APPOLO STUDY CENTRE CHENNAI

APPOLO STUDY CENTRE

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Vol –I (Physical Features)

1 India – Location, Relief and Drainage

Introduction

- India is the seventh largest country in the world and second largest country in Asia. It forms a part of south Asia and is separated by the Himalayas from the rest of the continent. India accounts for about 2.4 % of the total area of the world with an area of 32,87,263 sq.km. many of the India states are larger than several countries of the world.

India's Land and Water Frontiers

- India shares its 15,200 km long land frontier with Pakistan in the west, Afghanistan in the north-west, China, Nepal and Bhutan in the north and Bangladesh and Myanmar in the east. India's longest border is with Bangladesh (4156 km) while the shortest border is with Afghanistan. (106 km) About 6,100 km long coastline of India is washed on three sides of the country by the Indian Ocean and its two arms namely the Arabian sea in the west and the Bay of Bengal in the east. The total length of the coast line of India including the islands is 7,516.6 km. India and Sri Lanka are separated by a narrow and shallow sea called Palk Strait.

India and the World

- The Indian land mass has a central location between, the East and the West Asia. India and the southward extension of the Asian continent. The trans Indian ocean routes which connect the countries of Europe in the west and the countries of East Asia provide a strategic central location to India. Thus it helping India to establish close contact with West Asia, Africa and Europe from the western coast and with South East, east Asia from the eastern coast. India: A Subcontinent India along with the countries of Myanmar, Bangladesh, Pakistan, Nepal, Bhutan and Sri Lanka is called a subcontinent. This region is separated from the rest of Asia by a chain of mountains in the northwest, north and northeast and by seas in the south. This region also possesses a distinct continental characteristics in physiography, climate, natural vegetation, minerals, human resources etc. Hence India is known as 'subcontinent'.

Location and Extent

- India extends from 8°4 'N to 37°6 'N latitudes and 68°7 'E to 97°25 'E longitudes. Hence India is located of the north Eastern hemisphere The southernmost point of the country is Pygmalion Point or Indira Point (6°45'N latitude) located in the Andaman and Nicobar Islands. The southernmost point of main land of India is Cape Comorin (Kanyakumari). The north-south extent of India is 3,214 km and it extends from Indira Col in Jammu and Kashmir in the north to Kanyakumari in the south. The east-west extension is 2933 km and it stretches from Rann of Kutch (Gujarat) in the west to Arunachal Pradesh in the east. The Tropic of Cancer (23°30' N) passes through the middle of the country dividing it into two halves as northern temperate and southern tropical lands. India has been politically divided into 29 states and 7 union territories for administrative convenience.

Indian Standard Time (IST)

- The longitudinal difference between Gujarat in the west and Arunachal Pradesh in the east is about 30°. The Earth rotates through its axis around 360° in 24 hours. Thus, a difference of 1° longitude will make a difference of 4 minutes in time. The difference in longitude between Gujarat (68°7 'E) and Arunachal Pradesh (97°25 ' E) is 29°18'. Hence the difference in local time between these two places is 29°18' X 4' (minutes) = 1 hour 57 minutes 12 seconds

(approximately 2 hours). Since Arunachal Pradesh is towards east, it will have sunrise about two hours earlier than the sunrise at Gujarat which is in the west. In order to avoid these differences, Indian standard time is calculated. The local time of the central meridian of India is the standard time of India. India's central meridian is 82°30' E longitude. It passes through Mirzapur and roughly bisects the country in terms of longitude. The IST is 5.30 hrs ahead of Greenwich Mean Time (GMT).

Major Physiographic Divisions of India

- The majestic Himalayan peaks in the north, the beautiful beaches in the south, the great Indian desert in the west and the breath taking natural heritage in the east make India a geographically vibrant, colourful and truly incredible country. There is a varied nature of physiographic divisions in India. Though the country has many landforms based on the major differences, it is divided into the following five physiographic divisions:

1. The Himalayan Mountains
2. The Great Northern Plains
3. The Peninsular plateau
4. The Indian Desert
5. The Coastal Plains
6. The Islands

Himalayan Mountains

- The Himalayan Mountains (Northern Mountains) consist of the youngest and the loftiest mountain chains in the world because they have been formed only few millions years ago and also they were formed because of the folding of the earth crust due to tectonic activity.

- It stretches for a distance of 2,500 km from the Indus gorge in the west to Brahmaputra gorge in the east. The width of the Northern Mountains varies from 500 km in Kashmir to 200 km in Arunachal Pradesh. The Pamir Knot, popularly known as the "Roof of the World" is the connecting link between the Himalayas and the high ranges of Central Asia. From the Pamir, Himalayas extend eastward in the form of an arc shape. The term "Himalaya" is derived from

Sanskrit. It means "The Abode of Snow". The Northern Mountains that function as a great wall is grouped into three divisions. 1) The Trans-Himalayas, 2) Himalayas, 3) Eastern or Purvanchal hills.

1. The Trans-Himalayas

- It is also known as western Himalaya's. It lies to the north of the great Himalayan range. It lies in Jammu and Kashmir and Tibetian plateau. As its areal extent is more in Tibet, it is also known as Tibetean Himalayas. The Trans-Himalayas are about 40 km wide in its eastern and western extremities and about 225 km wide in its central part. They contain the Tethys sediments. The rocks of this regioncontain fossils bearing marine sediments which are underlain by 'Tertiary granite'. It has partly metamorphosed sediments and constitutes the core of the Himalayan axis. The prominent ranges of Trans Himalayas are Zaskar, Ladakh, Kailash, and Karakoram.

2. The Himalayas

Peak	Country	Height in Metres
Mt. Everest	Nepal	8848
Mt. K2 or Godwin Austen	India	8611
Kanchenjunga	India	8598
Makalu	Nepal	8481
Dhaulagiri	Nepal	8172
Nanga Parbat	India	8126
Annapurna	Nepal	8078
Nanda Devi	India	7817
Kamet	India	7756
Namcha Barwa	India	7756
Gurla Mandhata	Nepal	7728

- It constitutes the core part of northern mountains. It is an young fold mountain. It was formed by the movement of Angara land mass in the north and Gondwana land mass in the south. The Tethys sea found between these two land masses was uplifted by the compression and the resultant landform was the Himalayas. It consists of many ranges. The main divisions of the Himalayas are the (i) Greater Himalayas,(ii) the Lesser Himalayas and (iii)the Siwaliks

The Greater Himalayas or the Himadri

- The Greater Himalayas rise abruptly like a wall north of the Lesser Himalayas. The Greater Himalayas are about 25 km wide. Its average height is about 6,000 m. The Greater Himalayas receive lesser rainfall as compared to the Lesser Himalayas and the Siwaliks. Physical weathering is less effective over the Greater Himalayas as compared to the other ranges. Almost all the lofty peaks of Himalayas are located in this range. The notable ones are Mt. Everest (8,848 m) and Kanchenjunga (8,586 m). Mt. Everest is located in Nepal and Kanchenjunga is located between Nepal and Sikkim. This range is the most continuous of all ranges. It is region of permanent snow cover. So, it has many glaciers. Gangothri, Yamunothri and Siachen are some of them.

The Lesser Himalayas or the Himachal

- It is the middle range of Himalayas. Height of this range varies from 3, 700 to 4,500 m. Its width varies upto 80 km. The major rocks of this range are slate, limestone and quartzite. This region is subjected to extensive erosion due to heavy rainfall, deforestation and urbanization. Pir Panjal, Dhauladhar and Mahabharat are the mountain ranges found in this part. Major hill stations of the Himalayas are located in this range. Shimla, Mussourie, Nainital, Almora, Ranikhet and Darjeeling are the familiar ones.

The Siwaliks or Outer Himalayas

- The Siwaliks extend from Jammu and Kashmir to Assam. It is partly made by the debris brought by the Himalayan rivers. The altitude varying between 900-1100 metres elevation of this range is 1300 m. The width of Siwaliks vary from 10 km in the east to 50 km in the west. It is the most discontinuous range. The longitudinal valleys found between the Siwaliks and the Lesser Himalayas are called Duns in the west and Duars in the east. These are the ideal sites for the development of settlements in this region.

Purvanchal Hills

- These are the eastern off-shoot of Himalayas. It extended in the north-eastern states of India. Most of these hills are located along the border of India and Myanmar while others are inside India. Dafla Hills, Abor

Hills, Mishmi Hills, Patkai Bum Hills, Naga Hills, Manipur Hills, Mizo Hills, Tripura Hills, Mikir Hills, Garo Hills, Khasi Hills and Jaintia Hills are the hills which are collectively known as purvanchal Hills.

Importance of Himalayas

- ✓ Himalayas blocks southwest monsoon winds and causes heavy rainfall to north
- ✓ India.
- ✓ It forms a natural barrier to the subcontinent.
- ✓ It is the source for many perennial rivers like Indus, Ganges, Brahmaputra etc.
- ✓ The Northern Mountains are described as the paradise of tourists due to its natural beauty.
- ✓ Many hill stations and pilgrim centres like Amarnath, Kedarnath, Badrinath and
- ✓ Vaishnavi devi temples are situated here.
- ✓ It provides raw material for many forest based industries.
- ✓ It prevents the cold winds blowing from the central Asia and protects India from severe cold.
- ✓ Himalayas are renowned for the rich biodiversity.

Longitudinal Divisions of Himalayas

1. The Kashmir Punjab Himachal Himalayas- Located between the rivers of Indus and Sutlej.
2. The Kumaun Himalayas- Located between the rivers of Sutlej and Kali.
3. The Central-Nepal Himalayas- Located between the rivers of Kali and Tista.
4. The Assam Eastern Himalayas- Located between rivers of Tista and Dihang.

The Great Northern Plains

- The fertile land extending across seven north Indian states forms the Great Northern Plains. This extensive plain lies to the south of the northern mountains. This plain is one of the most extensive stretches of the alluvium in the world and is deposited by the rivers Indus,

Ganga, Brahmaputra and their tributaries. The length of the plain is about 2,400 km and the width varies from 240 to 320 km. Its width increases from east to west. It covers an area of over 7 lakh sq.km. The Great Plains of India is remarkably a homogeneous surface with an imperceptible slope. They are formed mostly by the depositional process of the Himalayan and Vindhyan rivers. These rivers deposit enormous quantity of sediments deposited along the foothills and flood plains. The important characteristics featuress of sediment deposition in the plains areas as follows.

The Bhabar Plain

- This plain is made up of gravels and unassorted sediments deposited by the Himalayan rivers. The porosity of this plain is so high that most of the small streams flow over this region disappear. It lies to the south of the Siwalik from west to east (Jammu Division to Assam). Its width varies from 8 to 15 km. It is wider in the western plains (Jammu Division) than in the east (Assam). This plain is not suitable for cultivation, only big trees with large roots thrive in this region.

The Tarai Tract

- It is a zone of excessive dampness, thick forests and rich wild life. This tract lies to the south of Bhabar plains. The width of this belt is 15-30 km. The Tarai is wider in the eastern parts of the Great Plains, especially in Brahmaputra Valley due to heavy rainfall. In many states, the Tarai forests have been cleared for cultivation.

The Bhangar Plains

- The Bhangar represent the upland alluvial tracts of the Great Plains of India, formed by the older alluviums. The Bhangar land lies above the flood limits of the rivers. This soil is dark in colour, rich in humus content, well drained and useful for agriculture.

On the basis of deposition of sediments by various rivers and topographical characteristics, the Northern Plains of India is divided into the following four major regions:

a. Rajasthan Plains: It is located to the west of Aravalli range. It covers an area of about 1,75,000 sq.km. Rajasthan plain is formed by the

deposition of the river Luni and the long vanished river Saraswathi. There are several salt lakes in Rajasthan. The Sambhar salt lake (Pushkar Lake) near Jaipur is the prominent one.

b. Punjab - Haryana Plains: It lies to the north-east of the Great Indian Desert. This plain is found over an area of about 1.75 lakh sq.km. The Punjab - Haryana plains are formed by the deposition of the rivers Sutlej, Beas and Ravi. This plain acts as water - divide (doab). The two major watershed it divides are Yamuna – Sutlej and Ganga – Yamuna.

c. Ganga Plains: It extends from the Yamuna River in the west to Bangladesh in the east. The total area covered by this plain is about 3.75 sq.km. River Ganga and its tributaries such as Ghaghra, Gandak, Kosi, Yamuna, Chambal, Betwa etc. constitute this plain by their sediments and make a great plain in India. It is the largest plain of India. The general slope of the entire plain (upper, middle and lower Ganga plains) is towards east and south-east.

d. Brahmaputra Plains: It is located mainly in the state of Assam. It is a low - level plain located in the eastern part of the Great Plains of India and is formed by the deposits of river Brahmaputra. It covers an area of about 56,275 sq.km. These plains create alluvial fans and marshy tracts.

The Khadar Plains

- The new alluvium tracts along the courses of the rivers are known as the 'Khadar' or 'Bet' lands. The Khadar tracts are enriched by fresh deposits of silt every year during rainy seasons. The Khadar land consists of sand, silt, clay and mud. It is highly fertile soil.

Delta Plains

- The deltaic plain is an extension of the Khadar land. It covers about 1.9 lakh sq.km in the lower reaches of the Ganga River. It is an area of deposition as the river flows in this tract sluggishly. The deltaic plain consists mainly of old mud, new mud and marsh. In the delta region, the uplands are called 'Chars' while the marshy areas are called 'Bils'.

The Peninsular Plateaus

- The plateau region lies to the south of the Great Northern Plains. This is the largest physiographic division of our country. It covers an area of about 16 lakh sq.km (about half of the total area of the country). It is an old rocky plateau region. The topography consists of a series of plateaus and hill ranges interspersed with river valleys. Aravalli hills mark the north-western boundary of the plateau region. Its northern and north-eastern boundaries are marked by the Bundelkhand upland, Kaimur and Rajmahal hills.

- The Western Ghats and the Eastern Ghats mark the western and eastern boundaries respectively. The altitude of a large portion of the plateau is more than 600 m from mean sea level. The peak of Anaimudi is the highest point in the plateau. Its height is 2,695 m and is located in Anaimalai. The general slope of this plateau is towards east. The Great Plateau is a part of the Gondwana (very ancient one) land mass. Due to the old age, the rivers in this region attained their base level and developed broad and shallow valleys.

- The river Narmada divides the plateau region of India broadly into two parts. The region lying to the north of the Narmada is called the Central Highlands and the region lying to the south of Narmada is called the Deccan Plateau. All the major rivers (Mahanadi, Godavari, Krishna, Kaveri etc.) lying to the south of the Vindhyas flow eastwards and fall into the Bay of Bengal. Narmada and Tapti are the two rivers situated to the south of the Vindhyas flow westward. Their movement towards west is due to the presence of a rift valley in the region.

a. Central Highlands

- The Central Highlands extend between the river Narmada and the Northern Great Plains. The Aravallis form the west and north-western edge of the Central Highlands. These hills extend from Gujarat, through Rajasthan to Delhi in the north-westerly direction for a distance of about 700 km. The height of these hills is about 1,500 m in southwest while near Delhi the height is hardly 400 m. Gurushikhar with 1,722 m is the highest peak of this range. The Western part of the Central Highland is known as the Malwa Plateau.

It lies to the southeast of Aravallis and to the north of Vindhyachal Range.

- The rivers Chambal, Betwa and Ken drain the Malwa Plateau before they join the river Yamuna. The part of the Central Highlands which extends to the east of Malwa Plateau is known as Bundelkhand and its further extension is known as Bagelkhand. The eastern part of the Central High lands which lies in the north-eastern part of the Indian Plateau is known as Chhota-Nagpur Plateau. It covers much of Jharkhand, adjacent parts of Odisha, West Bengal, Bihar and Chhattisgarh. This region is very rich in mineral resources particularly iron ore and coal.

b. Deccan Plateau

- This physiographic division is the largest part of the plateau region of India. The shape of this plateau is roughly triangular. One of the sides of this triangle is marked by the line joining Kanyakumari with Rajmahal Hills and this line passes through the Eastern Ghats. The second arm is marked by the Satpura Range, Mahadeo Hills, Maikal Range and the Rajmahal Hills. The third arm is marked by the Western Ghats. The area of this Plateau is about 7 lakh square km and the height ranges from 500 to 1000 m above sea level.

- The Western Ghats forms the western edge of the Peninsular Plateau. It runs parallel to the Arabian Sea coast. The northern part of this range is called as Sahyadris. The height of the Sahyadris increases from north to south. Anaimudi is a sort of tri-junction of the Anaimalai Range, the Cardamom Hills and the Palani Hills. Kodaikanal is a beautiful hill resort situated on the Palani Hills. Eastern Ghats run from southwest to northeast form the eastern edge of this Plateau. This range is also called as Poorvadri. The EasternGhats join the Western Ghats at the Nilgiri hills, bordering Karnataka and Tamil Nadu. The Eastern Ghats are not continuous like the Western Ghats. The rivers of Mahanadi, Godavari, Krishna, Pennar and Kaveri have dissected this range at many places.

The Indian Desert

- The Thar desert, also known as the Great Indian desert is a large arid region in the north western part of the Indian subcontinent that covers an area of 2,00,000 km2 and forms a natural boundary between

India and Pakistan. It is the world 7th largest desert, and world 9th largest sub tropical desert located in Western part of the India. The desert lies in the western part of the aravalli range and covers 2/3 of Rajastan state. There are two major divisions in the Thar desert. They are known as the Actual desert region (Marusthali) and the semi desert region (Bhangar). Many different types of sand dunes and salt lakes (Dhands) are seen here.

The Coastal Plains

- The Peninsula Plateau of India is flanked by narrow coastal plains of varied width from north to south, known as the Western Coastal Plains and the Eastern Coastal Plains. They were formed by the depositional action of the rivers and the erosional and depositional actions of the sea-waves. The Indian coastal plains are divided into the following two divisions: 1) The Western Coastal Plains and 2) The Eastern Coastal Plains.

1. The Western Coastal Plain

- It lies between the Western Ghats and the Arabian Sea. It extends from Rann of kutch in the north to Kanyakumari in the south and its width varies from 10 to 80 km. It is mainly characterised by sandy beaches, coastal sand dunes, mud flats, lagoons, estuary, laterite platforms and residual hills. The northern part of the West Coastal Plain is known as Konkan Plain. The middle part of this plain is known as Kanara. The southern part of the plain is known as Malabar coast which is about 550 km long and 20-100 km wide. This part of the coast is characterized by sand dunes. Along the coast, there are numerous shallow lagoons and backwaters called Kayals and Teris. Vembanad is a famous back water lake found in this region.

2. The Eastern Coastal Plain

- It lies between the Eastern Ghats and the Bay of Bengal and, stretches along the states of West Bengal, Odisha, Andhra Pradesh and Tamil Nadu. These plains are formed by the alluvial fillings of the littoral zone by the east flowing rivers of India. The coastal plain consists mainly of the recent alluvial deposits. This coastal plain has a regular shoreline with well-defined beaches.

- The coastal plain between Mahanadi and Krishna river is known as the Northern Circars and the southern part lies between Krishna and Kaveri rivers is called Coromandal coast. The Marina beach on this coast in Chennai and it is the second longest beach in the world. Among the back water lakes of this coast, lake Chilka (Odisha) is the largest lake in India located to the southwest of the Mahanadi delta, the Kolleru Lake which lies between the deltas of Godavari and Krishna and the Pulicat Lake lies in the border of Andhra Pradesh and Tamil Nadu are the well known lakes in the east coastal plain.

The Islands

- India has two major island groups namely Andaman and Nicobar and Lakshadweep. The former group consists of 572 islands and are located in Bay of Bengal, and the later one has 27 islands and are located in Arabian Sea. The islands of Andaman and Nicobar are largely tectonic and volcanic origin. India's only active volcano is found on Barren Island in Andaman and Nicobar group of Islands, while the islands of the Arabian Sea are mainly coral origin.

a) Andaman and Nicobar Islands

- These islands are located in an elevated portion of the submarine mountains. Since these islands lie close to the equator, the climate remains hot and wet throughout the year and has dense forests. The area of the island group is about 8,249 sq.km. The entire group of islands is divided into two. They are Andaman in the north and the Nicobar in the south. These island groups are of great strategic importance for the country. Port Blair is the administrative capital of the Andaman and Nicobar islands. The Ten Degree Channel separates Andaman from Nicobar group. The southernmost tip, the Indira Point is a part of Nicobar Island.

b) Lakshadweep Islands

- This is a small group of coral islands located off the west coast of India. It covers an area of 32 sq. km. Kavaratti is its administrative capital. Lakshadweep islands are separated from the Maldive Islands by the Eight Degree Channel. The uninhabited "Pitt Island" of this group has a bird sanctuary. Earlier, it had three divisions namely Laccadive, Minicoy and Amindivi. It was named as Lakshadweep in 1973.

c) Offshore Islands

- Besides the two group of islands, India has a number of islands along the Western Coast, Eastern Coast, in the delta region of Ganga and in the Gulf of Mannar. Many of these islands are uninhabited and are administered by the adjacent states.

Drainage System of India

- A drainage system is an integrated system of tributaries and a trunk stream which collects and drains surface water into the sea, lake or some other body of water. The total area drained by a river and its tributaries is known as a drainage basin. The drainage pattern of an area is the result of the geological structure of the respective areas. The river system provides irrigation, drinking water, navigation, power as well as grant livelihoods for a large number of population. The drainage system of India is broadly divided into two major groups on the basis of their location. They are Himalayan rivers and the Peninsular rivers.

Himalayan Rivers

- These rivers are found in north India and originate from Himalayas. So, they are also called

River	
Himalayan Rivers	**Peninsular Rivers**
> Indus > Ganga > Brahmaputra	> Mahanadi > Cauvery > Godavari > Narmada > Krishna > Tapti

a. The Indus River System

- The Indus River is one of the largest rivers of the world. It originates from the northern slope of the Kailash range in Tibet near Manasarovar Lake at an elevation of about 5,150 m. Its length is about 2,880 km (Only 709 km is in India). The river has a total drainage area extending 11,65,500 sq km in which 321,289 sq km areas are drained in India. The river flows through the Ladakh and Zaskar ranges and

creates deep gorges. The river runs through Jammu and Kashmir, turns south near Chillar and enters Pakistan. Its major tributaries are Jhelum, Chenab (Largest tributary of Indus), Ravi, Beas and Sutlej. It enters into with the Arabian Sea.

b. The Ganga River System

- The Ganga River system is the largest drainage system of India it extend over and area of 8,61,404 sq km in India. The Ganga plain is the most densely populated place in India and many towns are developed on the banks of this river. The river Ganga originates as Bhagirathi from the Gangotri Glacier in Uttar Khasi District of Uttarkhand state, at an elevation of 7,010 m. The length of the river Ganga is about 2,525 km. Its major tributaries from the north are Gomti, Gandak, Kosi and Ghaghra and from south, Yamuna (largest tributary of Ganga), Son, Chambal etc. The river Ganga is known as the River Padma in Bangladesh. The combined river of Ganga and Brahmaputra creates the World's largest delta known as Sundarbans in Bangladesh before joining the Bay of Bengal.

c. The Brahmaputra River System

- The river Brahmaputra originates from the Chemayungdung Glacier of the Kailash range to the east of Lake Manasarovar in Tibet at an elevation of about 5,150 m. The total area is about 5,80,000 sq km but the drainage area lying in India is 1,94,413 sq km This river is known as Tsangpo (Purifier) in Tibet. The length of this river is about 2,900 km (900 km in India). It enters into India through a gorge in Arunachal Pradesh namely Dihang. It has many tributaries. Tista, Manas, Barak, Subansiri are some of them. This river is called as Jamuna in Bangladesh. After it joins with the river Ganga in Bangladesh, the river is called as Meghna. Characteristics of Himalayan Rivers

  - ✓ Originate from Himalayas
  - ✓ Long and wide
  - ✓ Perennial in nature
  - ✓ Unsuitable for hydro power generation
  - ✓ Middle and lower courses are navigable

Peninsular Rivers

- The rivers in south India are called the Peninsular rivers. Most of these rivers originate from the Western Ghats. These are seasonal rivers (non–perennial). They have a large seasonal fluctuation in volume of water as they are solely fed by rain. These rivers flow in valleys with steep gradients. Based on the direction of flow, the peninsular rivers are divided into the West flowing and East flowing rivers.

East Flowing Rivers

a. Mahanadi

- The river Mahanadi originates near Sihawa in Raipur district of Chattisgarh and flows through Odisha. Its length is 851 km. Seonath, Telen, Sandur and Ib are its major tributaries. The main stream of Mahanadi gets divided into several distributaries such as Paika, Birupa, Chitartala, Genguti and Nun. All these distributaries form the Delta of Mahanadi which is one of the largest deltas in India. The Mahanadi empties its water in Bay of Bengal.

b. Godavari

- Godavari is the longest river (1,465 km) with an area of 3.13 lakh km2 among the Peninsular rivers. It is also called Vridha Ganga. It originates in Nasik district of Maharashtra, a portion of Western Ghats. It flows through the states of Telangana and Andhra Pradesh before joining Bay of Bengal. Purna, Penganga, Pranitha, Indravati, Tal and Salami are its major tributaries. The river near Rajahmundry gets divided into two Channels called Vasistha and Gautami and forms one of the largest deltas in India. Kolleru, a fresh water lake is located in the deltaic region of the Godavari.

c. Krishna

- The river Krishna originates from a spring at a place called Mahabaleshwar in the Western Ghats of Maharashtra. Its length is 1,400 km and an area of 2.58 lakh sq km. It is the second longest Peninsular river Bhima, Peddavagu, Musi, Koyna and Thungabhadra

are the major tributaries of this river. It also flows through Andhra Pradesh and joins in Bay of Bengal, at Hamasaladeevi.

d. Kaveri

- The river Kaveri originates at Talakaveri, Kudagu hills of Karnataka. Its length is 800 km. The river kaveri is called Dhakshin Ganga or Ganga of south Harangi, Hemavati, Kabini, Bhavani, Arkavathy, Noyyal, Amaravathi etc are the main tributaries of the river Kaveri. In Karnataka the river bifurcates twice, forming the sacred islands of Srirangapatnam and Sivasamudram. While entering Tamil Nadu, the Kaveri continues through a series of twisted wild gorges until it reaches Hogenakkal Falls and flows through a straight, narrow gorge near Salem. The Kaveri breaks at Srirangam Island with two channels, river Coleroon and Kaveri. At last, it empties into the Bay of Bengal at Poompuhar.

West Flowing Rivers

- **a.** Narmada**:** This river rises in Amarkantak Plateau in Madhya Pradesh at an elevation of about 1057 m and flows for a distance of about 1,312 km it covers and area of 98,796 sq km and forms 27 km long estuary before out falling into the Arabian Sea through the Gulf of Cambay. It is the largest among the west flowing rivers of Peninsular India. Its principal tributaries are Burhner, Halon, Heran, Banjar, Dudhi, Shakkar, Tawa, Barna and Kolar.

- **b. Tapti:**The Tapti is one of the major rivers of Peninsular India with the length of about 724 km. It covers an area of 65,145 sq km. Tapti river rises near Multai in the Betul district of Madhya Pradesh at an elevation of about 752 m. It is one of only the three rivers in Peninsular India that run from east to west - the others being the Narmada and the Mahi. The major tributaries are Vaki, Gomai, Arunavati, Aner, Nesu, Buray, Panjhra and Bori. It outfalls into the Arabian Sea through the Gulf of Cambay.

Characteristics of South Indian

Rivers

• Originate from Western Ghats

- Short and narrow
- Non perennial in nature
- Suitable for hydro power generation
- Not useful for navigation

NOTE

- ❖ Amaravati is the new capital of Andhra Pradesh But according to Andhra Pradesh
- ❖ Reorganization Act, Hyderabad will be the capital for both the states of Andhra Pradesh and Telungana till 2024 (For 10 years from the act passed).
- ❖ Aravalli range is the oldest fold mountain range in India.
- ❖ The major passes in the Himalayan are Karakoram pass (Jammu and Kashmir), Zojila pass, Shipkila pass (Himachal Pradesh), Bomdila pass (Arunachal Pradesh), Nathala pass (Sikkim) and Jhelepla pass (Sikkim). The Khyber pass which connects Pakistan and Afanisthan, and Bolan pass in Pakistan are important passes of the Indian subcontinent.
- ❖ Himalaya is the home of several high peaks. However, it holds the record of having the maximum number of highest peaks among any mountain range in world. Out of 14 heights peaks in this world, Himalayas holds 9.

Moonsoon & Forest Wildlife
10th vol –I
Unit 2- Climate & Natural Vegetation of India

Equable climate is also called as the British climate, Which is neither too hot nor too cold

The factors affecting the climate

- Climate of India is affected by the factors of latitude, distance from the seas, monsoon wind, relief features and jet stream.

Latitude

- Latitudinally, India lies between 8°4'N and 37°6'N latitudes. The Tropic of cancer divides the country into two equal halves. The area located to the south of Tropic of cancer experiences high temperature and no severe cold season throughout the year whereas, the areas to the north of this parallel enjoys sub-tropical climate. Here, summer temperature may rise above 40°C and it is close to freezing point during winter.

Altitude

- When the altitude increases, The temperatures decreases. Temperature decreases at the rate of 6.50C for every 1000 metres of ascent. It is called normal lapse rate.

- Hence, places in the mountains are cooler than the places on the plains. That is why the places located at higher altitudes even in south India have cool climate. Ooty and several other hill stations of south India and of the Himalayan ranges like Mussourie, Shimla etc., are much cooler than the places located on the Great Plains.

Distance from the Sea

- Distance from the sea does not cause only temperature and pressure variations but also affects the amount of rainfall. A large area of India, especially the peninsular region, is not very far from the sea and this entire area has a clear maritime influence on climate. This part of the country does not have a very clearly marked winter and the temperature is equable almost throughout the year. Areas of central and north India experience much seasonal variation in temperature due to the absence of influence of seas. Here, summers are hot and winters are cold. The annual temperature at Kochi does not exceed 30°C as its location is on the coast while it is as high as 40°C at Delhi, since it is located in the interior part. Air near the coast has more moisture and greater potential to produce precipitation. Due to this fact, the amount of rainfall at Kolkata located near the coast is 119 cm and it decreases to just 24 cm at Bikaner which is located in the interior part.

Monsoon Wind

- The most dominant factor which affects the climate of India is the monsoon winds. These are seasonal reversal winds and India remains in the influence of these winds for a considerable part of a year. Though, the sun's rays are vertical over the central part of India during the mid-June, the summer season ends in India by the end of May. It is because the onset of southwest monsoon brings down the temperature of the entire India and causes moderate to heavy rainfall in many parts of the country. Similarly, the climate of southeast India is also influenced by northeast monsoon.

Relief

- Relief of India has a great bearing on major elements of climate such as temperature, atmospheric pressure, direction of winds and the amount of rainfall. The Himalayas acts as a barrier to the freezing cold wind blows from central Asia and keep the Indian subcontinent warm. As such the north India experiences tropical climate even during winter. During southwest monsoon, areas on the western slope of the Western Ghats receive heavy rainfall. On the contrary,

vast areas of Maharashtra, Karnataka, Telangana, Andhra Pradesh and Tamil nadu lie in rain shadow or leeward side of the Western Ghats receive very little rainfall. During this season, Mangalore, located on the coast gets the rainfall of about 280 cm whereas the Bengaluru located on the leeward side receives only about 50 cm rainfall.

Jet Streams

- Jet streams are the fast moving winds blowing in a narrow zone in the upper atmosphere. According to the Jet stream theory, the onset of southwest monsoon is driven by the shift of the sub tropical westerly jet from the plains of India towards the Tibetan plateau. The easterly jet streams cause tropical depressions both during southwest monsoon and retreating monsoon.

Monsoon

- The word 'monsoon' has been derived from the Arabic word 'Mausim' which means 'season'. Originally, the word 'monsoon' was used by Arab navigators several centuries ago, to describe a system of seasonal reversal of winds along the shores of the Indian Ocean, especially over the Arabian Sea. It blows from the south-west to north-east during summer and from the north-east to south-west during winter.

- Monsoons are a complex meteorological phenomenon. Meteorologists have developed a number of concepts about the origin of monsoons. According to the Dynamic concept, Monsoon wind originates due to the seasonal migration of planetary winds and pressure belts following the position of the sun. During summer solstice, the sun's rays fall vertically over the Tropic of cancer. Therefore, all the pressure and wind belts of the globe shift northwards. At this time, Inter -Tropical Convergence Zone (ITCZ) also moves northward, and a major part of Indian landmass comes under the influence of southeast trade winds. While crossing equator this wind gets deflected and takes the direction of southwest and becomes south-west monsoon. During the winter season, the pressure and wind belts shift southward, thereby establishing the north-east

monsoon (trade winds) over this region. Such systematic change in the direction of planetary winds is known as monsoon.

Atacama desert is the driest place on the earth.

Seasons

The meteorologists recognize the four distinct seasons in India. They are;

- Winter or cold weather season (January - February).
- Pre Monsoon or summer or hot weather season (March - May).
- Southwest monsoon or rainy season (June - September).
- Northeast monsoon season (October - December).

Winter or cold weather season

- During this period, the vertical rays of the sun falls over tropic of capricorn which is far away from India. Hence, India receives the slanting sun's rays which results in low temperature. The cold weather season is characterized by clear skies, fine weather, light northerly winds, low humidity and large day time variations of temperature. During this season a high pressure develops over north India and a north-westerly wind blows down the Indus and Ganges valleys. In south India, the general direction of wind is from east to west. The mean temperature increases from north to south, the decrease being sharp as one moves northwards in the north-western part of the country. The mean daily minimum temperatures range from 22°C in the extreme south, to 10°C in the northern plains and 6°C in Punjab. The rain during this season generally occurs over the Western Himalayas, Tamil nadu and Kerala. Western disturbances and associated trough in westerlies are main rain bearing system in northern part of the country. The jet stream plays a dominant role in bringing these disturbances to India. These disturbances cause rainfall in Punjab, Haryana and Himachal Pradesh, and snowfall in the hills of Jammu and Kashmir. This rainfall is very useful for the cultivation of winter wheat.

Pre Monsoon or summer or hot weather season

- During this season, the vertical rays of the sun falls over the peninsular India. Hence, there is a steady increase in temperature from south to north. It is practically hot and dry in the entire country in the initial part of this season. Weather over the land areas of the country is influenced by thunderstorms associated with rain and sometimes with hail mostly in the middle and later part. During this season, temperature starts increasing all over the country and by April, the interior parts of south India record mean daily temperatures of 30°C–35°C. Central Indian land mass becomes hot with day-time maximum temperature reaching about 40°C at many locations. Many stations in Gujarat, North Maharashtra, Rajasthan and North Madhya Pradesh exhibit high day-time and low night-time temperatures during this season.

- Because of the atmospheric pressure conditions, the winds blow from southwest to northeast direction in Arabian Sea and Bay of Bengal. They bring pre monsoon showers to the west coast during the month of May. There are few thunder showers called "Mango Showers" which helps in quick ripening of mangoes along the coast of Kerala and Karnataka. "Norwesters" or "Kalbaisakhis" are the local severe storms or violent thunderstorms associated with strong winds and rain lasting for short durations. It occurs over the eastern and north eastern parts over Bihar, West Bengal and Assam during April and May. They approach the stations from the northwesterly direction.

Southwest monsoon or Rainy Season

- The southwest monsoon is the most significant feature of the Indian climate. The onset of the southwest monsoon takes place normally over the southern tip of the country by the first week of June, advances along the Konkan coast in early June and covers the whole country by 15th July. The monsoon is influenced by global phenomenon like ElNino.

- Prior to the onset of the southwest monsoon, the temperature in north India reaches upto 46°C. The sudden approach of monsoon wind over south India with lightning and thunder is termed as the 'break'

or 'burst of monsoon'. It lowers the temperature of India to a large extent. The monsoon wind strikes against the southern tip of Indian land mass and gets divided into two branches. One branch starts from Arabian sea and the other from Bay of Bengal. The Arabian sea branch of southwest monsoon gives heavy rainfall to the west coast of India as it is located in the windward side of the Western Ghats. The other part which advances towards north is obstructed by Himalayan Mountains and results in heavy rainfall in north. As Aravalli Mountain is located parallel to the wind direction, Rajasthan and western part do not get much rainfall from this branch. The wind from Bay of Bengal branch moves towards northeast India and Myanmar. This wind is trapped by a chain of mountains namely Garo, Khasi and Jaintia are mainly responsible for the heaviest rainfall caused at Mawsynram located in Meghalaya. Later on, this wind travel towards west which results in decrease in rainfall from east to west. Over all about 75% of Indian rainfall is received from this monsoon. Tamil nadu which is located in the leeward side receives only a meagre rainfall.

Post monsoon or Retreating or Northeast monsoon season

- The southwest monsoon begins to retreat from north India by the end of September due to the southward shifting pressure belts. The southwest monsoon wind returns from Indian landmass and blows towards Bay of Bengal. The coriolis force deflects this wind and makes it to blow from northeast. Hence, it is known as Northeast monsoon or Post-monsoon season. The season is associated with the establishment of the north-easterly wind system over the Indian subcontinent. Andhra Pradesh, Tamil nadu, Kerala and south interior Karnataka receive good amount of rainfall accounted for 35% of their annual total. Many parts of Tamil nadu and some parts of Andhra Pradesh and Karnataka receive rainfall during this season due to the storms forming in the Bay of Bengal. Large scale losses to life and property occur due to heavy rainfall, strong winds and storm surge in the coastal regions. The day time temperatures start falling sharply all over the country. The mean temperature over north-western parts of the country shows a decline from about 38°C in October to 28°C in November.

Mawsynram, the place which receives highest rainfall (1141 cm) in

the world. It is located in Meghalaya.

Distribution of rainfall

- The average annual rainfall of India is 118 cm. However, spatial distribution of rainfall in the country is highly uneven. About 11% area receives over 200 cm of annual rainfall, 21% area receives 125 to 200 cm, 37% area receives 75 to 125 cm, 24% area gets 35 to 75 cm and 7% area gets less than 35 cm. The Western coast, Assam, South Meghalaya, Tripura, Nagaland and Arunachal Pradesh are the heavy rainfall areas which get more than 200 cm rainfall. The whole of Rajasthan, Punjab, Haryana, Western and Southwestern parts of Uttar Pradesh, Western Madhya Pradesh, the entire Deccan Trap or Plateau region east of Western Ghats except for a narrow strip along Tamil nadu coast receive a low rainfall of less than 100 cm. The rest of the areas receive a rainfall ranging between 100 and 200 cm.

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4. Resources and Industries

Introduction

- Any matter or energy derived from the environment that is used by living things including humans is called a natural resource. Natural resources include air, water, soil, minerals, fossil fuels, plants, wild life etc. Many natural resources are used as raw materials. They play a vital role in the economic development of any region. Natural resources are classified on several basis. Based on continued availability, the resources are categorised into two types. Renewable Resources are those which have natural regeneration after their utilisation. Solar energy, wind energy, biogas, tidal energy, wave energy etc. are the renewable resources. Non- Renewable resources are the sources that cannot be replaced again after utilisation. Coal, petroleum, natural gas etc. fall under this category.

Minerals

- Mineral is a natural substance of organic or inorganic origin with definite chemical and physical properties. The process of extracting mineral from the earth is known as mining. The mines near the earth crust are known as open pit mines while the deep mines are known as shaft mines.

Types of Minerals

- On the basis of chemical and physical properties, minerals are broadly grouped under two categories. They are metallic and non-metallic minerals.

a. Metallic Minerals

- Metallic minerals are the minerals which contain one or more metallic elements in them. Metallic minerals occur in rare, naturally formed concentrations known as mineral deposits. These deposits consist of a variety of valuable metals such as iron, manganese, copper, bauxite, nickel, zinc, lead, gold etc.

i. Iron ore

- Iron ore is the most widely distributed elements of the earth crust, rarely occurs in a free state. It enters into the composition of many rocks and minerals especially from igneous and metamorphic rocks. The total recoverable reserves of iron ore in India are about 9602 million tons of haematite and 3408 million tons of magnetite. About 79% haematite deposits are found in Assam, Bihar, Chhattisgarh, Jharkhand, Odisha and Uttar Pradesh. About 93% magnetite deposits occur in Andhra Pradesh, Goa, Karnataka, Kerala and Tamil Nadu. Karnataka alone contributes about 72% of magnetite deposits of India.

Iron ores are rocks and minerals from which metallic iron can be economically extracted. The ores are usually rich in iron oxides and vary in colour from dark grey, bright yellow, or deep purple to rusty red. The iron is usually found in following form.

Form of Iron ores	Iron Content (%)
Magnetite	72.4%
Hematite	69.9%
Goethite	62.9%
Limonite	55%
Siderite	48.2%

- Jharkhand is the leading producer of iron ore with 25% the country's production. Singhbhum, Hazaribagh, Dhanbad and Ranchi districts are its major producers. Odisha with 21% production ranks second. Sundargarh, Mayurbhanj, Sambalpur and Keonjhar districts are its major producers. The magnetite production of Chhattisgarh is 18% (Rajgarh and Bilaspur are its leadings districts) and the Karnataka is 20% (Chikmangalur, Chitradurga, Shimoga and Dharwad districts are its major producers). Andhrapradesh and Karnataka produce about 5% each. Kurnool, Guntur, Cuddapah and Anantapur districts in Andhra Pradesh and Salem, Namakkal, Tiruvannamalai, Tiruchirappalli, Coimbatore, Madurai and Tirunelveli districts in Tamil Nadu are notable for the production of iron ore. SAIL (Steel Authority of India Limited): The Ministry of Steel is responsible for planning and development of iron and steel industry in India.

ii. Manganese

- Manganese is a silvery grey element. It is very hard and brittle in nature. It is always available in combination with iron, laterite and other minerals. It is an important mineral used for making iron and steel and serves as basic raw material for alloying. It is the most important mineral for making iron and steel. Nearly 10 kg manganese is required for manufacturing one ton of steel. It is also used in the manufacturing of bleaching powder, insecticides, paints and batteries. Manganese deposits occur mainly as metamorphosed bedded sedimentary deposits. The largest deposits of manganese is found in Odisha(44%) followed by Karnataka (22%), Madhya Pradesh (12%), Maharashtra & Goa(7% each), Andhra Pradesh (4%) and Jharkhand (2%). Rajasthan, Gujarat, Telengana and West Bengal together constitute about 2% of the India's manganese resource. Nagpur, Bhandara and Ratnagiri districts in Maharastra and Balaghat and Chhindwara districts in Madhya Pradesh are the leading producers. Odisha is the third largest producer with 24% (Sundargarh,Kalahandi, Koraput and Bolangir districts are the major ones). Other producers are Andhra Pradesh (13%) and Karnataka (6%). Srikakulam, Visakhapatnam, Cuddapah and Guntur districts in Andhra Pradesh and the districts of Shimoga, Bellary, Chitradurga and Tumkur are the important districts of Karnataka. It is the most important mineral for making iron and steel. India is the fifth largest producer of manganese in the world.

iii. Copper

- Copper is the first metal that prehistoric man has started using for many purposes. Being flexible, it can be made into utensils of any shape. Brass and Bronze are obtained when the copper alloys with zinc and tin respectively. Copper has been commonly used for making cooking utensils and other objects of common utility. In modern days, it is extensively used in vast variety of electrical machinery, wires and cables Largest reserves of copper ore is in the state of Rajasthan (53.81%) followed by Jharkhand (19.54%) and Madhya Pradesh (18.75%). The states of Andhra Pradesh, Gujarat, Haryana, Karnataka, Maharashtra, Meghalaya, Nagaland, Odisha, Sikkim, Tamil Nadu, Telangana, Uttarkhand and West Bengal account for 7.9% of the total copper reserves of India.

- Jharkhand is the largest producer of copper with 62% of India's production. Singhbhum and Hazaribagh districts are its leading producers of copper. Odisha is the other major producer with 50.2% production. Rajasthan ranks third with 28% production. The districts of Khetri, Alwar and Bhilwara are notables in this state. The states of Uttarkhand(Dehradun and Garhwal districts),Andhra Pradesh (Guntur, Kurnool and Nellore districts), Karnataka (Chitradurga and Hassan districts) and Tamil Nadu contributes about 7% of production each.

iv. Bauxite

- Bauxite is an important ore from which aluminium is extracted. It is found in the rock consisting mainly of hydrated aluminium oxides. Bauxite is widely distributed as surface deposits in the areas of laterite soil. Being light in weight and tough, aluminium is used in the manufacture of aircraft s and automobile engines. Bauxite is also used in the manufacture of cement and chemicals. The main bauxite deposits occur in Odisha – 50.2%, Gujarat – 15.8% (Junagadh, Amreli and Bhavnagar districts), Jharkhand – 11.9% (Ranchi and Gumila districts), Maharashtra – 9.9% (Sindhu durg and Ratnagiri), Chhattisgarh – 6.2% (Ballarpur and Durg districts), and Tamil nadu – 2.7%. Being light in weight and tough, aluminium is used in the manufacture of aircraft s and automobile engines. Bauxite is also used in the manufacture of cement and chemicals. Orissa is the largest producer of bauxite in India with approx. 1,370.5 million tonnes. India's State and Central Government is very supportive in production of Bauxite and other Industrial Minerals in Orissa, Jharkand, Tamil Nadu.

b. Non-Metallic Minerals

- These minerals do not contain metal in them. Mica, limestone, gypsum, nitrate, potash, dolomite, coal, petroleum etc are the non-metallic minerals.

i. Mica

In ancient time, Mica was used in ayurvedic medicine. Mica became very popular with the development of electrical industry. Abhrak is a good quality mica. It is translucent, easily splitable into thin

sheets, flat, colourless, elastic and incompressible. Mica is used in making of insulating properties, as it withstands high voltage and has low power loss factor. Since it is a non-conductor of electricity, it is exclusively used in electrical goods. It is also used in making of lubricants, medicines, paints and varnishes.

- The major deposits of mica are found in Andhra Pradesh(41%) with Nellore, Visakhapatnam, West Godavari and Krishna are its major districts. Other important states in mica deposits are Rajasthan(21%) and Odisha(20%). Bhilwara, Jaipur and Ajmer are the notable districts in Rajasthan and, Rayagada, Bolangir and Sundargarh districts are the major producers in Odisha. Dhanbad, Palamu, Ranchi and Singhbum districts are the major mica mines in Jharkhand state.

ii. Lime Stone

- Limestone is associated with rocks composed of either calcium carbonate or the double carbonate of calcium and magnesium or mixture of both. Limestone also contains small quantities of silica, alumina, iron oxides, phosphorous and sulphur. Limestone is used in the industries of chemicals for soda ash, caustic soda, bleaching powder, paper, cement, iron and steel, glass and fertilizers. The major producing areas: Andhra Pradesh produces about 20% with major concentration in Cuddapah, Kurnool and Guntur districts. Telengana also accounts for about 20% of the country's production with the districts of Nalgonda, Adilabad, Warangal and Karimnagar as major producers. Rajasthan produces about 18% (Jodhpur, Ajmer, Bikhaner and Kota districts), Madhya Pradesh about 12% (Jabalpur and Satna districts) and Tamil Nadu about 8.4% (Salem, Kancheepuram, Tiruchirappalli, Thoothukkudi, Tirunelveli and Virudhunagar districts) of limestone production of India. In terms of the reserves of limestone, the state of Karnataka leads with 27%, followed by Andhra Pradesh and Rajasthan (12% each), Gujarat (10%), Meghalaya (9%), Telangana (8%), Chhattisgarh and Madhya Pradesh (5% each) and the remaining by other states.

iii. Gypsum

- Gypsum is a hydrated sulphate of calcium which occurs as white, opaque or transparent minerals in beds of sedimentary rocks such as limestone, sandstone and shale. Gypsum is used in the manufacture

of cement, fertilizers, wall board, plaster of paris and in soil conditioning. The state of Rajasthan alone accounts for 81% of its reserves. 14% of its reserves is found in Jammu and Kashmir and 2% in Tamil Nadu. The remaining 3% resources are found in the states of Gujarat, Himachal Pradesh, Karnataka, Uttarakhand, Andhra Pradesh and Madhya Pradesh. Rajasthan produces 82% of the country's production. Jodhpur, Bikaner and Jaisalmer are notable districts. Jammu and Kashmir produces 14% of country's gypsum. Baramula, Doda and Uri districts are its major producers. The states of Gujarat (Bhavnagar and Jamnagar districts), Uttarkhand (Dehradun and Mussourrie districts), Andra Pradesh (Nellore, Guntur and Prakasam districts) and Tamil Nadu are the other producers with about 4% each.

Energy Resources

- The resources from which the electricity generated are called energy resources. Electricity is an important component of our life. No day to day activity takes without the use of this energy. It is also the key factor for all economic activities and industrial development. Energy resources can be classified into renewable and non-renewable. Coal, petroleum, natural gas and nuclear minerals are the sources of non-renewable energy. Water, sun light, wind, bio gas, tides etc., are the sources of renewable energy.

Non-Renewable Energy

a. Coal

- Coal is an inflammable organic substance composed mainly of hydrocarbons. Coal is available in the form of sedimentary rocks. It is used in the generation of thermal power. It has close association with the industrial development of any country. Since it is a valuable one, it is called as "Black Gold". Based on carbon content, it is classified in to the following types.

Anthracite:	contains 80 to 90% carbon
Bituminous:	contains 60 to 80% carbon
Lignite:	contains 40 to 60% carbon
Peat:	contains less than 40% carbon

- Coal is an important source of energy in India with its varied and innumerable uses. It can be converted into gas, oil, electricity and thermal power. Besides, it forms a basic raw material for the production of chemicals, dyes, fertilizers, paints, synthetic and explosives. Indian coal is mostly associated with Gondwana series of rocks and is primarily found in Peninsular India. The states of Jharkhand, odisha, West Bengal and Madhya Pradesh alone account for nearly 90% of coal reserves of the country. About 2% of India's coal is of tertiary type and is found mostly in Assam and Jammu & Kashmir.

- Jharkhand is the largest coal producing state in the country followed by odisha, Chhattisgarh, West Bengal, Madhya Pradesh, Andhra Pradesh and Maharashtra. The major coal fields of Jharkhand are Bokaro, North Karanpura, South Karanpura, Giridih, Ramgarh, Daltongunj and Rajmahal. Talcher and Ranapur in Odisha, Korba and Chirmiri in Chhattisgarh, Umaria and Singrauli in Madhya Pradesh, Tandur, Singareni, Kothagudem and Ramagundam in Andhra Pradesh, Wardha, Ballarpur, Chanda and Kampati in Maharastra and, Raniganj, Asansol and Mejia in West Bengal are the other major coal fields of India.

- Indian lignite (brown coal) deposits occur in the southern and western parts of Peninsular India particularly in Tamil Nadu, Pudhucherry and Kerala. The Ministry of coal has over-all responsibility of determining policies and strategies in respect of exploration and development of coal resource in India. Coal India Limited (CIL), NLC India Limited (NLCIL) and Singareni Collieries Company limited (SCCL) are its public sector under takings.

b. Petroleum (or) Crude oil

- The word petroleum has been derived from two Latin words petro (meaning – Rock) and oleum (meaning oil). Thus petroleum is oil obtained from rocks of the earth. Therefore, it is also called mineral oil. Petroleum is an inflammable liquid that is composed of hydrocarbons which constitute 90-95% of petroleum and the remaining is chiefly organic compounds containing oxygen, nitrogen, sulphur and traces of organ metallic compounds. Petroleum is used as a source of power and fuel for automobiles, aeroplanes, ships and locomotives. Lubricants, kerosene, vaseline, tar, soap, terylene and

wax are its by-products. Oil in India is obtained from both from on-shore and off-shore areas. As of 2017, the total estimated crude oil reserves of the country is 604.10 million tons. From this, 324.24 million tons (54%) are found in onshore and 279.86 million tonnes (46%) are in offshore areas. The production of crude oil fluctuates from year to year from 2011-12 to 2017-18 but only with marginal variations. The change is invariably in negative. In natural gas production also the trend is negative except the last year. The change is high in the first three years and it is low to moderate in the remaining years.

Western coast offshore oil fields	Eastern coast offshore fields
Mumbai high oil fields (largest 65%)	Bharmaputra valley (Dibrugarh and Sibsagar districts of upper Assam.)
Gujarat coast (2nd largest)	Digboi iol fields (oldest fields in country)
Basseium oil field, south of Mumbai high	Nahoratiya oil fields (south west of digboi)
Aliabet oil field, south of Bhavanagar	Moran – Hugrijian oil fields (sibsagar districts of assam)
Ankleshwar	Rudrasagar – Lawa oil fields (sibsagar districts of assam)
Cambay – Luni Region	Surrma valley (Badarpur, Masimpur, Patharia)
Ahmedabad Kalol Region	Offshore of Andaman and Nicobar, Gulf of mannar, Baleshwar coast, Punjab, Haryana and Uttar Pradesh.

c. Natural Gas

- Natural gas usually accompanies the petroleum accumulations. It is naturally occurring hydro carbon gas mixture consisting primarily of methane, but commonly includes varying amounts of other higher alkanes and sometimes a small percentage of carbon dioxide, nitrogen and hydrogen sulphides. It is formed when layers of decomposed plants and animals are exposed to intense heat and pressure over thousands of years. It is used as a source of energy for heating, cooking and electricity generation. It is also used as fuel for

vehicles and as a chemical feedstockin the manufacture of plastics and other commercially important organic chemicals.

- India has a very large proportion of tertiary rock and alluvial deposits particularly in the extra peninsular India. These sedimentary rocks, which were once under the shallow seas, hold the possibility of harbouring oil and gas deposits. The highest concentration of natural gas is found in the Bombay high and basseim oil fields. Jagatia and Gogha in Gujarat, Nahorkatiya and Moran in Assam, Neypaltur, Mangmadam in Thanjavur district in Tamil Nadu, Baranura and Atharnure ranges in Tripura, Barmer and Charaswala in Rajasthan, Miao Pung and Laptang areas in Arunachal Pradesh, Firozpur district in Punjab, Mausar and Maradpur areas in Jammu and Kashmir and Medinipur in West Bengal are the other areas where natural gas reserves have been discovered. The Gas Authority of India Ltd [GAIL] is doing pioneer work in the field of natural gas exploration. Discovery of gas made rapid strides in the 1985. Oil strikes at Cauvery offshore, at Nanda in Cambay basin and Tarot in Jaisalmer basin in Rajasthan were major discoveries during 1988-89. Recently, it has been found that Krishna- Godavari delta has reserves of Natural gas.

Conventional Energy Sources

a. Thermal power

- Thermal power is generated using fossil fuels like coal, diesel, petroleum and Natural gas. National Thermal Power Corporation [NTPC] was established in 1975. At present NTPC has 13 coal based super thermal power projects and 7 gas / liquid fuel based combined cycle projects in the states of Assam, Bihar, Jharkhand, Chhattisgarh, Mizoram and West Bengal. It accounts for over 90% of the installed capacity. Tamil Nadu produces about 5% of the total thermal electricity produced in India. Neyveli, Mettur, Thoothukudi and Ennore (Chennai) are the important thermal power stations in Tamil nadu.

b. Nuclear power

- The energy released during nuclear fission or fusion is used to generate electricity. Nuclear energy is generated mainly from the

minerals of Uranium and Thorium. Nuclear power programme in India was initiated in 1940's when 'Tata Atomic research commission was incorporated in August 1948. The first nuclear power station was setup at Tarapur near Mumbai in 1969 with the capacity of 320 mw. Later atomic reactors were installed at Rawatbhata (335 MW), near Kota in Rajasthan (100 MW), Kalpakkam (440 MW) and Kudankulam (2,000 MW) in Tamil Nadu and Narora (235 MW) in Uttar Pradesh, Kaiga in (235 MW) in Karnataka and Kakarapara (235 MW) in Gujarat.

Renewable or Non- Conventional Energy Resources

a. Hydro power

- Power generated from water is termed as hydroelectricity. Hydro power is the energy harnessed from running water. Hydro power is considered as one of the most economic and non-polluting sources of energy. It contributes nearly 7% of global electricity production. The cost of production of hydroelectricity is relatively low, making it a competitive source of renewable energy. It is also a flexible mode of power generation as the quantity of production can either be increased or decreased very quickly adapting to changing demands. India is fortunate to have a large potential of hydro- power potential. It is quite unevenly distributed in India. Of the total hydro-electric potential of the country, rivers of Assam, Arunachal Pradesh, Manipur, Nagaland and Tripura account for 30.4%, eastward flowing rivers of the peninsular India 20.9%, westward flowing rivers of the western Ghats (South of the Tapti) 10.5%, the Ganga Basin (excluding the potential of Nepal) 11.7%, the Indus Basin 16.0% and the rivers of central India 10.5%.

b. Solar Energy

- Solar Power is the conversion of sunlight into electricity, either directly using photovoltaic (PV) or indirectly using concentrated solar power (CSP). Concentrated solar power systems use lenses or mirrors and tracking system to focus a large area of sunlight into a small beam. Photovoltaic convert light into an electric current using the photovoltaic effect. The mass objectives of the solar thermal energy programme, being implemented by the Ministry of Non-Conventional Energy Source (MNES) are market development,

commercialisation and utilisation of heat energy requirement of different applications in domestic, institutional and industrial sectors. Solar power is used in water heaters, refrigerators, drying, street lighting, cooking, pumping, power generator, photovoltaic cells, salon parts etc. Andhra Pradesh, Gujarat, Rajasthan, Maharashtra and Madhya Pradesh are the major solar power producers.

c. Wind Energy

- Wind energy is extracted from air flow using wind turbines. It is a cheap and pollution free source of energy. Power from wind mills are used for pumping water and to sail propel ships. Wind power is plentiful, renewable, widely distributed, clean and produces no greenhouse gas emissions during operation. These plants occupy only a less space. The development of wind power in India began in 1986 with first wind farms were set up in coastal areas of Gujarat (Okha), Maharashtra (Ratnagiri) and Tamil Nadu (Thoothukudi) with 55 KW Vestas wind turbines. The capacity has significantly increased in the last few years. India has the fourth largest installed wind power capacity in the world.

d. Biomass Energy

- Bio energy may be obtained through bio-degradable materials like animal dung, kitchen wastes, water hyacinth, agricultural residues and city wastes etc. It is clean and cheap source of energy. India has a potential of about 18 GW of energy from Biomass. Currently, about 32% of total primary energy used in India is derived from Biomass. Energy derived from biomass is mostly used for domestic purposes.

e. Tidal and wave Energy

There are two main sources of ocean energy. They are Ocean tides and Ocean waves. It is estimated that India possesses 8,000-9,000 MW of tidal energy potential. The Gulf of Cambay is the best suited area with about 7,000 mw potential of tidal energy. This is followed by Gulf of Kachch (1,000MW) and sunder bans (100MW). At present a 900mw tidal power plant is proposed to be set up in the Gulf of Kachch region. Wave energy potential in India is estimated to be 40,000 MW. An wave energy power plant of 150 KW(maximum) has been installed at vizhinjam near Thiruvananthapuram. An another plant of this kind has been set up near Andaman& Nicobar Islands.

Industries

- It refers to the activities which converts the raw materials into finished products. This sector is called as the value addition sector. On the basis of the source of raw materials, Industries are classified into the Agro based industries, Forest based industries and Mineral based industries.

Agro based industries

- These industries draw their raw materials from agricultural sector. The following part discusses the agro based industries in India.

a. Cotton Textile Industry

- Textile is a broad term which includes cotton, jute, wool, silk and synthetic fibre textiles. This sector in India with 3400 textiles mills with installed capacity of more than 50 million spindles and 842000 rotors is the second largest in the world. Traditional sectors like hand loom, handicrafts and small power-loom units are the biggest source of employment for millions of people in rural and semi urban areas. The cotton textile industries contribute about 7% of industrial output, 2% of India's GDP and 15% of the country's export earnings. It is one of the largest sources of employment generation in the country. With over 45 million employees, the total employment in this industry is well over 25million worker. At present there are 1,719 textiles mills in the country. Out of which 188 mills are in public sector, 147 in cooperative sector and 1,284 in private sector. Currently, India is the third largest producer of cotton and has the largest loom arc and ring spindles in the world. At present, cotton textile industry is the largest organized modern industry of India. About 16% of the industrial capital, 14% of industrial production and over 20% of the industrial labour of the country are engaged in this industry. The higher concentration of textile mills in and around Mumbai, makes it as "Manchester of India". Presence of black cotton soil in Maharastra, humid climate, presence of Mumbai port, availability of hydro power, good market and well developed transport facility favour the cotton textile industries in Mumbai. The major cotton textile industries are concentrated in the states of Maharashtra, Gujarat, West Bengal, Uttar Pradesh and Tamil Nadu. Coimbatore is the most important centre in Tamil Nadu with 200 mills out of its 435 and called as "Manchester of South India". Erode, Tirupur, Karur,

Chennai, Thirunelveli, Madurai, Thoothukudi, Salem and Virudhunagar are the other major cotton textiles centres in the state.

b. Jute Textiles

- Jute is a low priced fibre used mainly for making package materials like gunny bags. Today jute is blended with cotton and wool to produce textiles. India is the largest producer of jute goods contributing 35% of the world's total output. This is the second important textile industry in India after cotton textiles. Jute is the golden fibre which meets all the standards of goods packing with its natural, renewable, bio degradable and eco-friendly products. The first jute mill in India was established at Rishra near, Kolkata in 1854 by the English man George Auckland.

- India tops in the production of raw jute and jute goods and second in the export of jute goods next to Bangladesh. Jute production includes gunny bags, canvas, pack sheets, jute web, carpets, cordage, hessians and twines. Now jute is also being used in plastic furniture and insulation bleached fibres to blend with wool. It is also mixed with cotton to make carpet and blankets. The major jute producing areas are in West Bengal and concentrated along the Hooghly river within the radius of six kilometre of Kolkata. Titagarh, Jagatdat, Budge-Budge, Haora and Bhadreshwar are the chief centres of jute industry. Andhra Pradesh, Bihar, Uttar Pradesh, Assam, Chhattisgarh and Odisha are the other jute goods producing areas.

c. Silk Industry

- India has been well known for the production of silk. Since the ancient times, India is the second largest producer of raw silk next only to China. Sericulture is a labour intensive industry and provides employment to 7.56 million people make to weaker and marginalised sections of society. Karnataka is the largest producer of silk with an average of 8200 metric tons every year which is about one third of the total silk production of India. Other major producers of silk are West Bengal, Jammu Kashmir, Bihar, Jharkhand, Chhattisgarh, Uttar Pradesh, Punjab, Assam and Tamil Nadu states. India exports exclusively silk fabrics, silk scarves, dress material and sarees. It exports to the principal countries like Europe, U.S.A, U.K, Russia, Saudi Arabia, Kuwait and Singapore.

d. Sugar Industry

- Sugar can be produced from sugar cane, sugar-beets or any other crop which have sugar content. In India, sugar cane is the main source of sugar. At present this is the second largest agro based industry of India after cotton textiles. India is the world's second largest producer of sugar cane after Brazil. This industry provides employment to 2.86 lakh workers. Sugar industry is decentralized and located near the sugarcane growing areas as they are weight loosing and bulky to transport. Uttar Pradesh is the largest producer of sugar, producing about 50% of the country's total. Other major producers are Maharashtra, Uttar Pradesh, Karnataka, Andhra Pradesh, Tamil Nadu, Bihar, Punjab, Gujarat, Haryana and Madhya Pradesh states. These states account for more than 90% of the sugar mills and sugar production.

Forest based industries

- Forest provide us with different types of material which are used as raw material for certain industries like paper, lac, sports goods, plywood etc.

a. Paper industry

- Paper Industry has emerged as a diversified and specialized industry in India that produces numerous types of papers that comes in various use such as sheet paper, paper boxes, tissues, paper bags, stationery, envelopes and printed-paper products such as books, periodicals, and newspapers. In India the Soft wood is the principal raw material used for making paper especially newsprint and high class printing papers. Paper is the pre-requisite for education and literacy and its use is an index of advancement in these two fields as well as the overall well-being of the society.

- The first successful effort was made in 1867 with the setting up of the RoyalBengal paper mills at Ballyganj near Kolkata. Subsequent successful efforts were made at Lucknow in 1879, Titagarh in 1882, Pune in 1887, Raniganj in 1892, Kankinra in 1892 and Naihati in 1918.The raw materials for paper industry includes wood pulp, bamboo, salai and sabai grasses, waste paper and bagasse. West

Bengal is the largest producer of paper in the country followed by Madhya Pradesh, Odisha and Tamil nadu states.

Mineral based industries

- Mineral based industries use both metallic & non-metallic minerals as raw materials. The major mineral based industry of country is the iron steel industry

a. Iron and steel industries

- Iron and steel industry is called a basic metallurgical industry as its finished product is used as raw material by host of other industries. Several industries like engineering, heavy machines and machine tools, automobile, locomotives and railway equipment industries use iron and steel as their primary raw material. Due to this, the steel producing capacity of a country is generally taken as an indicator of its level of industrial development. The modernization of the industry was started in 1907 with the establishment of Tata Iron and Steel Company at Sakchi, now called Jamshedpur. Iron and steel industry of India is mainly concentrated in the states of Jharkhand, West Bengal and Odisha. Proximity to the coal fields of Jharia, Raniganj, Bokaro and Karanpura and the iron ore mines of Mayurbhanj, Keonjar and Brona are responsible for this. This area also has sufficient deposits of limestone, dolomite, manganese, silicon and dolomite which are required for the industry.

S.NO	Name of Industry	Place	Establishment year	Product
1.	Tata Iron and Steel Company (TISCO)	Jamshedpur, Jharkhand	1911	Pig Iron
2.	Indian Iron and steel Company (IISCO)	Burnpur, Hirapur, Kulti, West Bengal	1972	Pig Iron & Crude steel
3.	Visweshwaraya Iron Steel Ltd (VISL)	Bhadravati, Karnataka	1923	Alloy and Sponge steel
4.	Hisdustan Steel Ltd (HSL) Collaborated with Russia	Bhilai, Chattisgarh	1957	Railway Equipment's and Ship Building
5.	Hindustan Steel Ltd (HSL) Collaborated	Rourkela, Odisha	1965	Hot and Cold rolled sheets,

	with Germany			Galvanized sheets and electrical plates
6.	Hindustal Steel Ltd (HSL) Collaborated with United Kingdom	Durgapur, west Bengal	1959	Alloy steel, Construction materials and railway equipment's
7.	Hisdustan Steel Ltd (HSL) Collaborated with Russia	Bokaro, Jharkhand	1972	Sludge and Slog
8.	Salem Steel Ltd	Salem, Tamil Nadu	1982	Stainless Steel
9.	Vijayanagar Steel Plant	Tornagal, Karnataka	1994	Flat steel and Long Steel
10.	Visakhapatnam Steel Plant (VSO)	Visakhpatnam, Andhra Pradesh	1981	Hot Metal

Automobile Industry

- India is set to emerge not only as a large domestic market for automobile manufacturers, but also as a crucial link in the global automotive chain. It is one of the most dynamic industrial groups in India. The first automobile industry of India was started in 1947. The industry is the Premier Automobiles Ltd located at Kurla (Mumbai). It was followed by the Hindustan Motors Ltd at Uttarpara (Kolkata) in 1948. At present, India is the 7th largest producer of automobile manufacturers which include two wheelers, commercial vehicles, passenger car, jeep, scooty, scooters, motor cycles, mopeds and three wheelers. Major centres are at Mumbai, Chennai, Jamshedpur, Jabalpur, Kolkata, Pune, New Delhi, Kanpur, Bengaluru, Sadara, Lucknow and Mysuru. Tata Motors, Maruti Suzuki, Mahindra & Mahindra and Hindustan Motors are the largest passenger car manufacturers of Indian companies in the country. Presence of foreign car companies such as Mercedes Benz, Fiat, General Motors, Toyota and the recent entryof passenger car manufacturers BMW, Audi, Volkswagen and Volvo makes the Indian automobile sector a special one. Tata Motors, Ashok Leyland, Eicher Motors, Mahindra & Mahindra and Ford Motors are the major Indian companies which manfacture commercial vehicles. MAN, ITEC, Mercedes-Benz, Scania

and Hyundai are the foreign companies engage in the manfacture of commercial vehicles. Twowheeler manufacturing is dominated by Indian companies like Hero, Bajaj Auto and TVS.

- The automobile industries are found in four clusters viz; Delhi, Gurgaon and Manesar in North India, Pune, Nasik, Halol and Aurangabad in West India, Chennai, Bengaluru and Hosur in South India and Jamshedpur and Kolkata in East India. Electrical and Electronic

Industries

- Heavy electrical industries manufacture equipment used for power generation, transmission and utilization. Turbines for steam and hydro power plants, boilers for thermal power plants, generators, transformers, switch gears etc. are the chief products of this industry. The most important company in the field of heavy electrical is Bharat Heavy Electricals Ltd (BHEL). It has its plants at Hardwar, Bhopal, Hyderabad, Jammu, Bengaluru, Jhansi and Tiruchirappalli. This Industry covers a wide range of products including television sets, transistor sets, telephone exchanges, cellular telegram, computers and varied equipment's for post and railway, defence and meteorological department. Bengaluru is the largest producer of electronic goods in India, hence it is called as the "Electronic Capital of India". The other major producers of electronic goods centers are Hyderabad, Delhi, Mumbai, Chennai, Kolkata, Kanpur, Pune, Lucknow, Jaipur and Coimbatore.

Software Industry

- India is home to some of the finest software companies in the world. The software companies in India are reputed across the globe for their efficient IT and business related solutions. The Indian Software Industry has brought about a tremendous success for the emerging economy. In India, software industry began in 1970 with the entry of Tata Consultancy Services (TCS). Along with this, L & T, InfoTech, i-Flex, Accenture, Cognizant, GalexE Solutions India Pvt Ltd and ITC InfoTech are the major software industries in the country. At present, there are more than 500 software companies all over India. It exports software service to nearly 95 countries in the world. The main centres of IT parks are located in Chennai, Coimbatore,

Thiruvananthapuram, Bengaluru, Mysuru, Hyderabad, Visakhapatnam, Mumbai, Pune, Indore, Gandhi Nagar, Jaipur, Noida, Mohali and Srinagar.

Major challenges of Indian Industries

Industries in India face many problems. Some major problems are listed below.

- ✓ Shortage and fluctuation in Power Supply.
- ✓ Non- availability of large blocks of land.
- ✓ Poor access to credit.
- ✓ High rate of interest for borrowed loan.
- ✓ Non- availability of cheap labourers.
- ✓ Lack of technical and vocational training for employees.
- ✓ Inappropriate living conditions nearby industrial estates.

NOTE

- ❖ The organisations associated with minerals in India are the Geological Survey of India (Headquarter is at Kolkata), Indian Bureau of Mines (Headquarter at Nagpur) and Non-Ferrous Material Technology Development Centre (NFTDC), located at Hyderabad. The Ministry of Mines is responsible for the administration of all mines and minerals (Development and Regulation Act, 1957).
- ❖ MOIL- Manganese Ore India Limited state-owned manganese-ore mining company headquartered in Nagpur. With a market share of 50%, it was the largest producer of manganese ore in India.
- ❖ Hindustan Copper Ltd is a Government-owned corporation in the central public Enterprise under the Ministry of minies, India. HCL is the only vertically integrated copper producer in India engaged in a wide spectrum of activities ranging from Mining, Beneficiation, Smelting, Refining and Continuous Cast Rod manufacturer. Bauxite is an oxide of aluminium; the name has been derived after the French word Le Baux.
- ❖ National Aluminium Company Limited, abbreviated as NALCO, (incorporated 1981) has units in Odisha at places like Angul and Damanjodi. It was incorporated as a public sector enterprise of the Ministry of Mines, Government of India in 1981.
- ❖ Coal India Limited (CIL) is an Indian state-controlled coal mining

company headquartered in Kolkata, West Bengal, its field offices are located at Dhanbad, Ranchi, Bilaspur, Nagpur, Sambalpur, Kothagudam and Asansol. It is the largest coal-producing company in the world.

- The Ministry of Petroleum and Natural Gas (MOP&NG) is a ministry of the Government of India. It is responsible for the exploration, production, refining, distribution, marketing, import, export, and conservation of petroleum, natural gas, petroleum products, and liquefied natural gas in India.
- Gail (India) Limited (GAIL) (formerly known as Gas Authority of India Limited) is the largest state-owned natural gas processing and distribution company in India. It is headquartered in New Delhi. It has the following business **segments**: natural gas, liquid hydrocarbon, liquefied petroleum gas transmission, petrochemical, city gas distribution, exploration and production, GAILTEL and electricity generation.
- Compressed natural gas (CNG) (methane stored at high pressure) is a fuel which can be used in place of gasoline, diesel fuel and propane/LPG. In comparison to other fuels, natural gas poses less of a threat in the event of a spill, because it is lighter than air and disperses quickly when released. Biomethane – cleaned-up biogas from anaerobic digestion or landfills – can be used. Natural gas vehicles are increasingly used in Delhi, Ahmedabad, Mumbai, Pune, Kolkata Lucknow, Kanpur, Varanasi, etc.
- The Nuclear Power Corporation of India Limited (NPCIL) is an Indian public sector undertaking based in Mumbai, Maharashtra. It is wholly owned by the Government of India and is responsible for the generation of nuclear power for electricity. NPCIL is administered by the Department of Atomic Energy (DAE) is responsible for designing, and operating the nuclear power stations in India.
- NHPC Limited (National Hydroelectric Power Corporation) is located in Faridabad, India
- The first hydro-electric power station in India was established at "Darjeeling" in 1897.
- Solar Energy Corporation of India Limited (A Government of India Enterprise) head quarter is located at New Delhi.
- Tamil Nadu has the largest installation of wind turbines in the country in the
- Muppandal-Perungudi area near Kanniyakumari is the largest

concentrations of wind farm capacity at a single location in the world.

- The National Institute of Wind Energy (NIWE), Chennai was established in Tamil Nadu in 1998 as an autonomous institution under the administrative control of the Ministry of New and Renewable Energy. CIWE main activities include resource assessment and testing & certification.
- The first cotton textile mill was established at Fort Gloster near Kolkata in 1818.
- Byssinosis, also called "brown lung disease" or "Monday fever", is an occupational lung disease caused by exposure to cotton dust in inadequately ventilated working environments.
- National jute board is headquarter at Kolkata.
- Ginning is the process of cotton fibre is separated from the cotton seed.
- The first attempt to produce iron and steel unit was set up at Porto Novo in Tamil Nadu in 1830.
- CSTRI is the only research institute in the country dedicated to the Research & Developmental activities related to silk technology. CSTRI was established in the year 1983 by the Central Silk Board, Ministry of Textiles, Govt. of India having head quarter at Bangalore
- Development Commissioner for Handlooms was set up as an attached non-participating office on 20th November, 1975 under the Ministry of Commerce. At present it is functioning under the Ministry of Textiles having headquarters at Udyog Bhawan, New Delhi.
- The first paper mill of India was started in 1812 at Serampore in West Bengal.
- National Newsprint and Paper Mills (NEPA) is at Nepanagar in Burhanpur District of Madhya Pradesh.
- Chennai is nicknamed as the "Detroit of Asia" due to the presence of major automobile manufacturing units and allied industries around the city. Make in India program was launched in 2014 to put India on the world map as a major hub for global design and manufacturing.