a product are directly related, i.e. if the price of a product is increasing in the market, its quantity in the market will also increase in the same manner (increase in price acts as an incentive for the suppliers to produce more).
- With the change in variables, the supply curve can shift in either direction. If it shifts towards the left, it implies a decrease in the quantity of product supplies in the market and rightward shift implies an increase in quantity supplies with respect to the price of the product.

Demand curve:

- It represents the relationship between the price and quantity of the product demanded by the consumers, keeping all other variables to be constant.
- It generally represents a downward sloping straight line from left to right as shown in the graph below.
- This is so because price and quantity of the product demanded are inversely related to each other, i.e. if the price of a commodity falls, its demand rises.
- Conforming to the supply curve, if it shifts leftwards, it implies a decrease in demand and if rightwards, it implies an increase in demand of a product.

Keynesian Theory

Keynesian Economics

- It was developed by the British economist John Maynard Keynes during the 1930s. It

was an attempt to understand the Great Depression.
- It suggested increasing government expenditures and lower taxes to stimulate demand and pull the global economy out of the depression.

Keynesian Theory of Employment
- This theory rejected the notion of full employment and instead suggested full employment as a special case and not a general case.
- It said if there is an increase in national income, there would be an increase in level of employment and vice versa.
- According to this theory, the level of employment is dependent on national income and output and factors of production remain unchanged while determining the level of employment.

Laissez-faire Theory
- This theory opposed any government intervention in business affairs.

World Trade Organisation: Structure, Objectives, Agreements, Subsidies

Introduction
- WTO is an international organization set up in 1995 by replacing the General Agreement on Trade and Tariffs (GATT) under the Marrakesh Agreement.
- It is the only global international organization dealing with the international Trade between nations.
- Its HQ is located in Geneva, Switzerland.
- Currently, WTO has 164 members and India is a founding member of WTO.
- Currently, the head (Director-General) of WTO is Roberto Azevedo.

Evolution of WTO
- After the end of World War-II, various international organizations were formed to facilitate collaboration between countries in dealing with economic, social, and technical problems.
- For the development of the world economy and seamless trade among all the countries, a dire need was felt for an international organization for regulating international trade.
- In 1945 a conference known as the Bretton Woods Conference (by two Bretton wood institutions- IMF and World Bank) was held for the creation of international trade organization (ITO) which finally could not be ratified due to lack of approval by the US and many other major countries.
- As the US was an emerging world power after World War-II, hence the creation of ITO without the US was meaningless.
- Meanwhile, through negotiations, a multilateral agreement was concluded in 1947 known as the General Agreement on Tariffs and Trade (GATT).
- Various conferences of GATT were held on periodic intervals for negotiations on trade. Finally, during the Uruguay round of conference held from 1986-1994, agreement on the creation of WTO was finally ratified through the Marrakesh Agreement.
- India has been a member of GATT since 1948 and a founding member of WTO. China joined WTO only in 2001 and Russia in 2012.

Objectives of WTO
- To formulate and implement rules for international trade.
- To provide a platform for negotiating and monitoring further trade liberalization.
- To provide a platform for the settlement of disputes.
- Providing assistance to the developing, least-developed and low-income countries in transition to adjust to WTO rules and disciplines through technical cooperation and training.
- To cooperate with the other major economic institutions (like UN, World Bank, IMF etc) involved in global economic management.

Structure of WTO

The basic structure of WTO is as appended below:-
- Ministerial Conference – It is the topmost decision-making body of the WTO. Usually, it meets after every two years. It brings together all WTO participants.

- The General Council – It is composed of representatives of all the member states. It is responsible for the day-to-day business and management of the WTO.
- Other councils/bodies - There are many other bodies like Goods Council, Services Council, Trade Policy Review Body, Dispute Settlement Body etc. which deals with other specific issues.

Principles of WTO

The WTO Agreements are based on the following simple and fundamental principles:-

- Non Discrimination
- Most Favored Nation - All nations should be treated equally. No one country can grant any other member country any special favour. For example, if one country lower tariff to one country then it has to be lowered to all other member countries.
- National Treatment- Same treatment to all products, either local or foreigners. Fair and equal treatment is given to local as well as the products imported from other countries.
- Reciprocity - Lowering of import duties and other trade barriers in return for similar concessions from another country.
- Predictability through Binding and enforceable commitments - To make the business environment stable and predictable.
- Transparency - The WTO members need to publish their trade regulations and to notify changes in trade policies to the WTO.
- Encouraging Development and Economic Reforms - All efforts are made by the WTO system to contribute to development.

Important Trades Agreements of WTO

The important trade agreements concluded under WTO are -

- Agreement on Agriculture (AoA),
- Agreement on TRIPS (Trade-Related Aspects of Intellectual Property Rights),
- Agreement on the Application of Sanitary and Phytosanitary Measures (SPS),
- Agreement on Technical Barriers to Trade (TBT),
- Agreement on Trade-Related Investment Measures (TRIMS),
- General Agreement on Trade in Services (GATS) etc.

Agreement on Agriculture (AoA)

- It was negotiated during the Uruguay Round of the GATT and was concluded with the establishment of the WTO in 1995.
- Through AoA, WTO aims at reforming trade in agriculture with a fair and market-driven system.
- The Agreement allows governments to support their rural economies, but only allows those policies that cause less trade "distortions".
- This agreement has fixed commitments from all member states on the following three agricultural supply chain system:-

1. **Improving Market access–** This can be done by removing various trade barriers by the member states. By fixing the tariffs and progressively promoting free trade among member states which will ultimately lead to an increase in market access.

2. **Domestic Subsidies-** It basically motivates for the reduction in domestic subsidies that distorts free trade and fair prices. This is based on the premise that not all subsidies distort trade to the same extent. Under this agreement, Subsidies can be categorized into the following three boxes –

   (a) Green Box – All those subsidies that do not distort trade or cause minimal distortion, come under the green box. Ex-All government services such as research, disease control, and infrastructure and food security. Also, all those subsidies given to the farmers that directly do not affect international trade also comes under the green box.

   (b) Amber Box - All kinds of domestic subsidies or support that can distort production and trade (with some exceptions) fall into the Amber Box. The measures to support prices come under this box. The exception is the provision that accepts subsidies upto 5% of agricultural production

for developed countries, 10% for developing countries.

(c) Blue Box – All those Amber Box subsidies which tend to limit the production comes under Blue Box. This can be increased without limit as long as subsidies are linked to production-limiting programs.

3. Export subsidies – All those subsidies that make the export of agricultural products cheaper are called export subsidies. These are basically presumed to have trade-distorting effects. This agreement prohibits the use of export subsidies by the member states for agriculture products.

India's trade concerns and WTO

Appended below please find India's concerns related to trade in WTO:-

- Tariff on steel and aluminium – Recently the USA govt imposed 10% tariff on aluminium and 25% tariff on steel against various trade partners. India wants that it should be removed or it will raise the issue in WTO.

- Export Subsidy Issue – Recently USA dragged India to WTO and raised concern on the export subsidy regime provided to the Indian companies in the form of SEZ, MEIS, EPCG, etc. USA argues that as India's Per Capita Income has increased from $ 1000, India can't use the export subsidy regime as per the ACSM.

- Agricultural subsidies - The present quota of subsidies is based on the price levels of 1986-88. Presently the minimum support price (MSP) concept which provides subsidies to the farmers in India falls under the Amber box. It can directly affect India's food security program. India wants that it should be at the current price level and the amber box concept should be done away with. However, a 'peace clause' agreed to during the Bali conference allows India to carry on with its PDS program as of now. But the developed member states are not taking any steps for a permanent solution of this problem.

- Special and differential treatment (SDT) - During Doha round, member states agreed to provide favourable treatment to developing nations. However, developed countries are denying the emerging economies such as India and China as unworthy of this provision.

- Issues related to intellectual property rights – The issues of compulsory licensing of medicines have been resolved through TRIPS. However, the developed nations are trying to push for TRIPS commitments.

NITI Aayog

- NITI Aayog is created for the financial planning at pan-India and the important reports it releases for the development assessing various parameters.
- The Planning Commission was established in March 1950 by a resolution of the Government of India.
- It was made responsible for assessing national resources and drafting five-year plans for the effective use of the resources.
- The objective was to the proper and effective utilization of resources. With changing times, and growing needs of the people and effectively address them, a new version of planning body i.e. NITI Aayog was established by a resolution of the Union Cabinet on January 1, 2015, replacing the Planning Commission.
- NITI Aayog is regarded as the premier policy 'Think Tank' of the Government of India. It provides both directional and policy inputs.
- Besides designing the strategic and long-term policies and programmes for the Government of India, the Aayog also provides relevant technical advice to the Centre as well as the States.

Role of International Labour Organization (ILO) in Social Security

- It was created as part of the "Treaty of Versailles" that ended World War I to ensure social justice for people of work.
- It became a specialized agency of newly formed united nations after the second world war and today has a membership of 186 states that continues to grow. The tripartite

structure is unique to the ILO where representatives from the government, employers and employees openly debate and create labour standards.

- The ILO received the Nobel Peace prize in 19 69 and today is recognized as the world's authority on the world of work.
- Its impact has seen key moments in history. Headquartered in Geneva with over 40 new offices around the globe, the ILO is unique amongst international organizations, where not only governments but employers and workers as well have equal voices.
- They work together to create Labour standards and qualities that impact today's global economy.
- In 2008, the ILO adopted a Declaration on Social Justice for fair globalization to respond to our world faced with the economic crisis. It made decent work the core of ILO policy and with the decent work agenda into practice. The Decent Work Agenda has forced to teach objectives:
- Promote decent employment opportunities
- Enhance social protection
- Strengthen tripartism and social dialogue
- Guarantee Fundamental principles and rights at work

Pradhan Mantri Garib Kalyan Yojana

About Pradhan Mantri Garib Kalyan Yojana

- The Pradhan Mantri Garib Kalyan Yojana (PMGKY) was originally launched by PM Narendra Modi in 2015 as a scheme built with the objective of addressing poverty.
- However, with the recent demonetization drive launched by the government to curb the spread of black money, an amendment has been made to the existing Income Tax Bill and the PMGKY has been made a part of the Taxation Laws (Second Amendment) Act, 2016.

Quick Glance at the announced highlights:

- Insurance cover of Rs 50 Lakh per health worker fighting COVID-19 to be provided under Insurance Scheme
- 80 crore poor people will get 5 kg of wheat or rice and 1 kg of preferred pulses for free every month for the next three months
- 20 crore women Jan Dhan account holders to get Rs 500 per month for next three months
- Increase in MNREGA wage to Rs 202 a day from Rs 182 to benefit 13.62 crore families
- Ex-gratia of Rs 1,000 to 3 crore poor senior citizen, poor widows and poor disabled
- Government to front-load Rs 2,000 paid to farmers in the first week of April under existing PM Kisan Yojana to benefit 8.7 crore farmers
- Central Government has given orders to State Governments to use Building and Construction Workers Welfare Fund to provide relief to Construction Workers

MGNREGA: The Contribution to Strengthening the Rural Economy

What is MGNREGA?

- The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) is a law whereby any adult who applies for employment has to be given a guarantee of 100 days of work on local public works within fifteen days of registration. If employment is not given, then the unemployment allowance has to be paid.
- The Act enacted in 2005 is regarded as the largest work guarantee program in the world, guarantees 100 days of wage employment per year to rural households. Roughly one-third of the stipulated workforce must be women.

Note: Previously, this social security scheme was called 'National Rural Employment Guarantee Act, but after April 2008, it was renamed as Mahatma Gandhi National Rural Employment Guarantee Act. Presently, the minimum number of days of work have been increased up to 150 days.

The objective of the MGNREGA Scheme

- It aims at addressing the causes of chronic poverty through the works that are undertaken and ensuring sustainable development.
- The Act was introduced with the aim of improving the purchasing power of the rural people, primarily semi or unskilled work to people living below the poverty line in rural India.

- It also aims to strengthen the process of decentralization and empowers Panchayati Raj Institutions (PRIs) for the planning and implementation of these works.

PHYSICS

WORK

- Work is said to be done, if force acting on a body is able to actually move it through some distance in the direction of the force. Its SI unit is a **joule**.

ENERGY

- Energy is a scalar quantity and its unit is **Joule**.
- The sum of all kinds of energies in an isolated system remains constant at all times. This is the law of conservation of energy.

POWER

Its unit is **watt**.

- **1 watt hour** = 3600 Joule
- **1 kilowatt hour** = 3.6 x 10^6 joule
- **1HP** = 746 watt

GRAVITATION

- Everybody in the universe attracts other body by a force called force of gravitation.
- The gravitational force of the earth is called **gravity**.
- The acceleration produced in a body due to force of gravity is called **acceleration** due to gravity (g) and its value **is 9.8 m/s'**
- Acceleration due to gravity is independent of shape, size and mass of the body.
- Escape velocity is the minimum velocity with, which an object just crosses the Earth's gravitational field and never returns. Escape velocity at the Earth's surface is **11.2 km/s.**
- Escape velocity at the **Moon's** surface is **2.4 km/s.** Due to low escape velocity there is no atmosphere on the moon.
- Value of g decreases with height or depth from Earth surface.
    - g is maximum at **poles**.
    - g is minimum at **equator**.
    - g decreases due to **rotation of Earth**.
    - g decreases if angular speed of Earth increases and increases if angular speed of Earth decreases.
- The acceleration due to gravity at the moon is **one-sixth** that of the Earth. So, the weight of a person on the surface of the moon will be **1/6** of his actual weight on the Earth.

SATELLITE

- Satellites are natural or artificial bodies revolving around a planet under its gravitational force of attraction.
- **Moon** is a **natural satellite**, while **INSAT-B** is an artificial satellite of Earth.
- The period of revolution of satellite revolving near the surface of earth is 1 hour 24 minutes (34 minutes).
- Geo-stationary satellite revolves around the Earth at a height 36000 km (approx).
- Time period of rotation of geo-stationary satellite is 24 hours.
- The Earth rotates on its axis from **West to East**. This rotation makes the Sun and the stars appear to be moving across the sky from **East to West**.
- A **geosynchronous satellite** is a satellite in geosynchronous orbit, with an orbital period the same as the Earth's rotation period.
- A special case of geosynchronous satellite is the **geostationary satellite**, which has a geostationary orbit – a circular geosynchronous orbit directly above the Earth's equator.
- **Geo-stationary satellite is used** to telecast. TV programmes from one part of the world to another, in weather forecasting, in predictions of floods and droughts.
- Polar Satellite Revolves around the earth in polar orbit at a height of **800km** (app.) Time periods of these satellites is **84 min**.

ATOMIC AND NUCLEAR PHYSICS

Cathode Rays

Cathode rays, discovered by Sir William Crooke and its properties are

- travel in **straight lines.**
- Produce fluorescence.
- can penetrate through thin foils of metal and deflected by both electric and magnetic fields.
- have velocity ranging **1/30th** to **1/10th** of the velocity of light.

Positive or Canal Rays

- These rays were discovered by **Goldstein**.
- The positive ray consists of **positively charged particles**.
- These rays travel in **straight line.**
- These rays are deflected by **electric and magnetic fields.**
- These rays can produce ionization in gases.

X-Rays

- X-rays are electromagnetic waves with wavelength **range 0.1 A-100 A.**
- X-rays were discovered by **Roentgen**.
- X-rays travels in **straight line.**
- Long exposures of X – rays in injurious for human body.
- X – rays shows **photoelectric effect.**

Uses of X-Rays

- **In medical sciences** X-rays are used in surgery for the detection of fracture, diseased organs, foreign matter like bullet, stones etc. They are used in treatment of cancer and in skin diseases.
- **In Engineering,** X-rays are used in detecting faults, cracks, flaws and gas pockets in the finished metal products and in heavy metal sheets.
- **In Scientific Work,** X-rays are used in studying crystal structure and complex molecules.
- **In Custom Department** X-rays are used in custom department for detection of banned materials kept hidden.

Radioactivity

- Radioactivity was discovered by **Henry Becquerel, Madame Curie** and **Pierre Curie** for which they jointly won Nobel Prize.

Nuclear Fission

- Atom Bomb is based on nuclear fission. U^{235} and Pu^{239} are used as fissionable material.
- Nuclear fission was first demonstrated by Halin and Fritz Strassmann.

Nuclear Fusion

- When two or more light nuclei combined together to form a heavier nucleus is called as **nuclear fusion**.
- For the nuclear fusion, a temperature of the order of $\mathbf{10^8}$ **K** is required.
- **Hydrogen Bomb** was made by the American Scientist in **1952**. This is based on **nuclear fusion**. It is **1000** times more powerful than atom bomb.

Nuclear Reactor or Atomic Pile

- Nuclear reactor is an arrangement, in which controlled nuclear fission reaction takes place.
- **First nuclear reactor was** established in Chicago University under the supervision of **Prof Enrico Fermi**.
- Heavy water, graphite and beryllium oxide are used to slow down the fast moving neutrons. They are called moderate.

Uses of Nuclear Reactor

(i)To produce electrical energy from the energy released during fission.

(ii)To produce different isotopes, this can be used medical, physical and agriculture science.

There are several components of nuclear reactor which are as follows

- Fissionable Fuel U^{235} or U^{239} is used.
- Moderator decreases the energy of neutrons, so that they can be further used for fission reaction.
- **Heavy water** and graphite are used as moderator.
- **Control Rod rods of cadmium** or boron are used to absorb the excess neutrons produced in fission of uranium nucleus, so that the chain reaction.

NEWTON'S LAWS OF MOTION

- **First Law:** Everybody maintains its initial state of rest or motion with uniform speed on a straight line unless an external force acts on it. It is also called Galileo's law or law of inertia.

Example: While jumping from a slowly moving train/bus one must run for short distance, in the direction of motion.

- **Second Law:** The form acting on an object is directly proportioned to the product of the mass of the object and the acceleration produced on it.
- **Third Law:** To every action, there is an equal and opposite reaction.

Example : Bogies of the trains are provided with buffers to avoid severe jerks during shunting of trains. Rocket moves up due to reaction of downward ejection of gas.

CIRCULAR MOTION

- When an object moves along a circular path, its motion is called circular motion.
- The external force required to act radially inward over the circular motion of the body is called **Centripetal force.**
- **Centrifugal force** is such a pseudo force that. is equal and opposite to **Centripetal force.**
- Cream separator, centrifugal dryer work on the principle of centrifugal force.

FRICTION

- In the opposing force that is set-up between the surfaces of contact, when one body slides or rolls or tends to do so on the surface of another body.
- Due to friction, we are able to move on the surface of Earth.
- While applying brakes in automobiles, it stops only due to friction.

Pascal's Law of Pressure

- Hydraulic lift, hydraulic press and hydraulic brakes are based on the **Pascal's law of pressure.**

Archimedes Principle

- When a body is immersed partly or wholly in a liquid, there is an apparent loss in the weight of the body, which is equal to the weight of liquid displaced by the body.
- 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. So, small ball of iron ball sink in water, but large ship float.
- A fat person will quickly learn the swimming as compared to a slim person because he will displace more water. So, it will be more balanced.
- Hydrogen filled balloon float in air because hydrogen is lighter than air. A person can lift more weight in water.

WAVE

A wave is a disturbance, which propagates energy from one place to the other without the transportation of matter.

Waves are broadly of two types:

- Mechanical wave (longitudinal wave and transverse wave)
- Electromagnetic wave
- Following are the electromagnetic (Non-mechanical) waves-

a. Gama rays (**Highest frequency**)
b. X-rays
c. UV rays
d. Visible radiation
e. infra-red rays
f. short radio waves
g. Long radio waves (**Lowest frequency**)

All are in decreasing order of the frequency

Following waves are not electromagnetic.

a. Cathode rays
b. Canal rays
c. alpha rays
d. beta rays
e. sound wave
f. ultrasonic wave

Longitudinal Waves

- In this wave the particles of the medium vibrate in the direction of propagation of wave.
- Waves on springs or sound waves in air are examples of longitudinal waves.

Transverse Waves

- In this wave, the particles of the medium vibrate perpendicular to the direction of propagation of wave.
- Waves on strings under tension, waves on the surface of water are the examples of transverse waves.

Electromagnetic Waves

- The waves, which do not require medium for their propagation i.e., which can propagate even through the vacuum are called electromagnetic waves.
- Light radio waves, X-rays etc are the examples of electromagnetic wave. These waves propagate with the velocity of light in vacuum.

Sound Waves

Sound waves are longitudinal mechanical waves. Eased on their frequency range sound waves are divided into following categories.

- The sound waves which lie in the frequency range 20 Hz to 20000 Hz are called audible waves.
- The sound waves having frequencies less than 20 Hz are called infrasonic
- The sound waves having frequencies greater than 20000 Hz are called ultrasonic waves.
- Ultrasonic waves are used for sending signals, measuring the depth of see, cleaning clothes and machinery parts, remaining lamp short from chimney of factories and in ultrasonography.

Speed of Sound

- Speed of sound is **maximum in** solids **minimum in** gases.
- When sound goes from one medium to another medium, its speed and wave length changes, but frequency remain unchanged. The speed of sound remains unchanged by the increase or decrease of pressure.
- The speed of sound increases with the increase of temperature of the medium.
- The speed of sound is more in humid air than in dry air because the density of humid air is less than the density.

Echo: The repetition of sound due to reflection of sound waves is called an echo.

Intensity: It is defined as amount of energy passing normally per unit area held around that point per source unit time.

Pitch: The sensation of a frequency is commonly referred to as the pitch of a sound.

Sonar: It stands for sound navigation and ranging. It is used to measure the depth of a sea, to locate the enemy submarines and shipwrecks.

LIGHT

- Light is a form of energy, which is propagated as an electromagnetic **wave**.
- It is the radiation which makes our eyes able to 'see' the object. Its speed is **3 x 108 m/s**. It is the form of energy. It is a **transverse wave**.
- It takes **8 min 19s** to reach on the earth from the sun and the light reflected from moon takes **1.28s** to reach earth.
- **Primary Colours**- Blue, Red, Green
- **Secondary Colours**- The coloured produced by mixing any two primary colors
- **Complementary Colours-** Any two colours when added produce white light.
- Blue colour of the sky is due to scattering of light.
- The brilliant red colour of rising and setting sun is due to scattering of light.

Human Eye

- Least distance of distinct vision is 25 cm.
- Myopia or short sightedness- far objects cannot see clear
- Hyperopia or hypermetropia or Long-sightedness- Near objects cannot see clear
- **Presbyopia-** in elder person, both far and near cannot see clear

Reflection of Light

- When a ray of light falls on a boundary separating two media comes back into the same media, then this phenomenon is called reflection of light.

Spherical Mirror

Spherical mirrors are of two types

1. **Concave mirror**
2. **Convex mirror**

- Image formed by a convex mirror is always virtual, erect and diminished.
- Image formed by a concave mirror is generally real and inverted.

Uses of Concave Mirror

(i) As a shaving mirror

(ii) As a reflector for the head lights of a vehicle, search light
(iii) In ophthalmoscope to examine eye, ear, nose by doctors.
(iv) In solar cookers.

Uses of Convex Mirror

(i) As a rear-view mirror in vehicle because it provides the maximum rear field of view and image formed is always erect.
(ii) In sodium reflector lamp.

Refraction of Light

- The bending of the ray of light passing from one medium to other medium is called refraction. When a ray of light enters from one medium to other medium, its frequency and phase do not change, but wavelength and velocity change. Due to refraction form Earth's atmosphere, the stars appear to twinkle.

Total Internal Reflection

- Sparkling of diamond, mirage and looming, shinning of air bubble in water and optical Fiber are examples of total internal reflection.

Power of a lens

- Power of a lens is its capacity to deviate a ray. It is measured as the reciprocal of the focal length in meters.
- SI Unit of Power is diopter.

ELECTRICITY AND MAGNETISM

Charge

Charge is the basic property associated with matter due to which it produces and experiences electrical and magnetic effects. Similar charges repel each other and opposite charges attract each other. The SI unit of charge is **coulomb**.

Conductor: Conductors are those materials, which allow electricity to pass through them. Metals like silver, iron, copper and earth acts like a conductor. Silver is the best conductor.

Insulator: Insulators are those materials which do not allow electricity to flow through them. Metals like wood, paper, mica, glass, ebonite are insulators.

Electric Current

- Its unit is Ampere. It is a scalar quantity.
- **An electric bulb makes a bang when it is broken** because there is a vacuum inside the electric bulb, when the bulb is broken air rushes at great speed from all sides to fill the vacuum. The rushing of air produces a noise generally referred to as the bang.
- A Galvanometer can be converted into an ammeter by connecting a shunt parallel to it.
- The sodium and mercury street lamps light up due to atomic emission.
- The purpose of choke coil in fluorescent is to produce high voltage to ionize the gas in the tube required for high current to flow through filament.

Magnetism

- Diamagnetic substance- when placed in magnetic field, acquire feeble magnetism opposite to the direction of the magnetic field.
- Examples- Gold, Diamond, Copper, Water, Mercury etc.
- Paramagnetic substance- when placed in magnetic field, acquire feeble magnetism in the direction of the magnetic field.
- Example- Al, Na, Mn etc.
- Ferromagnetic substance-when placed in magnetic field, are strongly magnetized in the direction of the magnetic field.
- Examples- Iron, Cobalt, Nickle
- Curie temp- the Curie temperature (TC), or Curie point, is the temperature at which certain materials lose their permanent magnetic properties, to be replaced by induced magnetism.
- **Isogonic lines** are lines on the Earth's surface along which the declination has the same constant value, and lines along which the declination is zero are called **agonic lines**.
- **Isoclinic lines** are imaginary lines on the earth's surface connecting points where the earth's magnetic field has the same angle.

- **The aclinic line** is the magnetic equator, where the magnetic field is inclined neither north or south, so it's a special case of an isoclinic line.
- **Isodynamic line-** A line on a map connecting points of equal strength of the earth's magnetic field.

Surface Tension and capillary

- Lubricating oil spread easily on all parts because of their low surface tension.
- Dirt get removed when detergents are added while washing clothes because surface tension of water is reduced.
- The absorption of ink by a blotting paper is due to capillary action
- The supply of water to the leaves at the top of even a tall tree is through capillary rise.

Heat

- Unit of heat-

C.G.S- Calorie

F.P.S- British Thermal Unit (B. Th. U)

- Absolute Zero Temp- minus 273 K (-273 K)
- 1 calorie= 4.2 J
- The specific heat is the amount of heat per unit mass required to raise the temperature by one degree Celsius.
- **Newton's Law of Cooling** states that the rate of change of the temperature of an object is proportional to the difference between its own temperature and the ambient temperature (i.e. the temperature of its surroundings).
- **Hoar Frost-**is the reverse process of sublimation.

MEASUREMENT UNITS

- **Angstrom** : For measuring length of light waves
- **Barrel** : For measuring liquids. One barrel is equal to 31½ gallons or 7,326.5 cubic inches
- **Cable**: For measuring length of cables. It is about 183m. in length
- **Carat** : Used for measuring precious stones. It is also a measure for the purity of gold alloy
- **Fathom** : It is used for measuring depth of water. One fathom is equal to 4 inches
- **Knot**: For measuring speed of ships

SOME CONVERSION FACTORS

Mass and Density

- 1 Kg = 1000 g = 6.02 u
- 1 Slug = 14.6 kg
- 1 u = 1.66 kg

Length and Volume

- 1 m = 100 cm = 39.4 inch = 3.28 ft
- 1 mile = 1.61 km = 5280 ft
- 1 inch = 2.54 cm
- 1 nm = m = 10 A
- 1 pm = m = 1000 fm
- 1 light year = 9.46 m
- 1 = 1000 L = 35.3 = 264 gal

Angular Measure

- 1 m/s = 3.28 ft/ s = 2.24 mi / h
- 1 km / h = 0.621 mi / h = 0.278 m/s

Force and Pressure

- 1 lb = 4.45 N
- 1 ton = 2000 lb
- 1 Pa = 1 N/ = 10 dyne/ = 1.45 lb/
- 1 atm = 1.01 x 10^5 Pa = 14.7 lb/ = 76 cm – Hg

SOME IMPORTANT SCIENTIFIC INSTRUMENTS

Accumulator: Electrical energy is stored

- **Altimeter**: Used in aircraft for measuring altitudes
- **Ammeter**: Measuring the electrical current in amperes
- **Anemometer**: Measuring the strength of winds
- **Audiometer**: Measuring intensity of wind
- **Audiophone:** It is used for improving imperfect sense of hearing.
- **Barometer**: Measuring atmospheric pressure
- **Binocular**: An optical instrument designed for magnified view of distant objects by both eyes simultaneously
- **Bolometer**: To measure heat radiation

- **Cardiogram**: For recording the heart movements
- **Calorimeter**: Measuring of quantities of heat
- **Chronometer**: A clock that keeps very accurate time as the one that is used to determine longitude at sea.
- **Colorimeter**: An instrument for comparing intensities of colour.
- **Commutator**: An instrument to change or remove the direction of an electric current, in dynamo used to convert alternating current into direct current.
- **Cyclotron**: Studying the properties of atoms by smashing them.
- **Dynamo**: A device for converting mechanical energy into electrical energy
- **Dynamometer**: An instrument for measuring the electrical power
- **Electroscope**: An instrument for detecting the presence of electric charge.
- **Endoscope**: To examine internal parts of the body
- **Fathometer:** Measure depth of the ocean
- **Galvanometer**: For detecting and measuring electric current
- **Hygrometer**: Measure level of humidity
- **Phonograph**: For reproducing sound
- **Pyrometer**: Measure very high temperature
- **Quartz Clock**: A highly accurate clock used in astronomical observations and other precision work
- **Radiometer**: An instrument for measuring the emission of radiant energy
- **Radio Micrometer**: An instrument for measuring heat radiations
- **Rain Gauge**: An instrument for measuring rainfall
- **Rectifier**: An instrument used for the conversion of AC into DC.
- **Refractometer**: An instrument used to measure the refractive index of a substance
- **Resistance Thermometer**: Used for determining the electrical resistance of conductors
- **Salinometer**: A type of hydrometer used to determine the concentration of salt solutions by measuring their densities
- **Seismometer (Seismograph)**: An Apparatus for measuring and recording earthquake shock
- **Sextant**: For guiding ships or surveying land.
- **Spectroscope**: An instrument used for spectrum analysis
- **Speedometer**: It registers the speed at which the vehicle is moving
- **Spherometer**: For measuring curvature of surfaces
- **Sphygmomanometer**: An instrument used to detect blood pressure in a human body. It is also called B.P.Apparatus
- **Sphygmophone**: Instrument with the help of which, a pulse beat makes a sound
- **Spring Balance**: Useful for measuring weight
- **Stereoscope:** It is used to view two dimensional pictures.
- **Stethoscope:** An instrument which is used by the doctors to hear and analyze heart and lung sounds.
- **Stroboscope**: It is used to view rapidly moving objects.
- **Tachometer:** An instrument used in measuring speeds of aero planes and motor boats.
- **Teleprinter:** This instrument receives and sends typed messages from one place to another.
- **Telescope:** It views distant objects in space.
- **Theodolite:** It measures horizontal and vertical angles.
- **Transistor**: A small device which may be used to amplify currents and perform other functions usually performed by a thermionic valve
- **Viscometer**: For measuring viscosity
- **Voltmeter**: To measure potential difference between two points
- **Udometer**: Rain guage

CHEMISTRY

MATTER

- **In general it exists in 3 states i.e.,**
  (i) Solid
  (ii) liquid
  (iii) gas.

- Now-a-days there is a discussion on two more states of matter i.e., **Plasma** (Ionised gases containing super energetic and super excited particles and **Bose-Einstein** condensates or BEC (a gas at super low temperatures with extremely low density).

Boiling Point

- The temperature at which liquid converts in to vapours is called its boiling point.
- Boiling point **of water is 100°C.**
- The boiling point **increases in the presence of impurities**. That's why boiling point of **sea water is more than the boiling** point of pure water (as the former contains impurity).
- **It usually decreases at high altitudes, that's why at high altitudes, the boiling point of water is less than 100°C and more time is required to cook a food.**

Melting Point

- It is a temperature at which a substance **converts from its solid state to liquid state**.
- Melting point **of ice is 0°C;** It decrease in the presence of impurity

Atom, Molecule and Element

- Atom is the smallest particle of a matter that takes part in chemical reactions, but cannot exist in free state.
- **Atom is made 43 of electrons**, protons and neutrons.
- Protons and neutrons reside in the nucleus **(at the centre of atom)** whereas electrons revolve around the nucleus.
- **Atoms combine to form molecules,** the smallest part of matter which can exist in free state.

Isotopes and Isobars

- **Isotopes have the same number of protons** ***(i.e.,*** atomic number), but different number of neutrons and mass number (atomic number + number of neutrons), *e.g.*, **1111, 1H2.**
- **Isobars have the same mass number** but different atomic number.
- **Example:** 18Ar40, 19K40

Dating Techniques

- **Radiocarbon** dating is used to **determine the age of carbon** bearing materials like wood, animal fossils etc.
- **Uranium** dating is used to **determine the age of Earth, minerals and rocks.**

Battery

- Battery is a device, used to convert **chemical energy into electrical energy** and is of two types

(i) Primary batteries (non-rechargeable) act as galvanic cell, e.g., dry cell, mercury cell etc.

(ii) Secondary Batteries: (rechargeable) Act as galvanic as well as voltaic cell E.g., lead storage battery, nickel cadmium battery etc.

Corrosion

- The oxidative deterioration of a metal surface by the action of environment is called **corrosion**, an electrochemical process.
- When **iron exposed in to air, iron surface turns brown** due to the formation of **hydrated** ferric oxide (**Fe203.xH20**) which is also called rust,
- **Silver - Surface turns black** due to the formation of **silver sulphide (Ag2S)**

Renewable Non-renewable Natural Resources

- **Renewable resources are available in** large excess, i.e., never ends, **e.g,** air, sunlight etc.

- **Non-renewable resources are** available in limited quantity and end, if used excessively, after a limited period of time**. e.g.,** mineral, coal, petroleum, natural gas etc.

- The substance, which produce heat and light on combustion are called fuels.
- A strong foul smelling substance, called ethyl mercaptan is added to LPG to detect its leakage as LPG is an odourless gas.

Fuels

Some important fuels and their compositions

Fuel	Composition	Sources
Water Gas	Carbon monoxide (co) + hydrogen(h2)	By passing stream over red hot coke
Producer Gas	Carbon monoxide (CO) + Nitrogen (N2)	By passing insufficient air over red hot coke
Coal Gas	Hydrogen + methane + Ethylene + Acetyene + CO +Nitrogen	By fractional distillation
Natural Gas	Methane(83%) + Ethane	From petroleum
Liquefied Petroleum Gas (LPG)	Butane (CH4) 95%	From petroleum
Compressed Natural Gas (CNG)	Methane (CH4) 95%	From petroleum
Biogas or Gobar Gas	Methane (CH4) + Carbon dioxide (CO2) + Hydrogen (H2)+ Nitrogen (N2)	From organic wastes

Physical and Chemical Changes

- Physical changes are the change, which only affect the physical properties like colour, hardness, density, melting point etc. of matter, but do not affect the composition and chemical properties of matter.
- A physical change is temporary, while a chemical change is **permanent**.
- Crystallisation, sublimation, 'boiling, melting, vaporisation, cutting of trees, dissolving sugar or salt in water etc. are physical changes.
- Chemical changes affect the composition as well as chemical properties of matter and result in the formation of a new substance.
- Burning of fuel, burning of candle and paper, electrolysis of water, photo synthesis, ripening of fruits etc, are examples of chemical changes

- Coal is obtained by carbonization of vegetable matter and is available in different varieties:
  - **Peat**- 60% C
  - **Lignite or Brown Coal** – 70% C
  - **Bituminous** – 60 to 80 % C
  - Anthracite Coal – 90% C
  - Fame

Flame contains three parts

1. **Innermost Part**- which is black due to the presence of unburned carbon particles- has lowest temperature.
2. **Middle part** – is yellow due to incomplete of fuel.

3. **Outermost part**- which is blue due to complete combustion of fuel is the hottest and used by goldsmith to heat the gold.

Fire Extinguishers

- Water extinguishes fire because as it evaporates**,** the vapours surround the burning substance, cutting off the oxygen supply, thus inhibiting burning process.
- In case of electrical or oil (petrol) fires, water cannot be used as extinguisher. This is because water is a conductor of electricity and heavier than oil. Thus, oil floats over it and continues to burn.
- Carbon dioxide, which is generated by the reaction of baking soda with acid, is used extinguish electrical or oil fires. Quality of petrol is measured in terms of octane number and that of diesel in terms of cetane number.

Safety Matches

- In safety matches, the stick consists of mixture of antimony trisulphide and potassium chlorate at its one end. The box side contains a mixture of powdered glass and phosphorus.

Acids, Bases and Salts

Acids

- These are the substance, which **have sour taste** and turn blue litmus red.
- These are **good conductor of electricity** in aqueous solution.
- Pickels are always kept in glass jar because acid present in them reacts with metal to **produce hydrogen gas.**

Bases

- These are the substances, **which have bitter taste and turn red litmus**, blue.
- They give different colours in acid and base solutions.

Salts

- These are the product of neutralisation reaction between an acid and a base.
- pH is the measure of acidity/basicity.

INORGANIC AND ORGANIC CHEMISTRY

Carbon Dioxide

- It is an acidic oxide of carbon and is used by green plants for photosynthesis. It does not help in burning.

Air and our breath contain carbon dioxide. Thus, when lime water is kept in air or we pass our breath into it, the lime water turns milky.

Carbon Monoxide

- It is a neutral oxide of air and has more affinity towards haemoglobin than oxygen (about 200 times more). That's why in the environment of carbon monoxide – which is a non- poisonous gas - people die for the need of oxygen.

It is dangerous to sleep in an unventilated room with fire burning inside because the fire produces carbon monoxide and carbon dioxide gases.

Plaster of Paris

It is chemically calcium sulphate hemihydrate ($CaSO_4.1/2H_2O$) and is prepared by heating gypsum – which is calcium sulphate dehydrate ($CaSO_4.2H_2O$) at 373 K.

On Mixing with water, plaster of Paris further sets into a hard solid, called gypsum. Thus, it is used to plaster fractured bones, for making toys, materials for decoration and for making surfaces smooth.

Portland Cement

It is a complex mixture of silicates and aluminates of calcium with small amount of gypsum. Raw materials used for the manufacture of Portland cement are **limestone and clay.**

The composition of Portland cement is calcium oxide (50-60%), alumina (5-10%), and magnesium oxide (2-3%). Gypsum is added to cement to decrease its rate of setting. In cement, if lime is in excess, cement cracks during setting and if lime is less, cement is of weak strength.

Mortar a mixture of sand, cement and water is used for joining bricks and plastering walls.

Concrete—a mixture of gravel, sand, cement and water is used for flooring and making roads.

Reinforced Concrete Cement (RCC)— which is concrete with steel bars and wires is used for constructing roofs, bridges and pillars

Glass

Glass—an amorphous solid or super- cooled liquid—contains maintz silica (SiO2).

Different substances are added to obtain glass of different colour

Colour	Substance Added
Red	Copper oxide (CuO)
Green	Chromium oxide (Cr203)
Blue	Cobalt oxide (Co0)
Brown	Iron oxide (Fe203)

Heavy water

- Heavy water is water that contains **heavy hydrogen or deuterium**. Deuterium differs from the hydrogen usually found in water, protium, in that each atom of deuterium contains a proton and a neutron. Heavy water may be deuterium oxide, **D2O** or it may be deuterium protium oxide, DHO.
- Note: **Heavy water occurs naturally, although** it is much less common than regular water**. Approximately** one water **molecule per twenty million water molecules is heavy water.**

Hard Water

- The water in which soluble bicarbonates oil calcium and magnesium are present, is called temporary hard water and in which soluble sulphates and chlorides of magnesium and calcium are present is called permanent hard water.
- The temporary hardness of water is removed by boiling or by adding calcium hydroxide, Ca(OH)2—the **Clark's process** The permanent hardness of water is removed by adding sodium carbonate (Na2CO3), or calgon (sodium hexametaphosphate, Na2[Na4(P03)

Hardening of Oil (Hydrogenation)

Oil, an unsaturated fat when heated with nickel catalyst and hydrogen gets converted into a solid mass, called ghee, a saturated fat. This process is called hardening of oil and is carried out through hydrogenation in the presence of nickel as a catalyst.

Some Important Ores of Metals

Ores - Those minerals from which the metals are extracted commercially and economically and with minimum effort are called Ores of Metals.

Name of Elements	Ores	Chemical Formulae
1. Aluminum (Al)	(a) Bauxite (b) Corundum (c) Kryolite	Al2O32H2O Al2O3 Na3AlF6
2. Iron (Fe)	(a) Hematite (b) Magnetite (c) IronPyrite (d) Siderite	Fe2O3 Fe3O4 FeS2 FeCO3

3. Copper (Cu)	(a) Copper Pyrite (b) Copper Glance (c) Malachite	CuFeS2 Cu2S 2CuCO3Cu(OH)2
4. Zinc (Zn)	(a) Zinc Blende (b) Calamine	ZnS ZnCo3
5. Sodium (Na)	(a) Rock Salt (b) Sodium Carbonate	NaCl Na2CO3
6. Potassium (K)	(a) Karnalite (b) Salt Petre	KClMgCl6H2O KNO3
7. Lead (Pb)	(a) Galena (b) Anglesite	PbS PbCl2
8. Tin (Sn)	(a) Tin Pyrites (b) Classiterite	Cu2FeSnS4 SnO2
9. Silver (Ag)	(a) Silver Glance	Ag2S
10. Gold (Au)	(a) Calve rite (b) Sybarite	AuTe2 AgAuTe2
11. Mercury (Hg)	(a) Cinnabar (b) Calomel	HgS Hg2Cl2
12. Magnesium (Mg)	(a) Dolomite (b) Karnalite	
13. Calcium (Ca)	(a) Lime Stone (b) Dolomite	CaCO3 MgCO3CaCO3
14. Phosphorous (P)	(a) Phosphorite (b) Floreopetite	Ca3(PO4)CaFe2 3Ca3(PO4)CaFe2

BIOLOGY

Vitamins:

- Organic compound required in small amounts in the diet to maintain normal metabolic functions are known as 'Vitamins'.
- Many vitamins act as (or) are converted into coenzymes; they neither provide energy nor are incorporated into tissues.
- These also regulate the Bio-chemical processes in the body.

Vitamins are classified into two groups

1. **Fat soluble vitamins** (A, D, E, K). These are rich in liver cells.
2. **Water soluble vitamins** (C, B-complex). These are present in much smaller amounts in cells.

Fat soluble vitamins:

Vitamin A:

- Vitamin A is also known as '**Retinol**'.
- **Deficiency diseases:** Night blindness, redness in eyes (Exophthalmia), degeneration of lachrymal glands.

Vitamin D:

- Vitamin D is also known as 'Calciferol'.
- **Deficiency diseases:** Rickets in children, Osteomalacia in adults.

Vitamin E:

- Vitamin E is also known as 'Tocopherol'.
- Deficiency diseases: Sterility nutritional nuclear dystrophy, neurosis of heart muscles.

Vitamin K:

- Vitamin K is also known as '**Anti hemorrhagic**'.
- Deficiency diseases: Blood coagulation is prevented, continuous bleeding occurs.

Water soluble vitamins:

Vitamin 'B Complex': Vitamin B Complex is a mixture of B1, B2, B3, B5, B6, B7, B9, and B12.

Vitamin B1:

- Vitamin B1 is also known as **Thiamin**.
- **Deficiency diseases:** Beri Beri disease which affects the legs.

Vitamin B2:

- Vitamin B2 is also known as Riboflavin.
- **Deficiency diseases:** Dark red tongue, dermatitis, cheilosis occurs at the corners of mouth & lips.

Vitamin B3:

- Vitamin B3 is also known as **Pentothenic acid**.
- **Deficiency diseases:** Burning sensations of feet.

Vitamin B5:

- Vitamin B5 is also known as Nicotinic acid/Niacin.
- **Deficiency diseases:** Pellagra, dermatitis, diarrhea.

Vitamin B6:

- Vitamin B6 is also known as **Pyridoxine**.
- **Deficiency diseases:** Dermatitis and convulsions.

Vitamin B7:

- Vitamin B7 is also known as **Biotin** (also considered as vitamin H).
- **Deficiency diseases**: Dermatitis, blood cholesterol increases, loss of hair and paralysis.

Vitamin B9:

- Vitamin B9 is also known as Folic acid.
- **Deficiency diseases:** Anemia, inflammation of tongue, gastro intestinal disorders.

Vitamin B12:

- Vitamin B12 is also known as **'Cynocobal amine'.**
- **Deficiency diseases:** Pernicious anemia, hyperglycemia.

Vitamin C:

- Vitamin C is also known as '**Ascorbic acid'.**
- **Deficiency diseases:** Scurvy, delay in wound healing.

Human Diseases Caused by Fungi :-

- Ringworm caused by Microsporum, Trichophyton by direct contact from unbathed cats and dogs or objects handled by infected individuals.
- Athlete's foot caused by Trichophyton by Bad foot hygiene where skin remains warm and moist for long period, fungi finds optimal condition, invade dead outer layer of skin.

Human Diseases Caused by Viruses -

- **Smallpox** caused by Variola Virus by direct contact (droplets), indirected by infected articles.
- **Chicken pox** caused by Varicella virus by direct contact (droplets) indirected by infected objects.

- **Common cold** caused by Rhinovirus by contact.
- Influenza/Flu caused by Orthomixo-virus by contact (droplets) virus transmitted through discharge from respiratory tracts of persons infected with disease
- **Mumps** caused by Mumps virus by direct contact, virus in Saliva and secretion of nose invades salivary glands.
- **Viral encephalitis** caused by Encephalitis virus (arbovirus) by some domestic animals' reservoir of virus, transmitted by mosquito bite to man.
- **Poliomyelitis** caused by Poliovirus by contact, houseflies, fleas, food and water.
- **Rabies** (Hydrophobia) caused by Rabies virus (Rhabdovirus) by Bite a mad (rabid) dog
- **Dengue** fever or breakbone fever caused by Dengue virus (arbovirus) by Mosquito (Aedes) bite.
- Acquired Immunodeficiency Syndrome (**AIDS**) caused by Human T-cell
- Lenkemia virus (**HTLV-III**) also called LAV (Retrovirus) by blood and sperm among homosexuals, heterosexuals, intravenous drug users, haemophiliacs, promiscuous individuals and prostitutes.

Human Diseases Caused by Bacteria

- **Septic sore throat** caused by Streptococcus Sp by Bacteria infect throat and nasal membranes by droplets and direct contact.
- **Diphtheria** caused by Irregular rod (Corynebacterium diphtheria) by Bacteria infect respiratory tract by carrier, through contact, droplets and food items.
- **Pneumonia** caused by Diplococcus pneumonia by Bacteria transmitted to respiratory tract, including the lungs by droplet infection.
- **Tuberculosis** caused by Irregular rod (Mycobacterium tuberculosis) by Bacteria transmitted to lungs, bones and other organs by direct contact droplet infection, food and milk.
- **Plague** or **Bubonic** caused by Short rod (Yersinia pestis) by Rat flea spreads disease from rat to man.
- **Tetanus** or **Lock-Jaw** caused by Clostridium tetani by Bacteria in soil, enters through wound.
- **Typhoid** or enteric fever caused by Salmonella typhi by Flies, food, faces water and carriers.
- **Cholera** caused by Vibrio cholerae by Flies food, stools, water and carriers.
- **Bacillary** dysentery caused by short rod (Shigella dysenteriae)by Flies, food, faeces, water and carriers.
- **Whooping cough** caused by small short rod (Hemophilus pertussis) by Droplets protected during coughing and sneezing.
- Syphilis caused by Spiral-shaped organism (Treponema pallidam) by direct contact, chiefly sexual intercourse.
- **Leprosy** caused by Mycobacterium Leprae by long and close contact with infected persons
- **Botulism** caused by Clostridium botulinum by organism produces poison in food.

Human Diseases Caused by Protozoans

- Amoebic dysentery (Amoebiasis) caused by Entamoeba histolytica by Transmission from man to man through ingestion of cysts in drinking water vegetables and food contaminated with faeces.
- Diarrhea 'Giardiasis' caused by Giardia intestinalis by Transmission from man to man through ingestion of cysts in drinking water vegetables and food contaminated with faces.
- Malaria caused by Plasmodium vivax by Transmitted to man by bite of an infected female auophelise mosquito.
- Sleeping sickness (Trypanosomiasis) caused by Trypanosoma brucei by Transmitted by bite of tse-tse fly

Some Important Information & Facts Related to Biology

1. **Melvin Kelvin** was awarded Nobel Prize for his work on Photosynthesis
2. The **largest flower** in the world is Refflessia and the **smallest one** is **wolfessia**.
3. **Penicillin** is obtained from **penicillium Notatum**.

4. Reserpine derived from the plant 'serpentine' is used to alleviate high blood pressure.
5. Plants, living in acidic soils, are called **oxalophytes**.
6. **Photosynthesis** is most **active** in **blue** and red light in which light energy is converted into chemical energy.
7. **The smallest bone**, lies **stapes** is found in the human ear.
8. **Enzymes** are basically **proteins**.
9. **Mitochondria** is called the '**power house of the cell**'
10. **Pancreas** is both an endocrine and **exocrine gland**.
11. Persons of blood group **'0'** are called '**Universal Donor**' while that of '**AB**' are called **'Universal Acceptors'.**
12. **Seedless** fruits are formed by **parthenogenesis.**
13. Simple plants that contain **no chlorophyll** are called **fungi**.
14. **Spirogyra** is commonly known as **'pond silk'**
15. The **longest muscle i**n the human body is found **in thigh**.
16. In a leaf, the opening between two guard cells is **stomata**.
17. **Gibberellins** are responsible for cell elongation.
18. The chemical **name of chlorophyll** is magnesium Dihydro prophysin.
19. **Bile** is produced in liver and stored in **gel bladder.**
20. All arteries, except pulmonary artery carry oxygenated blood.
21. The main function of **W.B. C.** is to produce **antibodies**.
22. **Retina** in the eye, acts as a film in the **camera**.
23. Human tears contain a mild antibacterial agent, named **Lysozyme**.
24. The biggest bone in the human body is **femur**.
25. Vitamin **B12** is almost never found in plants.
26. **Agrostology** is the study of **grasses**.
27. **Phycology** is the study of a algae while the study of fossils is called paleontology
28. **Hydroponics** is cultivating plants without using soil.
29. Palco botany is the study of fossils of **botanical specimens**.
30. **Pepsin** & **Lactose** enzymes add proteins in the digestive system.
31. The water soluble vitamins are **vitamin B and C**
32. A chemical change in **DNA molecule** is called **mutation**.
33. **Glycogen** acts as a short -term food reserve in animals.
34. **Estrogen** is a female sex **hormone**.
35. The enzyme amylase aids in the digestion of starch.
36. **ATP** synthesis takes place in **mitochondria**.
37. **70%** of the body weight of a man is **water**.
38. The tough transparent membrane that protects the eye ball is called cornea.
39. Energy is produced in human body by Carbohydrates.
40. Sugar is the product of the dark reactions of photosynthesis.

List Of Scientific Laws and Theories

1. **Archimede's principle -** It states that a body when wholly or partially immersed in a liquid experience an upward thrust which is equal to the weight of the liquid displaced by it. Thus, the body appears to lose a part of its weight.
2. **Aufbau principle** - It states that in an unexcited atom, electrons reside in the lowest energy orbitals available to them.
3. **Avogadro's Law** - It states that equal volumes of all gases under similar conditions of temperature and pressure contain an equal number of molecules.
4. **Brownian motion -** It is a zigzag, irregular motion exhibited by small solid particles when suspended in a liquid or gas due to irregular bombardment by the liquid or gas molecules.
5. **Bernoulli's principle -** It states that as the speed of a moving fluid, liquid or gas, increases, the pressure within the fluid decreases. The aerodynamic lift on the wing

of an aeroplane is also explained in part by this principle.

6. Boyles's Law - It states that temperature remaining constant, the volume of a given mass of a gas varies inversely with the pressure of the gas. Thus, PV = K (constant), where, P = Pressure and V = Volume.
7. Charles's Law - It states that pressure remains constant, the volume of a given mass of gas increases or decreases by 1/273 part of its volume at 0-degree Celsius for each degree Celsius rise or fall of its temperature.
8. Coulomb's Law - It states that the force of attraction or repulsion between two charges is proportional to the amount of charge on both charges and inversely proportional to the square of the distance between them.
9. Heisenberg principle (uncertainty principle) - It is impossible to determine with accuracy both the position and the momentum of a particle such as an electron simultaneously.
10. Gay-Lussac's Law of combining volumes - Gases react together in volumes
    - al to the weight of the water displaced.
    - The centre of gravity of the body and that of the liquid displaced should be in the same straight line.
14. Law of conservation of energy - It states that energy can neither be created nor destroyed but it can be transformed from one form to another. Since energy cannot be created or destroyed, the amount of energy present in the universe is always remain constant.
15. Newton's First Law of Motion - An object at rest tends to stay at rest, and an object in motion tends to stay in motion, with the same direction and speed in a straight line unless acted upon by some external force.
16. Newton's Second Law of Motion - The rate of change of momentum of a body is directly proportional to the force applied and takes place in the direction in which the force acts.

which bear simple whole number ratios to one another and also to the volumes of the products, if gaseous — all the volumes being measured under similar conditions of temperature and pressure.

11. Graham's Law of Diffusion - It states that the rates of diffusion of gases are inversely proportional to the square roots of their densities under similar conditions of temperature and pressure.
12. Kepler's Law - Each planet revolves around the Sun in an elliptical orbit with the Sun at one focus. The straight line joining the Sun and the planet sweeps out equal areas in equal intervals. The squares of the orbital periods of planets are proportional to the cubes of their mean distance from the Sun.
13. Law of Floatation - For a body to float, the following conditions must be fulfilled:
    - The weight of the body should be equ
17. Newton's Third Law of Motion - To every action, there is an equal and opposite reaction.
18. Newton's Law of Gravitation - All particles of matter mutually attract each other by a force directly proportional to the product of their masses and inversely proportional to the square of the distance between them.
19. Ohm's Law - It states that the current passing through a conductor between two points is directly proportional to the potential difference across the two points provided the physical state and temperature etc. of the conductor does not change.
20. Pauli exclusion principle - It explains that no two electrons in the same atom or molecule can have the same set of quantum numbers.
21. Raman effect - It is the change in wavelength that occurs when light is scattered by the atoms or molecules in a transparent medium.

22. Tyndall effect - The scattering of light by very small particles suspended in a gas or liquid.

Diseases and its Affected Area
Parts of the Body Affected by Diseases

Disease	**Affected Body Part**
Arthritis	*Joints*
Asthma	Bronchial Muscles
Cataract	Eyes
Diabetes	Pancreas
Diphtheria	Throat
Eczema	Skin
Glaucoma	Eyes
Goitre	Thyroid Gland
Jaundice	Liver
Leukemia	Blood
Malaria	Spleen
Meningitis	Brain and Spinal Cord
Otitis	Ears
Paralysis	Nerves
Pneumonia	Lungs
Polio	Legs
Pyorrhoea	Teeth and Gums
Rheumatism	Joints
Sinusitis	Inflammation of sinus linings
Tonsillitis	Tonsils
Trachoma	Eyes
Tuberculosis	Lungs

Typhoid	Intestines

Diseases and Causative Agents

Causative Agent	Disease
Bacteria	**Diphtheria, Gonorrhoea, Meningitis, Cholera, Leprosy, Typhoid, Tetanus, Tuberculosis, Plague, Whooping Cough, Pneumonia**
Virus	**Chicken Pox, Small Pox, Measle, Mumps, AIDS, Yellow fever, Influenza, Dengue fever, Rabies, Polio-meritis phelebotomus**
Protozoans	**Malaria, Sleeping sickness, Kala-azar, Leishmaniasis, Amoebic dysentery**
Fungus	**Athlete's foot, Ringworms, Madura foot, Dhobi's itch**
Helminths	**Filaria, Tapeworm and Hookworm transmission**

Important Information about Human Body

- Biggest Organ: *Liver*
- Heart Beat: *72 times in a minute*
- Master Gland: *Pituitary*
- Number of Bone: *206*
- Number of Muscles: 640
- Number of chromosomes: *46 or 23 pairs*
- Normal Blood Pressure: *80 to 120*
- Teeth: *32*
- The volume of Blood: *About 7 litres in normal body or about 7% of the total body weight.*
- Largest; Part of human Brain: *Cerebrum*

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