CHAPTER

3

Location, Extent and Physical Features

India is the largest country in the Indian **sub-continent**[1], deriving its name from the river 'Indus' which flows through the North-Western part of the country.

Location

India is a vast country and located in the Northern hemisphere. Its mainland extends between latitudes 8°44′N and 37°6′N and longitudes 68°7′E and 97°25′E. It is divided into almost two equal parts by the **Tropic of Cancer**[2] (23°30′N). It passes through the States of Gujarat, Rajasthan, Madhya Pradesh, Chhattisgarh, Jharkhand, West Bengal, Tripura and Mizoram. Two groups of islands belonging to India are the Andaman and Nicobar Islands in the Bay of Bengal (South-East of the main land) and the Lakshadweep Islands in the Arabian Sea (South-West of the mainland).

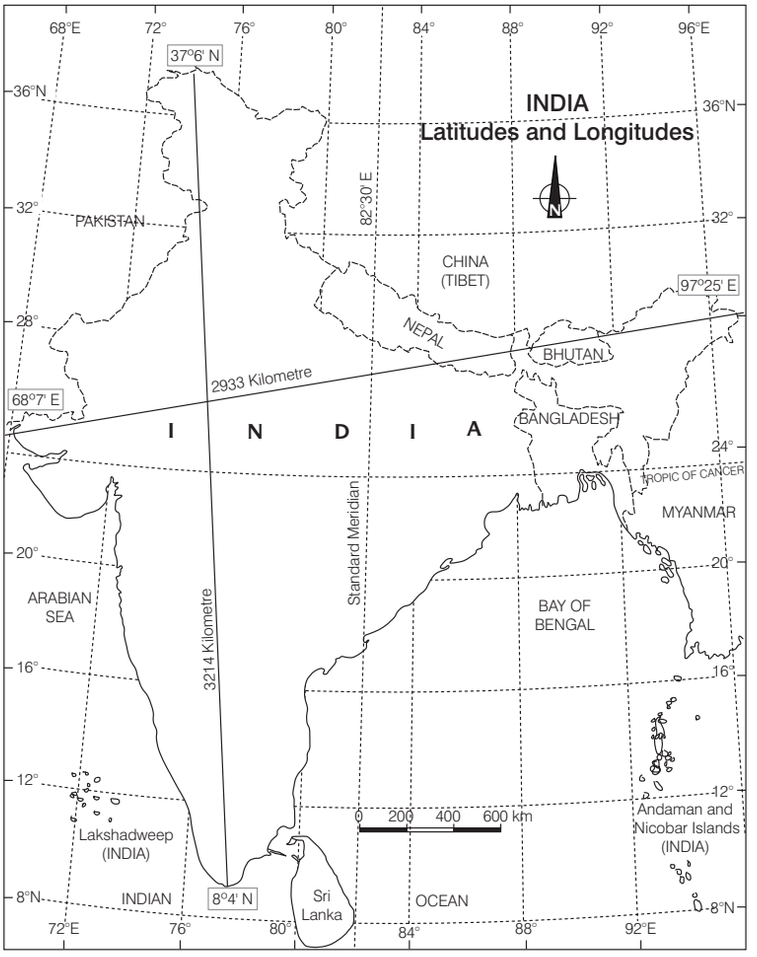
Size and Extent

India's landmass with an area of 3.287 million sq km occupies 2.4% of the total geographical area of the world. India is the 7th largest country of the world, after Russia, Canada, USA, China, Brazil and Australia. India has a land boundary extends over 15200 km and its coastline is about 7516.6 km.

The latitudinal as well as longitudinal extent of the main land is about 30° despite the fact that East-West extent appears to be smaller than the North-South extent. The latitudinal extent influences the duration of day and night as one moves from South to North.

1 Subcontinent A big landmass which stands out as a distinct geographical unit from the rest of the continent.

2 Tropic of Cancer An imaginary parallel of latitude at 23½° North-South which is considered as the tropical zone of India.



India : Size and Extent

Important Facts about India

Total Area	3.287 milion km^2
Latitude	8°44'N to 37°6'N
Longitude	68°7'E to 97°25'E
North to South Extent	3214 km
East to West Extent	2933 km
Main Land Coastline	6100 km
Total Coastline	7516.6 km
Land Boundary	15200 km
Northern Most Point	Indira Col, Siachen Glacier J&K
Southern Most Point	Indira point (Great Nicobar) that got submerged under Indian Ocean in 2004 during the Tsunami.
Western Most Point	Guhar Moti (Gujarat)
Eastern Most Point	Kibithu (Arunachal Pradesh)
Highest Altitude	K_2 (Godwin Austin)
Lowest Altitude	Kuttanad (Kerala)
Territorial Sea	12 nm (22.2 km)
State having Longest Coastline	Gujarat (1214.70 km)
State having Shortest Coastline	Goa (160.5 km)

Indian Standard Time (IST)

There is a time difference of almost two hours between Gujarat to Arunachal Pradesh. Hence, time along the **Standard Meridian**[3] of India passing through Mirzapur (in Uttar Pradesh) is taken as the Indian Standard Time for the whole country. It is $5\frac{1}{2}$ hours ahead of Greenwich Mean Time (GMT).

India and Adjacent Countries

India is the most influential country of South Asia. It has 29 States and 7 Union Territories. India shares its land boundaries with Pakistan and Afghanistan in the North-West, China, Nepal and Bhutan in the North-East and Myanmar and Bangladesh in the East. Two island countries, Sri Lanka (separated by Palk Strait and Gulf of Mannar) and the Maldives, lie to the South of India across the Indian Ocean.

India and the World

The nearness to the Indian Ocean, its central location and Southward extension of Indian landmass in Asia, give it a strategic position in the world. As Deccan Peninsula protrudes into the Indian Ocean, it helps India to establish a nearby contact with West Asia, Africa and Europe from the Western coast and with South-East and East Asia from the Eastern coast.

Physical Features of India

The physical features of India can be grouped under the following physiographic divisions:

The Himalayan Mountains

The Himalayas, geologically young and structurally fold mountains, run in West-East direction from the Indus to the Brahmaputra. They are the longest range in India, covering an area of about 2400 km. Their width varies from 400 km in Kashmir to 150 km in Arunachal Pradesh.

Sub-Divisions of the Himalayan Mountains

The range are as follows:

Himadri or Inner Himalayas or Greater Himalaya This is the Northern most and the highest range with an average height of 6000 m. It contains all the prominent Himalayan peaks like Mount Everest, Kanchenjunga (highest in India) Makalu, etc.

Himachal or Lesser Himalayas or Western Himalayas This range lies to South of the Himadri and forms the most rugged mountain system. Its height vary from 3700 to 4500 m and width about 50 km. The ranges here are Pir Panjal (longest), Dhaula Dhar and Mahabharat. They also contain the valleys like Kashmir, Kangra, Kullu, etc.

Shivaliks This is the outermost range of the Himalayas with height varying between 900 and 1100 m and width between 10 to 50 km. **Duns**[4] like Dehradun, Kotlidun and Patlidun are lying here.

Purvanchal Range or the Eastern Himalayas The Brahmaputra marks the Easternmost boundary of the Himalaya. Beyond Dihang gorge, this range turns South along the North-Eastern boundary of India. It include the Patkai hills, the Naga hills, the Manipur hills and the Mizo hills.

Mountains and Hill Range

Apart from the Northern mountains i.e. the Himalayan mountain range, India also has mountain ranges running in West, Central and Southern part along the coasts. The Aravalli range runs in the West while the Vindhyas and Satpura range is in Central India. The Western Ghats is along the Western coastal plain and Eastern Ghats is along the Eastern coastal plain while Nilgiris is in the confluence of both.

The Northern Plains

This plain is formed by three river systems, *viz* the Indus, the Ganga and the Brahmaputra, alongwith their tributaries. This plain is formed by alluvial soil. It spreads over an area of 7 lakh sq km. These plains are about 2400 km long and between 240 and 320 km broad.

They are densely populated due to the fertile soil, adequate water supply, favourable climate and terrain. The rivers originating from the Northern mountains slow down due to the gentle slope, which results in the formation of riverine islands. Majuli is the largest inhabited riverine island in the world and lies in the Brahmaputra river. The rivers split into a number of channels in their lower courses due to deposition of silt. These channels are called **distributaries**. They are common features of river deltas.

Parts of Northern Plain

The three parts of the Northern plains are:

(i) **Punjab Plain** It is the Western part of the plain. It has been formed by the Indus and its many tributaries. The larger part of this plain lies in Pakistan.

3 Standard Meridian The longitude which passes through a country or region which is used to fix the standard time for that country or region.

4 Duns These are longitudinal valleys lying between the lesser Himalayas and Shivaliks.

The Indus and its tributaries—the Jhelum, the Ravi, the Sutlej, the Beas and the Chenab, originate in the Himalayas. The Punjab plain is also dominated by doabs (meaning two waters).

(ii) **Ganga Plain** It is the middle part of the plain. It extends from the Ghaggar river (in Haryana) to the Tista river (in West Bengal) through the states of Haryana, Delhi, Uttar Pradesh, Bihar, partly Jharkhand and West Bengal.

(iii) **Brahmaputra Plain** It is the Eastern part of the plain. It extends from Assam to Bangladesh.

Regions of Northern Plain

Along its width, the Northern plain is divided into four regions according to variation in relief feature which are as follows:

(i) **Bhabar** After descending from the mountains, the rivers deposit pebbles in a narrow belt of about 8 to 16 km in width lying parallel to the slopes of the Shiwaliks. It is known as *bhabar* belt. All the river disappear in the *bhabar* belt.

(ii) **Terai** South of *bhabar* belt, the streams and rivers re-emerge and create a wet, swampy and marshy region known as *terai.* Earlier it was thickly forested with a lot of wildlife, but now most of the forests have been cleared for agriculture land and to settle migrants from Pakistan after independence. Some forest still remains here. Dudhwa National Park is located in this region.

(iii) **Bhangar** The largest part of the Northern plain consisting of older alluvium and known as *bhangar.* It presents a terrace like feature and contains calcareous deposits known as *kankars*.

(iv) **Khadar** The lowest region is the flood plain known as *khadar*. The soil here is renewed whenever there is a flood (almost every year) so this area is fertile and best for intensive agriculture.

The Peninsular Plateau

This is a **tableland** composed of the old crystalline, igneous and metamorphic rocks. It was formed due to the breaking up and drifting of Gondwana land; thus it is a part of the oldest landmass. The plateau has broad and shallow valleys and rounded hills.

This plateau consists of two broad divisions. These are:

(i) Central Highlands

This is the part lying North of the Narmada river which covers most of the Malwa plateau. The Vindhyan range is bounded by the Central Highlands on the South and the eroded and broken Aravallis on the North-West. Its further Westward extension gradually merges with the sandy and rocky desert of Rajasthan. It slopes from South-West to North-East, as indicated by the flow of the Chambal, Sind, Betwa and Ken rivers. The Central Highlands are wider in the West, but narrower in the East. Its Eastern edge is consists of the areas known as Bundelkhand and Baghelkhand. The Chotanagpur plateau marks the further Eastward extension drained by the Damodar river.

(ii) Deccan Plateau

This triangular landmass lies to the South of the river Narmada. The broad base of the Satpura range form its North while the Mahadeo hills, the Kaimur hills and the Maikal range from its Eastern extensions. The Deccan plateau is higher in the West and slopes gently Eastwards. An extension of the plateau is also visible in the North-East, generally known as the Meghalaya Karbi-Anglong plateau and North Cachar hills. It is separated from the Chotanagpur plateau by a fault. Three prominent hill ranges from its West to East are the Garo, the Khasi and the Jaintia hills.

Western and Eastern Ghats

These ghats mark the East and West edges of the Deccan plateau. The Western Ghats (also called the Sahyadri range) lie parallel to the Western coast. The Western Ghats are higher than the Eastern Ghats. Their average elevation is 900-1600 metres as against 600 metres of Eastern Ghats. The ghats cause orographic rain by forcing the rain-bearing moist monsoon winds to rise along the Western slopes of the ghats. The height of the Western Ghats increases from North to South.

Anai Mudi (2695 m) and Doda Betta (2637 m) are the highest peaks found here. The famous hill stations of Udagamandalam (popularly known as Ooty) and Kodaikanal are in these hills. The Western Ghats are continuous and can be crossed through passes only.

The Eastern Ghats stretch from the Mahanadi valley to the Nilgiris in the South. The Eastern Ghats are discontinuous and irregular and dissected by rivers draining the Bay of Bengal. Mahendragiri (1501 m) is the highest peak in the Eastern Ghats. Shevroy hills and Javadi hills are located in the South-East of the Eastern Ghats. The Nilgiri hills in Tamil Nadu lie at the junction of the Eastern and Western Ghats.

Deccan Trap

The Western part of the plateau known as the **Deccan Trap** contains black soil of volcanic origin. The rocks are igneous and denuded to form black soil, famous for cotton cultivation.

The Indian Desert

This lies on the Western margins of the Aravalli hills. It consists of wave like sandy plain with various types of sand dunes. It receives less than 150 mm rainfall annually. It has arid climate with low vegetation. Here streams appear only during the monsoon season. Luni is the only large river in this region.

Crescent shaped sand dunes called Barchans cover most of this desert, but longitudinal dunes are also seen on the Western edge of this region near the Indo-Pakistan border. This desert is known as the Thar Desert.

The Coastal Plains

The Peninsular plateau is bordered by narrow coastal strips running along the Arabian Sea on the West and the Bay of Bengal on the East. The Western coast which lies between the Western Ghats and Arabian sea, is a narrow plain. It consists of three sections:

(i) Northern part of the coast is called the Konkan (Mumbai-Goa)

(ii) Central stretch is called the Kannad plain.

(iii) Southern stretch is called as Malabar coast.

The plains, which lies along the Bay of Bengal, is more wide and level. In Northern part, it is known as Northern Circar and in Southern part, it is called as Coromandel coast. Rivers like the Mahanadi, Godavari, Krishna and Kaveri have formed extensive deltas on this coast. Lake Chilika is the largest salt water lake on the Eastern coast (Odisha). It is famous as a winter home for migratory birds. It lies to the South of Mahanadi Delta.

The Islands

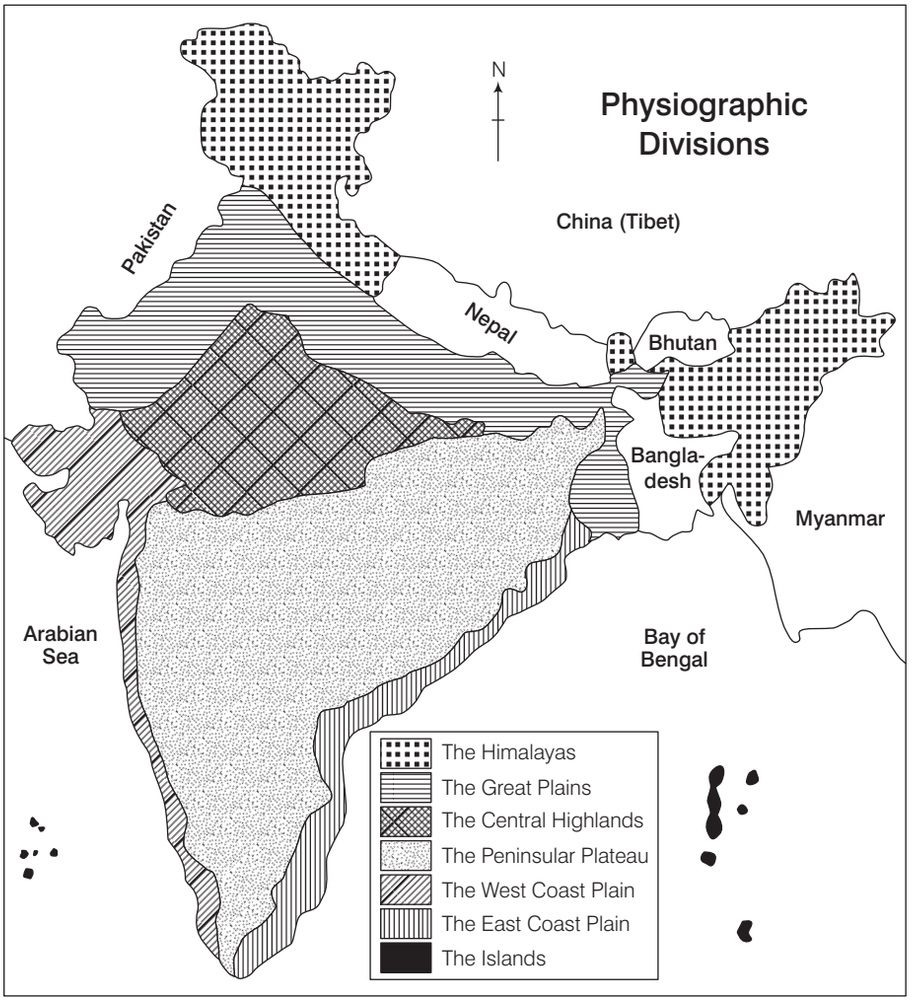
India has two island groups. These are:

(i) **The Lakshadweep islands group** It lies close to the Malabar coast (Kerala). This group of islands is composed of small coral islands. Earlier, they were known as Laccadive, Minicoy and Amindive. In 1973, these were named as Lakshadweep. They cover a small area of 32 sq km.

Kavaratti island is the administrative headquarters of Lakshadweep. In this group, the Pitti island has a bird sanctuary which is uninhabited.

(ii) **The Andaman and Nicobar islands** They are two chains of densely forested islands. The Andamans are bigger in size. They are more numerous and scattered. The entire group of islands is divided into two broad categories: the Andamans in the North and the Nicobars in the South. These islands are believed to be an elevated portion of submarine mountains. The Southernmost tip of these islands (called Indira Point) is more South than the Indian mainland.

India's only active volcano is found on Barren Island in the Andaman and Nicobar islands. There is great diversity of flora and fauna in this group of islands. They lie close to equator and experience equatorial climate with thick forest cover.



Rivers of India

In India, rivers are basically classified into Himalayan rivers and Peninsular rivers. These are explained below:

(i) The Himalayan Rivers

The major Himalayan rivers are the Indus, the Ganga and the Brahmaputra.

The Indus River System The Indus river rises from China (Tibet) near Mansarovar lake and flowing North-Westwards enters India in the Ladakh district of Jammu and Kashmir. The Sutlej, the Beas, the Ravi, the Chenab and the Jhelum join together to enter the Indus near Mithankot in Pakistan.

The Ganga River System This system starts as the Bhagirathi, being fed by the Gangotri glacier in Uttarakhand. It is joined by the Alaknanda river at Devaprayag to form the Ganga. This river is 2500 km long. Its tributaries are the Yamuna (longest), the Ghaggar (largest), the Gandak and the Kosi (from Himalayas), the Son (largest), the Chambal and the Betwa (from Peninsular uplands).

The Brahmaputra River System The Tsang Po river (Brahmaputra) rises in China (Tibet), East of the Mansarovar lake and flows Eastwards parallel to the Himalayas till the Namcha Barwa mountain from where it takes a 'U' turn and enters India in Arunachal Pradesh. Here, it is called the Dihang. It is slightly longer than the Indus and most of its course lies outside India.

(ii) The Peninsular Rivers

The rivers in Peninsular India is divided into West flowing and East flowing rivers:

The West Flowing Rivers

These rivers are smaller in number and do not form deltas. These rivers fall into Arabian sea.

The Narmada Basin It rises in the Amarkantak hills of Madhya Pradesh and forms an **estuary**[5] near Bharuch in Gujarat from where it reaches the Arabian Sea.

The Tapi Basin It rises in the Satpura ranges in the Betul district of Madhya Pradesh and forms an estuary near Surat in Gujarat from where it reaches the Arabian sea.

The East Flowing Rivers

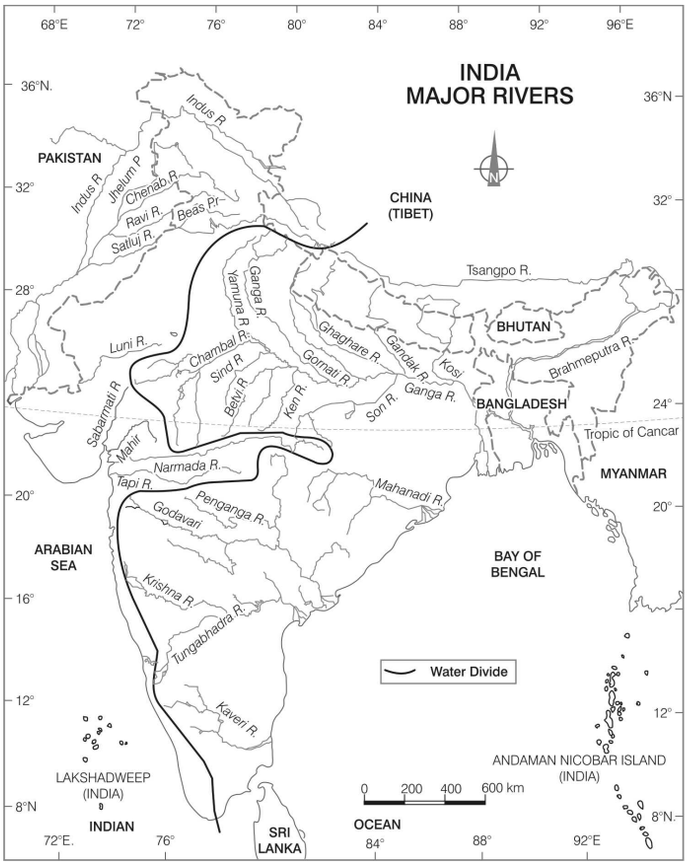
These rivers are large in number and form deltas as compared to West flowing rivers. They fall into Bay of Bengal.

The Godavari Basin Godavari is the largest Peninsular river. It is also known as the 'Dakshin Ganga'. The river Godavari rises from the slopes of the Western Ghats in the Nasik district of Maharashtra and covers parts of Maharashtra, Madhya Pradesh, Odisha and Andhra Pradesh.

The Mahanadi Basin The Mahanadi rises in the highlands of Chhattisgarh and flows through Odisha to reach the Bay of Bengal.

The Krishna Basin Rising from the Western Ghats near Mahabaleshwar in Maharashtra, the Krishna flows about 1400 km before forming a large delta at the Bay of Bengal. The Tungabhadra is an important tributary of Krishna river.

The Kaveri Basin It rises in the Brahmagiri range of the Western Ghats and flows into the Bay of Bengal, South of Cudalore in Tamil Nadu after flowing for 760 km.



5 Estuary The tidal mouth of a large river, where the tide meets the stream.

CHAPTER

4

The Climate of India

The term climate refers to the atmospheric conditions, which prevails in a large area over a long period of time. It is measured by assessing the patterns of variation in temperature, humidity, atmospheric pressure, wind, precipitation and other meteorological variables in a given region over long periods of time.

Generally, the climate of India belongs to the **tropical monsoon type**. The Tropic of Cancer, which passess through the centre of the country divides it into subtropical climatic zone (Northern part) and tropical zone (Southern part). But, overall, India is mostly affected by the monsoon climate, thus it is called a 'Tropical country'.

Factors Affecting the Climate of India

The factors affecting the climate of India are as follows:

Latitude The **Tropic**[1] of Cancer (23°30' N) runs from the Rann of Kutch (West) to Mizoram (East) and divides the country into the tropical zone (South of this line) and the sub-tropical zone (North of this line). So, India's climate has characteristics of tropical as well as subtropical climates.

Altitude Generally, with increase in height, temperature decreases, that is why Agra and Darjeeling are located in same latitude but due to height difference, the weather conditions differ.

Himalaya Mountains The lofty Himalayan mountains form a barrier which affects the climate of India. It prevents the cold winds of Northern Asia from entering into India and thus, protects the country from severely cold winters. It also traps the monsoon winds, forcing them to shed their moisture within the subcontinent.

Pressure and Winds India lies in the region of North Easterly winds, which originate from the subtropical high pressure belt of the Northern Himalayas. The Western disturbances experienced in the North and North-Western parts of India are brought by Westerly jet stream.

Western Disturbances It originate over the Mediterranean sea and cause light rainfall in Northern India. The snowfall caused by these sustain the flow of water in the Himalayan rivers during summer months.

1 Tropics The temperature zone lying between the Tropic of Cancer (23.5°N) and the Tropic of Capricorn (23.5°S).

Distance from the Sea The Southern half of India is surrounded by sea from the three sides; the Arabian sea in the West, the Bay of Bengal in the East and the Indian Ocean in the South. Due to moderating influence of the sea, this region is neither hot in summers nor very cold in winters. The North India far away from the sea has extreme type (continental type) of climate.

Continental and Equable Type of Climate

All the places of North and Central India which are away from the sea, experience continental type of climate with very hot summers and very cold winters. The coastal areas of India are constantly under the influence of sea and hence, the variation in the range of temperature between summer and winter is low. This is an equable or maritime type of Climate.

Tropical Cyclones They influence Indian weather in summer season. They originate in the Bay of Bengal and Arabian sea and move towards the interior of the country. The amount of rainfall increases in the wake of these cyclones.

Relief Features Presence of mountains, plateaus, etc also affect the rainfall pattern. The Aravalli hills do not block the way of rain bearing winds hence Western Rajasthan is dry. Likewise the windward side of Western Ghats get heavy rainfall as these mountains prevent the moisture laden winds to cross them.

Distribution of Temperature and Rainfall

Although, there is an overall unity in the general climatic pattern in India, there are perceptible regional variations in temperature and rainfall such as:

Distribution of Temperature

The following examples show the distribution of temperature in India:

- Temperatures in the winter in North-West mountainous regions can go down to –45° C while it is 22°C in Thiruvananthapuram in Kerala.
- Similarly, it can go upto 50°C in summer in some parts of Western Rajasthan and 20°C in Shillong.
- Whereas the regions to the South of the Tropic of Cancer $23\frac{1}{2}^{\circ}$ N which are nearer to the equator (coastal areas) have a range of 25-27°C average temperature during the entire year due to the **moderating effect**[2] of the sea, e.g. Bengaluru, Mumbai, Chennai.

Also in many areas we find a wide variation between day and night temperatures, e.g. in the Thar desert the day temperature may rise to 50°C and drop down to near 15°C the same night. On the other hand, there is hardly any difference in day and night temperatures in the Andaman and Nicobar Islands and in Kerala due to the moderating effect of the sea.

Distribution of Rainfall

India is the unique example of rainfall distribution with marked contrasts, e.g. the annual precipitation varies from over 400 cm in Meghalaya to less than 10 cm in Ladakh and Western Rajasthan. Spatial variations in rainfall in India can be shown under the following headings:

Areas of Heavy Rainfall (More than 200 cm) Maximum rainfall in India occurs in the Western coast, sub-Himalayan regions of North-East and Garo, Khasi and Jaintia hills of Meghalaya.

Areas of Moderate Rainfall (100-200 cm) These areas include some parts of Western Ghats, remaining parts of North-Eastern India, West Bengal, Odisha, Jharkhand, Bihar, Chhattisgarh, the Tarai region, hills of Uttarakhand and Uttar Pradesh.

Areas of Low Rainfall (50 to 100 cm) These areas include the Southern and Western Uttar Pradesh, Northern and Western Madhya Pradesh, Rajasthan, Interior Deccan Plateau (Eastern Maharashtra, Gujarat, Southern Andhra Pradesh).

Areas of Inadequate Rainfall (Less than 50 cm) This is the region of scanty or insufficient rainfall. These areas include Western Rajasthan, Western Gujarat, Karnataka Plateau, Tamil Nadu, Plains of Haryana, Punjab, etc. Desert and semi-desert parts of Rajasthan (Thar), North-West Kashmir and the Ladakh region receive less than 20 cm rainfall.

CHECK POINT 01

1 Which type of climate India has?
2 Which regions of India experience - 45°C temperature?
3 Which regions of India faces low rainfall?

Winds in Summer and Winter

Winds of summer and winter seasons are as follows:

Jet Streams (Summer and Winter) These are a narrow belt of high altitude Westerly winds (above 12000 m) in the troposphere, which help in determining the arrival of monsoon.

2 Moderating Effect Climatic conditions that is neither too hot nor too cold.

Their speed varies from about 110 km per hr in summer to about 184 km per hr in winter.

Loo (Summer) The summer months experience rising temperature and falling air pressure in the Northern part of India, it is because of the local wind named 'Loo'. It is a gusty (wild), hot, dry wind blowing during the day over the North and North-Western India in the months of May and June.

South-West Summer Monsoon Winds (Summer) These winds blow from June to September. The direction of these winds is from South-West to North-East. These winds tend to carry moisture with them and cause rain in the entire country.

North-East Monsoon Winds (Winter) These winds blow from the continent (Asia) to the ocean. During winter season, North-East trade winds prevail over India. These winds, being offshore do not give rain. They are dry except for the branch that blows over the Bay of Bengal and gives rainfall to the East coast of India.

Mango-Showers (Summer) These are local winds which occur in South India during April-May. These carry little rain which help in blooming of coffee and cherries as well as ripening of mangoes.

Kaal Baisakhi (Summer) It means 'the calamity of the months of Baisakhi'. These are the local winds in West Bengal. These winds are accompanied by thunder storms and bring rainfall in the months of April-May. This rain is good for the cultivation of tea in Assam and rice and jute in West Bengal. It is also known as 'Norwester' due to its North-West direction.

Monsoon and its Mechanism

The word 'monsoon' is derived from the Arabic word *'Mausim'* which means season. Monsoon refers to the seasonal reversal in the wind during a year which strongly influence climate of India. The monsoons are experienced in the tropical area roughly between 20°N and 20°S. The following facts are important to understand the mechanism of the monsoon:

The Differential Heating and Cooling of Land and Water It creates low pressure on the landmass of India while comparatively high pressure around the sea.

The Shift of the Position of Inter Tropical Convergence Zone (ITCZ)[3] In summer, ITCZ shifts its position over the Ganga plain. This is the equatorial trough normally positioned about 5°N of the equator. It is also known as the 'Monsoon Trough' during the monsoon season.

The Presence of the High-Pressure Area (East of Madagascar) It lies approximately at 20°S over the Indian Ocean. The intensity and position of this high-pressure area affects the Indian monsoon.

The Heating of Tibetan Plateau The Tibetan plateau gets intensely heated during summer. This results in strong vertical air currents and the formation of low pressure over the plateau at about 9 km above sea level.

The Movement of the Westerly and Tropical Easterly Jet Streams The movement of the Westerly jet stream is recorded to the North of the Himalayas and the tropical Easterly jet stream over the Indian Peninsula during summer.

El Nino Southern Oscillations (ENSO)

This is a name given to the periodic development of a warm ocean current along the coast of Peru which is a temporary replacement of the cold Peruvian current. The presence of the El-Nino leads to an increase in sea-surface temperature and weakening of the trade winds in the region. Hence, the phenomenon is referred to as ENSO (El-nino Southern **Oscillations**).

CHECK POINT 02

1 What are jet streams?
2 What is the direction of South-West summer monsoon winds?
3 Give the meaning of the word monsoon.

Seasons

The large size of the country and its varied relief play a crucial role in determining the climatic variations in different parts of India.

On the basis of the monsoon variations in a year is divided into four seasons such as:

(i) March to May (Hot and Dry Summer)
(ii) June to September (South-West Monsoon)
(iii) October to November (Retreating Monsoon)
(iv) December to February (Cool and Dry Winters)

3 Inter Tropical Convergence Zone (ITCZ) The Inter Tropical Convergence Zone or ITCZ, is a belt of low pressure which circles the Earth generally near the equator where trade winds of the Northern and Southern hemisphere come together.

(i) March to May

The months of March, April and May are the summer months in India where the Sun moves from over the equator towards the Tropic of Cancer (Northward movement) and the global heat belt shifts Northward. And by 21st June, it is directly overhead the Tropic of Cancer.

Temperature Conditions

- During summer, the interior parts of North Indian plains covering Rajasthan, Punjab, Haryana and Western Uttar Pradesh are intensely hot.
- The daily maximum temperature in some of these parts is as high as 45-47°C.
- The average maximum temperature is above 33°C in the month of May at Delhi and Jodhpur. The mean minimum daily temperature in May also remains quite high being about 36°C at Delhi and Jaipur.
- In the month of April, the **diurnal range**[4] of temperature ranges between 5° C and 6° C in coastal areas, but reaches 20° C in the interior parts of the country and in the North -West Sutlej Ganga plains.

Air Pressure

- High temperature heats up the air of the North Indian plains. Hot air rises and low pressure area is created under it. This low pressure is also known **'as monsoonal trough'**.
- This low pressure area moves from South-East to North-West and finally settles over North-Western India in the end of May or early part of June.
- It lies between Jaisalmer in the West and Balasore in Odisha in the East.
- The pressure generally increases towards South in the neighbouring sea. On the other hand, temperature over Indian Ocean is relatively low, as water needs more time to get heated as compared to land. So, a relatively high pressure region is created over the sea.

Winds and their Direction

- Hot and dry wind locally known as loo blows during this season over the North and North-Western India.
- The 'duststorms' and 'thunderstorms' are the most striking features of the summer season in India.
- Duststorm is common in this season. These storms bring temporary relief as they lower the temperature and may bring light rain and cool breeze. They are known by different names like Kaal Baisakhi, Norwester, etc.

Rainfall

- During summer season, the Sun is scorching and the relative humidity is generally below 30 per cent.
- The rains in this season are caused by thunderstorms in Karnataka which are called as 'Cherry Blossoms' where these are beneficial for coffee plantation. In Kerala, Konkan and Goa these rains are called 'Mango showers' as they help in the ripening of mangoes there.

(ii) June to September

This season is from June to September and also known as 'advancing monsoon'. The low pressure areas over the Northern plains intensifies by mid June and attracts the **trade winds**[5]. These trade winds originate over the warm tropical ocean in the Southern hemisphere. After crossing equator, these blow towards South-West entering peninsula as monsoon winds. They cover the entire sub continent in just over one month and bring abundant rainfall.

Temperature

- Sudden onset of South-West monsoons leads to significant fall in temperature i.e. 3°C to 6°C.
- The temperature remains less uniform throughout the rainy season. There is a rise in temperature whenever there is break in the monsoons.
- The diurnal range of temperature are experienced at places west of the Aravalli e.g. 38°C to 40°C. This is due to lack of clouds and hot continental air masses.
- Other parts of North-West India also have temperatures above 30°C.
- Generally, in the afternoon of a scorching day, rains begin suddenly which that is called 'Monsoon Burst'.

Branches of South-West Monsoon

The South-West monsoon divides into two branches. These are:

The Arabian Sea Branch

- Arabian sea branch advances Northwards by 1st June from the Kerala coast and reaches Mumbai by about 10th June. By mid-June, it spreads over Saurashtra, Kutch and Madhya Pradesh.
- This branch causes rainfall all along the Malabar coast, Konkan coast, Western Ghats, Maharashtra, Gujarat and parts of Madhya Pradesh.

4 Diurnal Range It is the difference the maximum and minimum temperature of a day.
5 Trade winds Winds that blow steadily from East to West towards the equator over most of the equatorial zone.

- The moisture laden winds strike Western Ghats and cause heavy rainfall in the **windward side**[6].
- Due to the parallel alignment rainfall of the Aravallis, the sub-branch of the Arabian Sea current, which moves North-West through Kutch, Gujarat and Rajasthan gives little rainfall to these regions.
- Western Rajasthan receives no rain from the Arabian sea branch because these winds undergo thermal heating on blowing over the hot sands as they lie on the rain shadow area.
- The Arabian Sea branch gives a voluminous rain almost in the entire country and is much greater and powerful than the Bay of Bengal.
- Punjab, Himachal Pradesh, Uttarakhand at the foothills of the Shivalik get relief rainfall.

The Bay of Bengal Branch

- The Bay of Bengal branch first strikes Andaman and Nicobar Islands by about 25th of May and advances North-Eastward after collecting moisture from the Bay of Bengal.
- Then it rushes against the Myanmar coast and reaches Meghalaya, Mizoram and Tripura by about 1st June.
- It rapidly spreads over most of Assam and causes the heaviest rainfall in the world at Mawsynram (in the Southern ranges of the Khasi hills in Meghalaya) about 1200 cm and Cherrapunji about 1100 cm annually.
- These winds deflected Westward towards the Ganga plains, where these winds reach Kolkata around 11th June.
- Both the branches (Arabian Sea branch and Bay of Bengal branch) merge over the North-Western part of the Ganga plains and shed remaining moisture at the foot hills of the Himalayas, Northern plains and North-West India.
- In Delhi, Western Uttar Pradesh, Haryana and Punjab, the monsoon reaches around 1st July. It covers the other parts of India by 15th of July.
- The quantity of rainfall decreases as they move towards West over the Northern plains. For example, Kolkata receives 120 cm, Patna receives105 cm, Allahabad 91 cm, Delhi receives 56 cm, Bikaner recives 25 cm and Srinagar (Jammu and Kashmir) recives only 20 cm of rainfall in this season.

(iii) October to November

- This is also known as 'Post-Monsoon season'. The sun starts shifting towards the South during October- November.
- The South-West monsoon winds become weak and starts retreating or gradually withdrawing from North to South i.e. from land to sea. While retreating, these winds pick up moisture from Bay of Bengal and cause rainfall in Coromandel Coast (Tamil Nadu).

Characteristics

- October and November are the months of retreating monsoon.
- During this season, low monsoon trough becomes weak and is replaced by high pressure. Thus, monsoon begins to retreat. By the beginning of October, it retreats completely from Northern plains.
- This period is the period of transition from hot rainy season to cold winter season. It is marked by clear sky, moist ground and high temperature giving birth to October heat.
- Cyclonic depressions cause havoc on the Eastern coasts especially the coasts of Odisha, Andhra Pradesh and Tamil Nadu with very strong storms and rains.
- It is the retreating monsoon which brings rain to Tamil Nadu coast and known as 'North-East monsoon'.

Temperature

- The temperature during this season is uniformally high being about 25°C in the beginning of October in Northern India and then it gradually decreases in November.
- The day temperature is fairly high, but nights become pleasant with the mean temperature going down to 20°C or even lower.

October Heat

By the beginning of October, the monsoon withdraws from the Northern Plains. The months of October-November form a transition period from hot rainy to dry winter conditions. Due to the high temperature and humidity the heat is oppressive. This phenomenon is called 'October Heat'.

Cyclonic Depressions

During this time, cyclonic depression originating over the Andaman Sea cause tropical cyclones on the coastline from Bangladesh to Tamil Nadu as low pressure conditions get transferred to the Bay of Bengal. These cyclones cause heavy and widespread rain and lots of destruction.

6 Windward side This side that faces the prevailing wind or the directional and sides of a mountain.

These cyclones frequently struck the populated deltas of Godavari, Krishna and Kaveri. The Coromandel Coast gets its monsoon rainfall mostly during October and November from the cyclones and due to the retreating monsoon.

(iv) December to February

The cold weather season lasts from mid-November to February in Northern parts of India with December and January as coldest.

Temperature

- The temperature decrease from South to North. For instance, the average temperature of Chennai on the Eastern coast is between 24-25°C while in Northern plains, it ranges between 10-15°C. Here, days are warm and nights are cold.
- Frost occurs in the Northern plains and snow falls in the high mountainous regions of Himalayas. Clear sky, low temperature and humidity and feeble, variable winds are the characteristics of the weather during this season.

Cyclonic or Western Disturbances and Winter Rainfall

- There is an inflow of cyclonic disturbances from the West and the North-West, which originate over the Mediterranean Sea and Western Asia.
- The frequency of these disturbance is 4 to 6 days per month between December and January.
- This causes rainfall in North and North-West India.
- Though in small amount, it is highly beneficial to 'Rabi' crops. It is locally known as 'Mahawat'.
- Besides, snowfall also occurs from the Western disturbance, which feed the glaciers of the Western Himalayas.
- The North-Eastern parts of India also get some rainfall during winter season.

CHECK POINT 03

1. What is the meaning of monsoonal trough?
2. Where did the Bay to Bengal Branch causes the heaviest rainfall in the world?
3. Which weather phenomenon, gives rise to October heat?
4. Due to which weather phenomenon the North-Western region gets rainfall during winter season?

SUMMARY

- The term 'climate' refers to the atmospheric conditions, which prevails in a large area over a long period of time.
- Generally, the climate of India belongs to the tropical monsoon type. The Tropic of Cancer, which passes through the centre of the country, divides it into sub-tropical climate zone (Northern part) and tropical zone (Southern part).
- Climate of India is affected by various factors such as latitude, altitude, Himalayan mountains, pressure and surface winds, Western disturbances, distance from the sea, tropical cyclones and by relief features.
- India has many summer and winter winds. These are jet streams, loo, South-West winds, Noth-East winds, mango showers and Kaal Baisakhi.
- The mechanism of monsoon develops over Indian sub-continent by various factors such as the differential heating and cooling of land and water, ITCZ, presence of high pressure area East of Madagascar, heating of Tibetan plateau.
- India generally has four seasons such as hot and dry summers, South-West monsoon, retreating monsoon and cool and dry winters or North-East monsoon.
- The hot and dry summer is experienced in India in the months of March, April and May and characterised by intensely hot weather and very little humidity.
- After summer there is South-West Monsoon which occurs in June and last until September due to trade winds that originate over the warm tropical ocean in the Southern hemisphere and cover the entire sub-continent in just over one month.
- South-West monsoon has two branches namely the Arabian sea branch and the Bay of Bengal branch.
- Both the branches merge over the North-Western part of the Ganga plains and shed remaining moisture at the foothills of the Himalayas.
- During retreating monsoon, the Sun starts moving towards the South during October-November. This is the period of 'October heat'.
- During this season, tropical cyclones originate over the Andaman Sea and cause heavy and widespread rain over the Eastern Coast of India and the Coromandel coast of India.
- At the advent of December the whole part of India experiences winter season that lasts from December to February.
- There is an inflow of cyclonic disturbances from West and the North-West, (low pressure depression) which originates in West Asia and in areas near the Mediterranean Sea which is called 'Western Disturbance'.

EXAM PRACTICE

a Short Questions [2 Marks each]

1. (i) Name the type of climate prevailing over India.
(ii) Mention any two factors responsible for it. ***[2012]***
Or What is the name given to the climate of India? Mention any two factors responsible for such a type of climate. ***[2016]***

Ans. (i) Tropical monsoon climate.
(ii) The two factors are as follows:
(a) The Tropic of Cancer passes through the middle of the country.
(b) The climate is influenced by the monsoon winds, altitude, distance from sea, relief etc.

2. What is the chief cause of the tropical monsoon type of climate?

Ans. The chief cause of the tropical monsoon climate is the differential heating and cooling of the land and the water and the resulting low pressure regions drawing in the winds.

3. Why are there great variations in the climate of the Indian subcontinent?

Ans. The Indian subcontinent extends from 8°4′ N to 37°6′ N latitude and a distance of 3214 km from North to South. Thus, there is a great variation in the climate (a great latitudinal extent, extending into two climatic zones i.e. Tropical and Subtropical zones).

4. Write two characteristics of monsoon in India.

Or

Mention two main features of the Indian monoon. ***[2009]***

Or

Give two important characteristics of the South-West monsoon rainfall. ***[2013]***

Ans. Two characteristics of monsoon in India are as follows:
(i) A large part of the country receives rainfall mainly in the summer from the South-West Monsoon winds. Very little rain is caused in winter from the North-East winter monsoons.
(ii) Erratic and unpredictable nature of monsoon that causes heavy or very little rainfall in some years.

5. Explain two factors that affect the climate of India giving a suitable example for each. ***[2015]***

Ans. Two factors affecting the climate of India are as follows:
(i) **Latitude** The Tropic of Cancer divides India into two halves. The Southern part is closer to equator and has tropical climate.The Northern part has subtropical climate as it gets slanting rays of the sun.
(ii) **Altitude** Places in the mountainous regions are cooler as atmosphere is thinner so they do not get heated as fast as in the plains. Places in the Himalayan mountains, Western Ghats, Nilgiris are relatively cooler even in summers.

6. How do the water bodies influence the climate of India?

Ans. The water bodies that influence the climate of India are as follows:
(i) The water bodies surrounding India on three sides have a moderating influence due to which the coastal areas enjoy equable climate.
(ii) Monsoon winds carry moisture from the water bodies that surrounds India.

7. Name the places that experience continentality.

Ans. The places of India which experience continentality are as follows:
Agra, Delhi, Jaipur, Udaipur, Jaisalmer, Jodhpur, Pokaran, Bhopal, Meerut, Bareilly, Amritsar, Lucknow, Ludhiana, Indore, Patna, Kanpur, Chandigarh, Nagpur, Hyderabad, Bikaner, Ajmer, Jabalpur, Mathura, Ambala and Varanasi.

8. Name the places that experience oceanic or coastal or maritime climate in India.

Ans. The places of India which experience maritime climate are as follows:
Kandla, Dwarka, Porbandar, Diu, Mumbai, Ratnagiri, Panaji, Murmagao, Karwar, Mangalore, Kannur, Kozhikode, Kochi, Thiruvananthapuram, Kanyakumari, Tuticorin, Nagapatnam, Puducherry, Chennai, Kakinada, Visakhapatnam, Haldia, Kolkata, Machilipatnam.

9. Why Agra's temperature in January is higher than Darjeeling in spite of having same latitudinal locations?

Ans. The difference in temperatures is due to the elevation levels at which these places are located. With rise in elevation, the temperature and pressure falls. Darjeeling is situated in the mountains where the temperature is less than plain areas where Agra is located.

10. Why are the South facing slopes of the Garo, Khasi, Jaintia hills or Himalayas or Shivaliks warmer than the North facing slopes of these hills or mountains?

Ans. The Garo, Khasi, Jaintia hills or Himalayas or Shivaliks are in the Northern hemisphere and have an East-West alignment. The South facing slopes are warmer as they get more direct rays as the sun rays strike at a steeper angle than the North facing slopes and hence, they are less intense.

11. Define loo.

Ans. It is a gusty (wild), hot, dry wind blowing during the day over the North and North-Western India in the months of May and June.

12. State two differences between the rainfalls that occur from June to September and that from December to February in North India. ***[2015]***

Ans. Difference between South-West monsoon and North-East monsoon are as follows:

	South-West Monsoon	North-East Monsoon
(i)	These winds start blowing during the months of June to September.	These winds start blowing during December to February.
(ii)	These winds bring rain to almost whole part of India.	These winds bring rain only to Tamil Nadu coast and a little to some parts of North-East regions.

13. Mangalore and Chennai lie approximately on the same latitude, yet Mangalore receives its rainfall from June to September, while Chennai receives its main rain in November to February. What are the reason for this difference?

Ans. Mangalore lies on the West coast of India and experience the South-West monsoon of the Arabian Sea branch which blooms from June to September. This place is on the windward side of the Western Ghats hence, receives rain during this period. While Chennai lies on the East coast of India and this place experiences the North-East monsoons during the months of November to February. These monsoons bring rain to Chennai in winter that lies on the windward side of the Eastern Ghats.

14. Name the four seasons into which the climatic conditions of India is divided.

Or

Mention the four seasons that prevails in India stating the months for each. ***[2017]***

Ans. The four seasons are as follows:

(i) The hot dry season (March to May)

(ii) South-West monsoon (June to September)

(iii) Retreating monsoon (October to November)

(iv) Cool dry season (mid November to February)

15. "Rainfall in India is orographic in nature." Give an example with reference to the distribution of rainfall and the effect of relief on its distribution. ***[2011]***

Ans. Relief plays a very important role in the distribution of rainfall in India. The windward slopes of the Western Ghats obstruct the moist winds from the sea and cause heavy rainfall, while the Leeward slopes remain dry. Thus, Western Ghats receive more than 200 cm rainfall.

16. State the benefits that are derived from the local winds that blow in summer in the following states. ***[2014]***

(i) Kerala

(ii) West Bengal

Ans. (i) **Kerala** The local wind is called 'Mango Shower'. These winds bring little rain in April and May, which is helpful in the early ripening of mangoes, tea and coffee plants.

(ii) **West Bengal** The local wind is called 'Norwesters or Kaal Baisakhi'. This rain is useful for the cultivation of rice and jute in West Bengal.

17. Name the following. ***[2016]***

(i) The winds bring heavy rain in Cherrapunji.

(ii) The local winds that bring a light rainfall to South India and is good for tea and coffee crops.

Ans. (i) The Bay of Bengal Branch of South-West monsoon.

(ii) Mango showers or cherry blossoms.

18. Give two important characteristics of the hot and dry summer in India.

Ans. Two characteristics of the hot and dry summer in India are as follows:

(i) It is a dry season with high temperature and low humidity.

(ii) The tornado like duststorms, hot wind (loo) and the norwesters are the characteristics of summer season.

19. Which Indian state is the first to receive the South-West monsoons? Give a reason to justify your answer.

Ans. The first state that receives monsoon is Kerala. Kerala lies on the South-West of India from where the Arabian Sea branch of the South-West monsoon enters India.

20. Name the state which experiences the longest monsoon season and another state which experience the shortest monsoon season.

Ans. Kerala experiences the longest monsoon season. Jammu and Kashmir experiences the shortest monsoon season.

21. Give two important characteristics of the Indian monsoon season in India.

Ans. **Uneven distribution of rainfall** monsoon winds cause uneven rainfall over India. Some areas like Western slopes of Western Ghats and North-East India receive heavy rainfall whereas some areas receive less rainfall.

Heavy rainfall in short duration monsoon rainfall occurs for short time period i.e. summers only.

22. Which winds are responsible for the rainfall experienced over the greater part of India? ***[2006]***

Ans. South-West monsoon winds blow from June to September. These winds tend to carry moisture with them and cause rain in the entire country.

23. Mention two features of the Arabian sea branch of the South-West monsoons.

Ans. Following are the features of the Arabian Sea branch of the South-West monsoon:

(i) This branch originates from the Arabian Sea and advances Northwards.

(ii) This branch gives voluminous rainfall throughout the country except the parts of Western Rajasthan and Gujarat as they lie on the Leeward side of the Aravalli range.

24. Mention two features of the Bay of Bengal branch of the South-West monsoon.

Ans. The two features are as follows :

(i) This branch originates from the Bay of Bengal and gives heavy rainfall in the Eastern and North-Eastern parts of India.

(ii) Then it moves to the left and causes moderate rainfall in North and Central parts of India.

25. Why has Mawsynram become the place that receive highest rainfall in the world?

Ans. Mawsynram lies in the Southern ranges of the Khasi hills in Meghalaya. Here, the Bay of Bengal branch of the South-West monsoon offer collecting moisture dashes against the hills and cause 1200 cm of rainfall.

26. Mention two differences in the climatic conditions which prevail over Kerala and Uttar Pradesh in the month of June. ***[2010]***

Ans.

	Climatic conditions in Kerala in the month of June	Climatic conditions in Uttar Pradesh in the month of June
(i)	High pressure prevails.	Low pressure prevails.
(ii)	Lower temperature as compared to Uttar Pradesh prevails in the region due to moderating effect of the sea.	High temperature prevails in the region.

27. Why do much of the Central Maharashtra and Central Deccan Plateau have only light rainfall?

Ans. Central Maharashtra and Deccan Plateau region get light rainfall as lie in the rain shadow area of the Western Ghats. These mountains block the way of the rain bearing winds coming from the Arabian Sea.

28. Mumbai receives rainfall in the summer season while Chennai receives rainfall from October to December. Why? ***[2009]***

Ans. Mumbai is situated in the West coast of India where it gets rainfall from the South-West monsoons that bring rainfall in summer from June to September. Chennai is situated in the East coast where it receives rainfall from North-East monsoons during winters from December to February.

29. Which regions of India experience snowfall regularly?

Ans. The Himalayan lofty mountain ranges of India experiences snowfall regularly.

30. How is the winter rainfall of the North-West part of India different from the winter rainfall of the South-East of India? ***[2018]***

Ans. The North-West India receives winter rainfall from low pressure systems, called the Western disturbances. These disturbance travel Eastward across Iran and Pakistan from Mediterranean Sea and Gulf of Persia and reach India during the winter season. They cause much rainfall over plain areas of North-West regions of India.

The South-East of India receives rainfall in winter due to North-East monsoons. During winter season several cyclonic storms develop in Bay of Bengal which moves from the North-East to South-West causing substantial rainfall on the coast of Tamil Nadu.

31. Western Coastal plains receive more rainfall than Eastern Coastal plains. Give a reason.

Ans. Western Coastal plains receive more rainfall because they lie in the windward side of the Western Ghats that block the way of rain bearing winds coming from the Arabian Sea. While the Eastern Coastal plains lie on the leeward side of the Western Ghats and receives less rainfall.

32. Name two types of cyclonic systems that affect India and two areas that receive rainfall from these systems. ***[2013]***

Ans. Two cyclonic systems that affect India are as follows:

(i) **Temperate Cyclones** Region affected are North-West of India (Punjab, Haryana).

(ii) **Tropical Cyclones** Region affected are Eastern Coast of India (Andhra Pradesh, Tamil Nadu Odisha and West Bengal).

33. Give two important facts about retreating of South-West monsoon.

Ans. The two important facts of the retreating monsoon in India are as follows:

(i) October and November are the months of retreating monsoon. During this season, low monsoon trough becomes weak and is replaced by high pressure. Thus, monsoon begins to retreat. By the beginning of October, it retreats completely from Northern Plains.

(ii) This period is the period of transition from hot rainy season to cold winter season. It is marked by clear sky, moist ground and high temperature giving birth to October heat.

34. Define 'October Heat'.

Ans. By the beginning of October, the monsoon withdraws from the Northern Plains. The months of October-November form a transition period from hot rainy to dry winter conditions. Due to the high temperature and humidity the heat is oppressive. This phenomenon is called 'October Heat'.

35. Mention the different sources of rain in Punjab and Tamil Nadu during the winter season. ***[2014]***

Ans. The different sources of rain in Punjab and Tamil Nadu during the winter season are as follows:

(i) Punjab receives rainfall due to the cyclonic disturbances (Westerly disturbances), that originate over the Eastern Mediterranean Sea during the winter season.

(ii) Tamil Nadu receives rainfall from North-East monsoon wind during the winter season.

b *Long Questions* [3 Marks each]

1. What is the most important feature of the tropical monsoon type of climate?

Ans. The most important feature of the tropical monsoon type of climate is the 'alteration of season'. During winter the interior of the large land mass in Asia becomes very cold and develops a high pressure centre.

The cold surface winds move out towards the surrounding sea as the North-East monsoon.

In summer, the interior of the land masses become extremely hot this causes the development of low pressure areas. Winds then begin to blow from the high pressure areas in Australia to low pressure regions. These winds on crossing the equator deflect to the right and become the South-West monsoon winds.

2. The Thar Desert has Sandy and Rocky soils while the Indo-Gangetic plain has alluvial soil. Which place would have greater diurnal range in temperature and why?

Ans. The Thar Desert would have a greater diurnal range in temperature because of the nature of its soil which is Rocky and Sandy and hence, has an extreme climate. This is because Sandy and Rocky soils do not retain water and is heated rapidly and cools rapidly. While on the other hand the Indo-Gangetic Plain have Alluvial soil.

This Alluvial soil has the ability to retain water hence, this soil is heated slowly and cools slowly, thus the Indo-Gangetic Plain will have a small range in temperature resulting in an equable climate.

3. Name the region of India which experiences the highest diurnal range of temperature. Also give its reason.

Ans. The North-Western part of India comprising the Indian desert experiences the highest diurnal range of temperature. This is because of the fact that sand (found in ample quantity in this region) gains and loses heat very quickly. As a result of this phenomenon, there is a wide difference between day and night temperatures in this region. The day temperature may rise to 50°C and drop down to near 15°C the same night.

4. How do the Himalayas play an important role in influencing the climate of Indian subcontinent?

Ans. The role of Himalayas in influencing the climate of the Indian subcontinent is as follows:

(i) The Himalayan mountains act as a natural barrier against the cold winds of Central Asia and Siberia to enter India thus, preventing a severe cold climate.

(ii) The Himalayas trap the rain bearing winds of South-West monsoon causing them to shed their moisture in the Indian subcontinent thus, making agriculture possible on a large scale.

5. Why does Jodhpur do not get much rainfall?

Ans. Jodhpur does not get much rainfall due to following reasons:

(i) Jodhpur is situated on the outskirts of Thar Desert or in the Western part of Rajasthan. When the monsoon winds pass over Western part of Rajasthan, i.e.Thar Desert, they become warmer and increase their capacity to hold moisture instead of shedding moisture.

(ii) Besides this, Aravalli hills fall parallel to the Arabian Sea branch of the South-West monsoon and they do not act as barriers. Hence, they do not cause any rainfall there.

6. What is extreme type of climate? Name three places of extreme climate in India.

Ans. The climate which has high annual range of temperature and great variation in the amount of rainfall over the year is known as 'extreme climate'. It is also known as 'continental' or 'interior type of climate', as it is found in the interior parts of the continents. Examples of extreme type of climate are Jodhpur, Delhi, Kanpur.

7. "Location and relief are important factors in determining the climate of India." Explain the statement.

Ans. Following are the ways in which location and relief features affect the climate of a place:

(i) **Location** The amount of solar energy varies according to latitude. Air temperature generally decreases on moving from equator to poles. That is why, Antarctic is the coldest region. When we move from the surface of the Earth to higher altitudes, the atmosphere becomes less denser and temperature decreases. The hills, therefore, are cooler during summers.

(ii) **Relief** High mountains act as barriers for cold and hot winds. They may also cause precipitation, if they are high enough and lie in the path of rain bearing winds. For example the Windward side of mountains gets more rainfall.

8. Define jet streams. Also explain how do they affect the climate of India?

Ans. Jet stream are Westerly winds which blow in the upper layers of the atmosphere.

These winds blow at a speed of 110 kmph in summers and 184 kmph in winters. These winds are air currents and greatly help in determining the arrival of monsoons in India.

9. Distinguish between Arabian Sea branch and Bay of Bengal branch of South-West monsoon.

Ans. The difference are as follows:

	Arabian Sea Branch	Bay of Bengal Branch
(i)	This branch is more powerful.	This branch is less powerful.
(ii)	This branch covers large part of Indian subcontinent consisting of Western Ghats, Deccan Plateau and then moves on to Northern Plains.	This covers North-East India, Ganga- Brahmaputra delta and Northern Plains.
(iii)	This branch picks up moisture from the Arabian Sea.	This branch picks up moisture from the Bay of Bengal.

10. How does the change in pressure conditions over the Southern oceans affect the monsoons?

Ans. Southern oceans affect the monsoons over the change in conditions because:

(i) When the tropical Eastern-South Pacific Ocean experiences high pressure, the tropical Eastern Indian Ocean experiences low pressure. In this condition, the monsoon rainfall will be average.

(ii) In some years, it is reverse when pressure differences are negative means below average and late monsoon.

(iii) The change in pressure conditions is connected to the El-Nino.

11. Why are the delta regions of Eastern India struck by cyclones?

Ans. Owing to transfer of low pressure conditions over Bay of Bengal, this shift generate cyclonic depressions over Andaman Sea. The cyclone coming under influence of retreating monsoon winds generally cross the Eastern coast and struck the thickly populated delta region of Godavari, Krishna and Kaveri rivers. These are often destructive and cause great damage to life and property.

12. Give a geographic reason for each of the following. *[2015]*

(i) Kerala has the longest rainy season.

(ii) The Konkan Coast experiences orographic rainfall.

(iii) The city of Kanpur in Uttar Pradesh has a higher range of temperature than that of Chennai in Tamil Nadu.

Ans. (i) Kerala has the longest rainy season because Kerala is surrounded by water bodies i.e. Arabian Sea on West. So when monsoon blows they bring rainfall from the Arabian Sea and strikes on the Western ghats. This results in frequent and long rain in Kerala.

(ii) Orographic rainfall is mainly caused by the presence of a relief barrier. The Konkan coast lies on the Windward side of the Western Ghats which obstructs the onshore Arabian Sea branch of the South-West monsoon winds. Thus, this causes heavy rainfall on the Western slopes of the Western Ghats and hence, Konkan coast experiences orographic rainfall.

(iii) Kanpur has an interior location while Chennai has a coastal location. The areas in the interior of the country have an extreme type of climate resulting in high annual range of temperature while the coastal areas have a moderate climate. This is mainly due to the influence of land and sea breeze caused by differential heating and cooling of land and sea.

13. Mention a geographical reason for each of the following. *[2014]*

(i) Patna receives heavier rain than Delhi.

(ii) Western Rajasthan receives no rain from the Arabian Sea branch of the South-West monsoon winds.

(iii) Mangalore is not cold even in the month of December.

Ans. (i) Patna receives heavier rain than Delhi because it lies to the East of Delhi and receives rainfall from the Bay of Bengal branch of South-West monsoon. The moisture of the branch decreases from East to West.

(ii) Western Rajasthan receives no rain from the Arabian Sea branch because these winds run parallel to the Aravalli ranges and do not cross it to give rainfall in Western Rajasthan. Also the temperature is so high that monsoon winds become dry and do not shed any moisture there.

(iii) Mangalore is not cold even in the month of December because it lies on the Western coast of India and therefore have the moderating influence of the sea.

14. Give reasons for the following. *[2013]*

(i) When the Malabar coast is receiving heavy rainfall in July, the Tamil Nadu coast is comparatively dry.

(ii) The Northern plains of India have a continental type of climate.

(iii) Central Maharashtra receives little rainfall.

Ans. (i) When the Malabar coast is receiving heavy rainfall in July, the Tamil Nadu coast is dry because it lies in the rain shadow region of Arabian Sea branch and Bay of Bengal is parallel to the coast.

(ii) The Northern plains of India are far away from the sea and there is no moderating influence of the sea so it experiences a continental type of climate.

(iii) Central Maharashtra receives little rainfall because it lies in the rain shadow region of the Western Ghats.

15. Give geographical reasons for the following *[2012]*

(i) Even in summer Shimla is cooler than Delhi.

(ii) The Northern Plains of India do not freeze in winter.

(iii) Kochi has a lesser annual range of temperature than Agra.

Ans. (i) Shimla is cooler than Delhi in summers because Shimla is situated at a higher altitude where the atmosphere is cooler. Delhi is in the plains where atmosphere gets heated up fast.

(ii) Northern plains do not freeze in winters because the Himalayan mountains act as a natural barrier against the cold winds coming from North.

(iii) Kochi is located on the Western coast due to which it enjoys marine climate. The moderating influence of the sea keeps the temperature average throughout the year. Agra lies in the interiors as it is far away from the sea so it experiences continental type of climate and has more range of temperature.

16. Give a reason for each of the following.

(i) Patna gets a heavier rainfall than Varanasi.

(ii) The Arabian Sea branch of the South-West monsoon does not shed any moisture in Western Rajasthan.

(iii) India has varied climatic conditions.

Ans. (i) The quantity of rainfall decreases as the monsoon winds moves Westwards from sea towards the land. Patna is situated more towards the East than Varanasi so it gets heavier rainfall.

(ii) Western Rajasthan receives no rain from the Arabian Sea branch because these winds run parallel to the Aravalli ranges and do not cross it to give rainfall in Western Rajasthan. Also the temperature is so high that monsoon winds become dry and do not shed any moisture there.

(iii) Varied climatic conditions are due to different factors that affect the climate of India like pressure and winds, distance from the sea, relief, cyclonic disturbances etc.

17. Give a reason for each of the following.

(i) Mumbai experiences moderate but Jaipur experiences extreme climate.

(ii) Mawsynram gets highest rainfall while its neighbour Shillong gets just 150 cm of rainfall.

(iii) 'Rabi' crops growing even in dry winters.

Ans. (i) Mumbai lies on the Western coast so experiences moderate type of climate while Jaipur lies in the interiors far away from the sea so experiences extreme climate.

(ii) Mawsynram lies on the windward side of Khasi hills and receives highest rainfall while Shillong lies on the leeward side of Khasi hills and receives little rainfall.

(iii) The cold weather precipitation in the Northern parts of India is due to the Western disturbances originate from the Mediterranean Sea. This precipitation is good for Rabi crops.

18. Write three difference between summer monsoon and retreating monsoon season. *[2018]*

Ans. Three difference bfetwen Summer monsoon and retreating monsoon are:

Summer Monsoon	Retreating Monsoon
These winds or monsoon winds blow from June to September.	These winds blow from October to November.
These monsoon covers the whole India and gives heavy rainfall.	These monsoon covers little regions of India but the coastal areas of Tamil Nadu receives maximum rainfall.
The temperature is humid and pressure is low on the land.	The temperature goes up and the humidity becomes high.

19. How does India get rainfall in winters and what is the importance of this rainfall for India?

Ans. India gets rainfall in the winter months between December and January by the cyclonic or Western disturbances. The Western disturbances originate over the Mediterranean Sea and Western Asia. It causes rainfall in the North and North-West of India.

Importance In the Himalayan mountain region, these cause snowfall which feed the glaciers of Western Himalayas. This rainfall is highly beneficial to 'Rabi' crops specially wheat. The North-Eastern parts of India also get some rainfall during the winters from Western disturbances.

20. Give a reason to explain the following. *[2011]*

(i) The coastal areas of India do not experience a significant variation in temperature between summer and winter months.

(ii) The annual rainfall in Rajasthan is less than 25 cm.

(iii) The Coromandel Coast gets most of its rain during the winter season.

Ans. (i) The coastal areas of India do not experience a significant variation in temperature between summer and winter months due to the effect of land and sea breeze caused by differential rate of heating and cooling of the land and sea which results in an equable and moderate climatic conditions.

(ii) Rajasthan gets less than 25 cm of rainfall or very little rainfall as it lies in the rain shadow of the Aravalli ranges. The Bay of Bengal branch of South-West monsoon is almost exhausted by the time it reaches Rajasthan while the Arabian Sea branch blows parallel to the Aravalli ranges.

(iii) Coromandel Coast gets most of its rainfall from the North-East monsoon winds that travels from land to sea. On the way, these winds pick moisture from Bay of Bengal and cause rainfall in Coromandel Coast that includes parts of Andhra Pradesh and Chennai.

21. Give reasons for the following. *[2010]*

(i) The North-East monsoons bring almost no rain to most of India.

(ii) The Mango Showers are beneficial local winds.

(iii) The latitudinal extent of India is responsible for the variation in the climatic conditions which prevail in the country.

Ans. (i) The North-East monsoons bring almost no rain to most of India as these winds travel from land towards sea.

(ii) Mango Showers are local winds which bring rain to Kerala in the month of May. It is good for the growth of mangoes.

(iii) The latitudinal extent of India is between 8° N to 37° N and the Tropic of Cancer passes through the Centre of India. The Southern part of India lies in the tropical zone and experiences high temperature throughout the year while the Northern part lies in the temperate zone and experiences extremity of temperature i.e. too cold in winters and too hot in summers.

22. (i) Name a state that is the first to experience the onset of the monsoon.
(ii) How does the 'Mango shower' influence the state of Karnataka? ***[2018]***

Ans. (i) Kerala is the first state in India to experience the onset the monsoon from Arabian branch of monsoon. After the South-West monsoon gains momentum, it crosses the Western Ghat and downpours in all other states in India.
(ii) Mango shower also called as April rains, or summer showers or mango rains are so called because they help in early ripening of mangoes in Karnataka and parts of Tamil Nadu.

23. Name the following.
(i) The winds that provide relief rainfall to Andhra Pradesh coast.
(ii) A region receiving orographic rain.
(iii) A region receiving cyclonic rain.

Ans. (i) South-West monsoon winds.
(ii) Windward side of the Western Ghats.
(iii) Punjab.

24. Distinguish between South-West Monsoon and North-East Monsoon.

Ans. The difference between South-West Monsoon and North-East Monsoon are as follows:

	South-West Monsoon	North-East Monsoon
(i)	These winds blow from sea to land.	These winds blow from land to sea.
(ii)	In this season oppressive heat and humidity is felt, which is known as 'October Heat'.	In this season pleasant weather with low temperature, low humidity and clear skies are experienced.
(iii)	These winds have two branches i.e. the Arabian Sea and Bay of Bengal branch.	These winds have only one branch.

25. Distinguish between cool dry winters and hot dry summers.

Ans. The difference between cool dry winters and hot dry summers are as follows:

	Cool Dry Winters	Hot Dry Summer
(i)	The months of December, January and February are cool dry winters.	The months of March, April and May have hot dry summers.
(ii)	This season has low temperature, low humidity and clear skies.	This season has high temperature and low humidity.
(iii)	A little precipitation takes place that causes rainfall in North-West India and snowfall in Himalayas.	Duststorms, hot winds (Loo) and Norwesters blow in hot dry summers.

26. Differentiate between tropical cyclones and temperate cyclones.

Ans. The difference between tropical cyclones and temperate cyclones are as follows:

	Tropical Cyclones	Temperate Cyclones
(i)	Tropical cyclones originate in the tropical zone that is why called as 'Tropical Cyclones'.	These cyclones originate in the temperate zone that is why they are known as 'Temperate Cyclones'.
(ii)	They are circular in shape and generally small in size as compared to temperate cyclones.	These cyclones are of oval shape and larger than that of tropical cyclones.
(iii)	They develop over the oceans or seas.	They develop over continents.
(iv)	Cyclones in the months of June and July develop over Bay of Bengal and affecting the Eastern coast of India are example of these cyclones.	Western disturbance causing rain in North-Western region of India in the winter season are examples of these cyclones.

27. Give a reason for each by the following. ***[2017]***
(i) Kolkata receives heavier rain than Lucknow.
(ii) The summer monsoon winds blows over the Arabian Sea from the South-West.
(iii) Thar is a desert.

Ans. (i) Kolkata receives heavier rain than Lucknow because Kolkata lies in the lower Ganga plain so it receives more rainfall but by the time the Bay of Bengal Branch of South-West Monsoons reach Lucknow their moisture holding capacity decreases therefore it sheds less rainfall.
(ii) The summer Monsoon winds blow over the Arabian Sea from the South-West because during the summer season in the Northern hemisphere, the subcontinental landmass gets heated up and develops low pressure so because of that the South-East Trade winds are attracted towards the Indian subcontinent and become the South-West Monsoon winds in Indian subcontinent due to rotation of the Earth and Ferell's Law.
(iii) Thar is a desert because the soil of the Thar Desert remains dry for most of the year due to having a scanty rainfall. There are very few local tree species. The sand in the desert is highly mobile due to strong winds.

28. Give a geographical reason for each of the following. ***[2016]***
(i) Kanpur has extreme temperature conditions.
(ii) Kochi is warmer than Mumbai even though both lie on the Western coast of India.
(iii) The Ganga plain gets the monsoon rain much later than the West coast of India.

Ans. (i) Kanpur has extreme temperature condition as it is located in the interiors and has no moderating influence of the sea. Therefore, it is very hot in summers and very cold in winters.

(ii) Although Kochi and Mumbai lie on the West coast of India yet Kochi is warmer because it is situated closer to the equator and get adequate sunshine throughout the year.

(iii) The West coast of India gets monsoon rains first as the Arabian Sea branch of the South-West monsoon enters India from there. Then it moves upwards from Deccan Plateau in Central India towards Ganga Plains in North. So, the Ganga Plain gets monsoon rain later than West coast.

29. State the agricultural benefits derived from :

(i) The Westerly depressions in Punjab. *[2017]*

(ii) The Kaal Baisakhi in Assam.

Ans. (i) **The Westerly Depression in Punjab** The Westerly depression in Punjab causes rain during winter. This is good for rabi crop. Rabi crops are sown at the start of winter and harvested in spring or at the start of summer. Rabi crops mainly wheat and barley in Punjab get sufficient precipitation during winter months due to the Western temperature cyclone or Westerly depression.

(ii) **The 'Kaal Baisakhi' in Assam** The 'Kaal Baisakhi' wind usually blows in North-West direction. These winds are accompanied by thunderstorms and brings heavy rainfall. This rain in the month of April to May is good for tea crop in Assam.

30. What is the direction of the summer monsoon? Why? *[2012]*

Ans. The direction of the summer monsoon is from South-West to North-East. In summer, due to high temperature low pressure areas develops over the North-Western India, and high pressure over the sea. Air from high pressure areas blow from Southern hemisphere towards the region as this region attracts moisture bearing winds from South. After crossing the equator these winds deflected to the right and blow over India and give windespread rainfall over the mainland. These are known as 'the South-West monsoon' winds.

31. Give a reason for each of the following. *(3) [2018]*

(i) Kanyakumari experiences equable climate.

(ii) Central Maharashtra gets less rainfall than coastal area of Maharashtra.

(iii) Jaipur has a higher annual range of temperature than Mumbai.

Ans. (i) Kanyakumari is located at the top of the Indian subcontinent where the Bay of Bengal and the Arabian Sea meet which moderate the climate, making it equable or maritime.

(ii) Central Maharashtra gets less rainfall than coastal area of Maharashtra because Central Maharashtra lies in the rain shadow zone of the Western Ghats. On the other side, coastal area of Maharashtra is humid, means water vapours are present and moist wind comes from sea, therefore it gets heavy rainfall.

(iii) Jaipur lies in the interiors far away from the sea, so it experiences higher temperature whereas Mumbai lies on the Western coast, so it experiences moderate type of temperature.

C *Data Based Questions* [3 Marks each]

1. Study the climatic data given below and answer the questions that follow. *[2017]*

Month	Temp. °C	Rainfall cm	Month	Temp. °C	Rainfall cm
Jan	12.0	1.5	Jul	36.0	25.3
Feb	25.5	0.1	Aug	35.9	27.2
Mar	26.3	0.0	Sep	30.3	24.0
Apr	27.1	1.4	Oct	28.4	9.4
May	30.0	1.1	Nov	21.0	1.5
Jun	36.2	21.0	Dec	16.6	0.4

(i) What is the annual range of temperature of the station?

(ii) What is the total annual rainfall experienced by the station?

(iii) Why would it be correct to presume that the station lies in the interior and not on the coast?

Ans. (i) The annual range of temperature of the station is 36.2°C-12°C = 24.2 °C

(ii) The total annual rainfall is 1.5 + 0.1 +0.0 + 1.4 + 1.1 + 21.0 + 25.3 + 27.2 + 24.0 + 9.4 + 1.5 + 0.4 = 112.9 cm.

(iii) The Western coast gets its heaviest rainfall during June by South-West monsoon, while Eastern coast gets its maximum rainfall in winter. But in the given table there is no heavy rainfall either in summer or in winter. Besides, the annual range of temperature is also very high. Thus, it is correct to presume that the station lies in the interior and not on the coast.

2. Study the climatic data of station X given below and answer the questions that follow. *[2016]*

Month	Temp. °C	Rainfall cm	Month	Temp. °C	Rainfall cm
Jan	24.5	4.3	Jul	31.0	8.6
Feb	25.7	1.6	Aug	30.2	11.4
Mar	27.7	1.7	Sep	29.8	11.8
Apr	28.4	2.4	Oct	28.0	30.6
May	30.0	2.8	Nov	25.9	35.0
Jun	32.5	4.6	Dec	24.7	13.9

(i) Calculate the total annual rainfall experienced by the station.
(ii) What is the annual range of temperature?
(iii) On which coast of India does the station lie? Give a reason for your answer.

Ans. (i) The annual rainfall is 4.3 + 1.6 + 1.7 + 2.4 + 2.8 + 4.6 + 8.6 + 11.4 + 11.8 + 30.6 + 35.0 + 13.9 = 128.7 cm.

(ii) The annual range of temperature is
$32.5°C - 24.5°C = 8°C$

(iii) The station lies on the East coast as maximum rainfall is in the months of October-November i.e. in retreating monsoon season.

3. Study the climatic data given below and answer the questions that follow. *[2015]*

Month	Temp. °C	Rainfall cm	Month	Temp. °C	Rainfall cm
Jan	21.0	5.1	Jul	26.1	8.4
Feb	21.9	2.8	Aug	25.4	11.4
Mar	24.3	1.2	Sep	25.0	11.9
Apr	27.2	1.7	Oct	26.0	31.6
May	28.0	3.9	Nov	23.8	34.5
Jun	26.4	4.6	Dec	21.2	14.8

(i) Identify the hottest month.
(ii) Calculate the annual rainfall.
(iii) Name the winds that bring the maximum rainfall to this city.

Ans. (i) Hottest month is May.

(ii) Total annual rainfall is 5.1 + 2.8 + 1.2 + 1.7 + 3. 9 + 4.6 + 8.4 + 11.4 + 11.9 + 31. 6 + 34.5 + 14.8 = 131.9 cm.

(iii) As the maximum amount of rainfall is received during the months of October and November. We can deduce that they are caused by the winds of reteating monsoon.

4. Study the climatic data given below and answer the questions that follow. *[2014]*

Month	Temp. °C	Rainfall cm	Month	Temp. °C	Rainfall cm
Jan	25.0	24.5	Jul	36.0	9.3
Feb	25.5	23.1	Aug	35.9	7.2
Mar	26.3	15.0	Sep	30.3	4.0
Apr	27.1	2.4	Oct	28.4	9.4
May	30.0	0.1	Nov	27.0	14.5
Jun	36.2	11.0	Dec	24.6	20.4

(i) Calculate the annual range of temperature.
(ii) What is the total annual rainfall?
(iii) Presuming that the station is located in India, give a reason for its location being on the East Coast or the West Coast of India.

Ans. (i) Annual range of temperature is
$36.2°C - 24.6°C = 11.6°C$

(ii) Total annual rainfall is
24.5 + 23.1 + 15.0 + 2 .4 + 0.1 + 11.0 +9.3 + 7.2 + 4.0 + 9.4 + 14.5 + 20.4 = 140.9 cm

(iii) The station is located on the Eastern coast of India, because heavy rainfall is observed in winter season.

5. Study the climatic data given below and answer the questions that follow. *[2013]*

Month	Temp. °C	Rainfall cm	Month	Temp. °C	Rainfall cm
Jan	23.1	15.3	Jul	33.1	6.1
Feb	24.8	10.1	Aug	32.1	10.2
Mar	26.5	0.3	Sep	30.5	10.5
Apr	29.3	0.1	Oct	29.3	20.1
May	32.0	1.3	Nov	28.7	16.8
Jun	32.8	4.5	Dec	26.1	19.0

(i) Calculate the annual rainfall experienced by the station.
(ii) Suggest a name of this station, giving a reason for your answer.
(iii) Name the season during which the rainfall is highest.

Ans. (i) Annual rainfall = 15.3 + 10.1 + 0.3 + 0.1 + 1.3 + 4.5 + 6.1 + 10.2 + 10.5 + 20.1 + 16.0 + 19.0 = 114.3 cm

(ii) Suggested name is Chennai, because the station is receiving most of its rain in October and November.

(iii) Rainfall is high in winter season.

6. Study the climatic data given below and answer the questions that follow. *[2012]*

Month	Temp. °C	Rainfall cm	Month	Temp. °C	Rainfall cm
Jan	23.8	0	Jul	30.4	46.5
Feb	25.0	0	Aug	33.3	45.4
Mar	27.7	1.1	Sep	30.0	43.3
Apr	28.3	1.5	Oct	30.3	20.1
May	30.2	2.1	Nov	25.5	3.0
Jun	30.3	45.3	Dec	24.2	0.1

(i) Calculate the mean annual temperature.

(ii) What is the total rainfall during the monsoon season?

(iii) Does the station have a maritime or a continental climate? Give a reason for your answer.

Ans. (i) The mean annual temperature

$$= \frac{\text{Sum of all observations}}{\text{No. of observations}} = \frac{339}{12} = \text{is } 28.25^\circ \text{ C}$$

(ii) The total rainfall during the monsoon season (June to October) is 200.6 cm.

(iii) The station has a maritime type of climate because it has less temperature variation (from 30.4°C to 23.8°C).

7. Study the climatic data given below and answer the questions that follow. *[2011]*

Month	Temp. °C	Rainfall cm	Month	Temp. °C	Rainfall cm
Jan	24.5	4.6	Jul	31.0	8.7
Feb	25.7	1.8	Aug	30.2	11.3
Mar	27.7	1.3	Sep	29.8	11.9
Apr	20.4	1.8	Oct	28.0	30.6
May	30.0	3.8	Nov	25.9	35.0
Jun	32.5	4.5	Dec	24.7	13.9

(i) Name the driest month.

(ii) Calculate the annual rainfall experienced by the station.

(iii) What is the annual range of temperature?

Ans. (i) The driest month is March (1.3 cm).

(ii) The annual rainfall experienced by the station is 4.6 + 1.8 + 1.3 + 1.8 + 3.8 + 4.5 + 8.7 + 11.3 + 11.9 + 30.6 + 35.0 + 13.9 = 129.2 cm.

(iii) The annual range of temperature is 20.4 to 32.5°C-20.4°C = 12.1°C.

8. Study the climatic data provided below and answer the questions that follow. *[2010]*

Month	Station A		Station B	
	Temp. °C	Rainfall cm	Temp. °C	Rainfall cm
Jan	21.0	0.1	24.4	0.2
Feb	22.6	0.1	24.4	0.3
Mar	26.3	0.5	26.7	0.3
Apr	29.2	1.5	28.3	1.7
May	29.7	2.7	30.0	1.9
Jun	27.5	11.4	28.9	50.2
Jul	25.1	16.7	27.2	61.0
Aug	24.5	9.0	27.2	37.0
Sep	24.8	13.4	27.2	27.0
Oct	25.8	9.0	28.3	4.8
Nov	22.5	2.7	27.2	1.4
Dec	20.5	0.3	25.0	0.3

(i) Calculate the annual range of temperature of Station B.

(ii) Calculate annual rainfall of Station A.

(iii) Presuming that both the stations are located in West India, state giving a reason as to which of the two lies on the windward side of the Western Ghats.

Ans. (i) $30^\circ\text{C} - 24.4^\circ\text{C} = 5.6^\circ\text{C}$

(ii) Annual Rainfall of sation A =

0.1 + 0.1 + 0.5 + 1.5 + 2.7 + 11.4 + 16.7 + 9.0 + 13.4 +9.0 + 2.7 + 0.3 = 67.4 cm

(iii) Station B as it gets heavy rainfall in the months of June, July and August.

9. Study the following climatic data and answer the questions that follow.

Month	Temp. °C	Rainfall cm	Month	Temp. °C	Rainfall cm
Jan	14.4	2.5	Jul	30.3	19.3
Feb	16.7	1.5	Aug	29.4	17.8
Mar	23.3	1.3	Sep	28.9	11.9
Apr	30.0	1.0	Oct	25.6	1.3
May	33.2	1.8	Nov	19.4	0.2
Jun	33.3	7.4	Dec	15.6	1.0

(i) Name the rainiest month of the year. How much is the rainfall in this month?

(ii) What is the annual range of temperature here?

(iii) Name the hottest month and write the temperature.

Ans. (i) The rainiest month of the year is July. The rainfall in this month is 19.3 cm.

(ii) The annual range of temperature is 33.3°C – 14.4°C = 18.9°C

(iii) The hottest month of the year is June and the temperature is 33.3°C.

10. Given below is the climatic data of a station. Study the table and answer the questions that follow.

Month	Temp. °C	Rainfall cm	Month	Temp. °C	Rainfall cm
Jan	24.5	4.6	Jul	31.0	8.7
Feb	25.7	1.3	Aug	30.2	11.3
Mar	27.7	1.3	Sep	29.8	11.9
Apr	20.4	1.8	Oct	28.0	30.6
May	30.0	3.8	Nov	25.9	30.5
Jun	32.5	4.5	Dec	24.7	13.9

(i) Calculate the annual rainfall experienced by the station.

(ii) What is the annual range of temperature?

(iii) Name the wettest month.

Ans. (i) Annual rainfall experienced by the station = 4.6 + 1.3 + 1.3 + 1.8 + 3.8 + 4.5 + 8.7 + 11.3 + 11.9 + 30.6 + 30.5 + 13.9 = 124.2 cm.

(ii) The annual range of temperature is = 32.5 °C – 20.4 °C = 12.1°C

(iii) The wettest month is October with the highest rainfall 30.6 cm.

CHAPTER TEST

Short Questions

[2 Marks each]

1. Why is Chennai warmer in December than Delhi?
2. The Northern Plains experience what kind of climate?
3. What are the pressure conditions and wind directions during the hot weather season in India?
4. State two characteristic of the retreating monsoon.
5. Which state receive the maximum rainfall in winter season and why?
6. What is the duration of the monsoon season in Western Rajasthan?
7. In which season does the heat belt shift Northwards.
8. October heat is the main phenomenon of which season?

Long Questions

[3 Marks each]

1. What is windward side? Define.
2. How do Himalayas act as 'climate divide'?
3. Briefly explain how does relief affect the climate of India?
4. What is retreating monsoon and name any two months associated with them? Normally by what date does the monsoon advance into Kerala?

Data Based Questions

[3 Marks each]

1. Given below is the climatic data of a station. Study the table and answer the questions that follow.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temp (°C)	13.7	16.6	21.6	25.4	33.1	33.3	30.5	29.3	29.5	25.4	18.5	15.1
Rainfall (cm)	2.6	2.0	1.5	0.7	1.3	7.1	17.6	18.4	13.6	1.0	0.2	1.6

(i) Calculate the annual range of temperature.
(ii) What is the total rainfall experienced by the station?
(iii) Which is the driest month?

2. Study the climatic data provided below and answer the questions that follow.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temp (°C)	14.5	17.5	20.5	23.7	30.7	34.6	30.4	29.8	25.6	25.1	18.6	14.5
Rainfall (cm)	2.7	2.0	1.6	0.3	1.8	8.2	16.7	18.8	14.5	1.0	0.6	1.7

(i) Calculate the annual range of temperature.
(ii) What is the total rainfall experienced by the station?
(iii) Which is the driest month?

ARCHIVES*

Collection of Questions Asked in Previous Years' ICSE Class 10th Examinations

2018

1. (a) How is the winter rainfall of the North-West part of India different from the winter rainfall of the South-East of India? ***(2)***

2. (i) Name a state that is the first to experience the onset of the monsoon.
(ii) How does the 'Mango shower' influence the state of Karnataka? ***(2)***

3. Give a reason for each of the following. ***(3)***
(i) Kanyakumari experiences equable climate.
(ii) Central Maharashtra gets less rainfall than coastal area of Maharashtra.
(iii) Jaipur has a higher annual range of temperature than Mumbai.

4. Write three difference between summer monsoon and retreating monsoon season. ***(3)***

2017

1. Mention the four seasons that prevails in India stating the months for each. ***[2]***

2. State the agricultural benefits derived from: ***[2]***
(i) The Westerly depressions in Punjab.
(ii) The 'Kaal Baisakhi' in Assam.

3. Give a reason for each of the following. ***[3]***
(i) Kolkata receives heavier rain than Lucknow.
(ii) The summer monsoon winds blows over the Arabian Sea from the South-West.
(iii) Thar is a desert.

4. Study the climatic data given below and answer the questions that follow. ***[3]***

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temp (°C)	12.0	25.5	26.3	27.1	30.0	36.2	36.0	35.9	30.3	28.4	21.0	16.6
Rainfall (cm)	1.5	0.1	0.0	1.4	1.1	21.0	25.3	27.2	24.0	9.4	1.5	0.4

(i) What is the annual temperature of the station?
(ii) What is the total annual rainfall experienced by the station?
(iii) Why would it be correct to presume that the station lies in the interior and not on the coast?

2016

1. What is the name given to the climate of India? Mention any two factors responsible for such a type of climate. ***[2]***

2. Name the following. ***[2]***
(i) The winds that bring heavy rain to Cherrapunji.
(ii) The local wind that brings a light rainfall to South India and is good for tea and coffee crops.

3. Give a geographical reason for each of the following. *[3]*

(i) Kanpur has extreme temperature conditions.

(ii) Kochi is warmer than Mumbai even though both lie on the Western Coast of India.

(iii) The Ganga plain gets the monsoon rain much later than the West Coast of India.

4. Study the climatic data of station X given below and answer the questions that follows. *[3]*

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temp (°C)	24.5	25.7	27.7	28.4	30.0	32.5	31.0	30.2	29.8	28.0	25.9	24.7
Rainfall (cm)	4.3	1.6	1.7	2.4	2.8	4.6	8.6	11.4	11.8	30.6	35.0	13.9

(i) Calculate the total annual rainfall experienced by the station.

(ii) What is the annual range of temperature?

(iii) On which coast of India does the station lie? Give a reason for your answer.

2015

1. Explain two factors that affect the climate of India giving a suitable example for each. *[2]*

2. State two differences between the rainfalls that occur from June to September and that from December to February in North India. *[2]*

3. Give a geographic reason for each of the following. *[3]*

(i) Kerala has the longest rainy season.

(ii) The Konkan experiences orographic rainfall.

(iii) The city of Kanpur in Uttar Pradesh has a higher range of temperature than that of Chennai in Tamil Nadu.

4. Study the climatic data given below and answer the questions that follow. *[3]*

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temp (°C)	21.0	21.9	24.3	27.2	28.0	26.4	26.1	25.4	25.0	26.0	23.8	21.2
Rainfall (cm)	5.1	2.8	1.2	1.7	3.9	4.6	8.4	11.4	11.9	31.6	34.5	14.8

(i) Identify the hottest month.

(ii) Calculate the annual rainfall.

(iii) Name the winds that bring the maximum rainfall to this city.

2014

1. Mention the different sources of rain in Punjab and Tamil Nadu during the winter season. *[2]*

2. State the benefits that are derived from the local winds that blow in summer in the following state

(i) Kerala

(ii) West Bengal *[2]*

3. Mention a geographical reason for each of the following. *[3]*

(i) Patna receives heavier rain than Delhi.

(ii) Western Rajasthan receives no rain from the Arabian Sea branch of the South-West monsoon winds.

(iii) Mangalore is not cold even in the month of December.

4. Study the climatic data given below and answer the questions that follow. *[3]*

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temp (°C)	25.0	25.5	26.3	27.1	30.0	36.2	36.0	35.9	30.3	28.4	27.0	24.6
Rainfall (cm)	24.5	23.1	15.0	2.4	0.1	11.0	9.3	7.2	4.0	9.4	14.5	20.4

(i) Calculate the annual temperature range.

(ii) What is the total annual rainfall?

(iii) Presuming that the station is located in India, give a reason for its location being on the East Coast or the West Coast of India.

2013

1. Name two types of cyclonic systems that affect India and two areas that receive rainfall from these system. *[2]*

2. Give two important characteristics of the South-West Monsoon rainfall. *[2]*

3. Give reasons for the following. *[3]*

(i) When the Malabar Coast is receiving heavy rainfall in July, the Tamil Nadu coast is comparatively dry.

(ii) The Northern Plains of India have a continental type of climate.

(iii) Central Maharashtra receives little rainfall.

4. Study the climatic data given below and answer the questions that follow. *[3]*

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temp (°C)	23.1	24.8	26.5	29.3	32	32.8	33.1	32.1	30.5	29.3	28.7	26.1
Rainfall (cm)	15.3	10.1	0.3	0.1	1.3	4.5	6.1	10.2	10.5	20.1	16.8	19.0

(i) Calculate the annual rainfall experienced by the station.

(ii) Suggest a name of this station giving a reason for your answer.

(iii) Name the season during which the rainfall is highest.

* All these questions are covered and explained in chapter exercise 'Exam Practice'.

CHAPTER

5

Soil Resources

Soil can be simply defined as a mixture of small rock particles and organic materials/humus which develop on the Earth's surface and support growth of plants. Agricultural production depends on the fertility of soil because, if the soils are fertile, production is more and such areas support a high density of population.

Major Soils of India

The Indian Council of Agricultural Research (ICAR) has divided the soils found in India into major groups which are as follows:

1. Alluvial Soils

This is the most widespread soil in India. It has been deposited by three important Himalayan river systems i.e. the Indus, the Ganges and the Brahmaputra. Alluvial soil is also known as riverine soil.

Composition

It is made up of silt, sand, clay and rich in nutrients like humus potash, phosphoric acid and lime which are suitable for growing paddy, wheat, sugarcane and other cereal and pulse crops. It is poor in phosphorous and nitrogen. It is dark in colour and has silty loam or clay texture.

Characteristics

Some characteristics of Alluvial soil are given below:

- Due to its high fertility, areas having this soil are intensively cultivated and highly populated.
- It is also known as transported soil, as the soil has been transported by the rivers to its current location.
- The particles of this soil are bigger and coarser in the upper reaches of the rivers and become finer as the river flows down.
- Alluvial soil in drier areas is more alkaline and can be productive after proper treatment and irrigation.

Types of Alluvial Soils

There are two types of alluvial soils which are as follows:

(i) **Bhangar** The older alluvial soil, further away from the rivers is known as bhangar. It is coarse in texture. It is found higher up in the plains at river terraces away from rivers. It is clayey and non-porous.

(ii) **Khadar** The newer alluvial soil near the river is known as khadar. It is finer in texture. It is found in the lower levels in the plains near the rivers. It is loamy (smooth), porous soil. It is more fertile than bhangar as new layers are deposited year after year during monsoonal floods.

Distribution

This soil is prevalent in river valleys of the Northern plains (Indus, Ganga, Brahmaputra), strips in Gujarat and Rajasthan, as well as in Eastern coastal plains in the deltas of rivers of the Peninsular plateau (Mahanadi, Godavari, Krishna and Kaveri). These soils are more common in Punjab, Haryana, Uttar Pradesh, Bihar, West Bengal.

Crops

It is good for most of the crops (Kharif and Rabi) like rice, wheat, sugarcane, cotton, jute, oilseeds and pulses, etc.

2. Black Soils

This is also known as **black cotton soil** or regur soil. It is formed after solidification of molten lava during volcanic activity.

Composition

It is composed of lime, alumina, iron, potash, magnesium carbonate and calcium carbonate. It is deficient in nitrogen, humus and phosphates.

Characteristics

Some characteristics of black soil are given below:

- It has been formed by weathering of the parent rock material found in Deccan Plateau i.e. igneous rocks and is called regur soil.
- Black soils are made up of extremely fine particles i.e. clayey material.
- It develops deep cracks during hot summer, which helps in **aeration**[1] of the soil, but it becomes sticky (due to high moisture retention) when it is wet due to which it becomes difficult to be tilled. It has self ploughing quality and holds moisture when becomes wet.
- It needs to be tilled just after the first rain as it becomes sticky.
- It is deep black, medium black or dark brown in colour because it is volcanic in origin.
- It is **in situ**[2] or residual soil that means it is found where it is formed.

Distribution

It is found in the Deccan trap (Basalt lava region) and covers the plateau areas of Saurastrian Gujarat, Maharashtra, Malwa of Madhya Pradesh, parts of Andhra Pradesh, Northern Karnataka, parts of Tamil Nadu, Chhattisgarh and also along the valleys of the Godavari and Krishna rivers.

Crops

Cotton, sugarcane, groundnut, millets, rice, wheat, oilseeds tobacco are the important crops that grow well in this soil.

3. Red and Yellow Soils

Red soils are formed due to weathering of old crystalline rocks like igneous and metamorphic rocks in the areas of low rainfall.

Composition

It is composed of iron, potash, magnesium, small amount of humus and lacks in phosphorus, lime, nitrogen and manganese.

Characteristics

Some characteristics of red and yellow soils are given below:

- This soil is red, yellow, brown and reddish in colour.
- The red colour of this type of soil is due to diffusion of iron particles into crystalline and metamorphic rocks. It looks yellow when it is in the hydrated form.
- It is more sandy and less clayey.
- It is porous and has friable (dry) structure.
- It is slightly acidic and does not retain moisture.
- It is siliceous and aluminous in nature.
- Soil aggregates (kankars) are absent in the soils.

1 Aeration It involves entering the soil with small holes to allow air, water and nutrients to penetrate the grass roots.
2 In situ It refers to the natural or original place.

Types of Red and Yellow Soils

The soils are grouped into three types which are as follow:

(i) **Red Loamy Soils** These are dark red in colour and loamy in texture.

(ii) **Red Gravelly Soils** These are dark red and gravelly in texture.

(iii) **Mixed Red and Black Soils** These soils are found in areas that integrate into black soil regions.

Distribution

It is found in low rainfall areas of the Deccan plateau (Eastern and Southern parts). It is thus found in parts of Tamil Nadu, Odisha, Madhya Pradesh, Karnataka, Maharashtra, Andhra Pradesh and the Chotanagpur plateau areas of Chhattisgarh and Jharkhand.

Crops

Wheat, rice, millet, gram, sugarcane, groundnut, coconut, ragi, oilseeds, pulses and cotton are the important crops growing in this soil. Cultivation of red soils depends on the irrigation.

4. Laterite or Lateritic Soils

The word 'Laterite' has been derived from the Latin word 'Later' which means 'brick'. It develops in areas with high temperature and heavy rainfall, resulting in intense **leaching**[3] due to heavy rain.

Composition

This soil is rich in iron, phosphate, aluminium compounds and lacks in lime, magnesium, phosphoric acid, potash and humus.

Characteristics

Some characteristics of laterite or lateritic soil are given below:

- This soil has low humus content as the micro-organisms get destroyed due to high temperature.
- It can be made cultivable with adequate amounts of manure and chemical fertilizers.
- It becomes hard when exposed to air.
- The soil is compact, reddish or yellowish-red in colour and turns black on exposure to the Sun.
- It is not capable of retaining moisture due to its acidic nature.
- The soils are 'residual soils' or 'in situ soils', developed on aluminium rich rocks, e.g. gneiss, sandstone, granite and basaltic rocks in regions of high rainfall with alternating wet and dry seasons.
- The soil may be broken and transported by streams to lower levels and deposited there becoming cemented again into compact mass. Thus, the higher elevation laterite is residual and lower elevation laterite is alluvial in nature.

Distribution

These soils are found in Karnataka, Kerala, Tamil Nadu, Madhya Pradesh, Andhra Pradesh and hilly areas of Odisha and Assam, etc.

Crops

Tea, coffee, cashewnuts, rubber, coconut, rice, sugarcane and tapioca are the important crops growing in this soil.

CHECK POINT 01

1 What is the composition of alluvial soil?
2 Mention the other name of black soil?
3 Which soil is formed due to weathering of crystalline rocks?
4 Name the soil formed due to high temperatures and heavy rainfall.

Soil Erosion

It is the removal of top layer of soil by the forces of nature, particularly wind and water, more rapidly than the various soil forming processes can replace it. It is a natural process. It becomes a problem when human activity causes it to occur much faster than under natural conditions. Erosion removes the top soil first. Once this nutrient-rich layer is gone, then few plants will grow in the soil again.

Problems caused by Soil Erosion are as follows:

- Loss of valuable top soil
- Damage to fields
- Fall in plant productivity
- Desertification
- Land infertility
- Leads to devastating floods
- Land degradation
- Reduce in level of groundwater

Soil Erosion is caused by natural as well as well as human factors.

3 Leaching It is the process by which nutrients in the soil are washed away by heavy rains into the lower layer.

Natural Factors of Soil Erosion

Natural factors of soil erosion are as follows:

Water Erosion

Water plays an important role in soil erosion as it is a powerful factor of soil erosion. It has different types or forms through which soil erosion takes place.

These are:

Sheet Erosion Sometimes water flows as a sheet over large areas down a slope. In such cases, the top soil is washed away. This is known as sheet erosion.

Rill Erosion It is the removal of soil by concentrated water running through little streamlets making grooves or channels on the land surface.

Gully Erosion Extensive areas may be affected by gully formation and whole area is turned into **bad lands**[4]. Sandy soils are more prone to formation of gullies, e.g. **Ravines**[5] of Yamuna and Chambal basin have been formed in this manner.

Bank Erosion In this type of erosion, the continuously flowing water erodes the banks of streams and rivers e.g. the flood plains of Ganga, Yamuna and other rivers.

Shore or Sea Erosion or Littoral Erosion Tidal water of sea cause considerable damage to the soil along the sea coast, powerful waves dash against sea-coast and break hanging cliff rocks. The broken material is then removed by the retreating sea waves. This type of erosion is seen throughout the Eastern and Western Coasts of India.

Splash or Slip Rate of soil erosion by running water depends on intensity of rainfall, velocity and volume of water gradient, sediment load, nature of rocks and extent of vegetative cover.

Wind Erosion

It refers to the movement and deposition of soil particles by wind. Wind erosion is active in arid and semi-arid areas which are devoid of vegetative cover. Soil erosion by wind is performed through i.e. wind picking up soil particles and carrying them away; and through **abrasion**[6]. Soil erosion by wind is common in Rajasthan and the adjoining areas of Haryana, Punjab and Gujarat.

Human Factors of Soil Erosion

In addition to action of water, winds and glaciers, human and animal interferences also lead to soil erosion in a variety of ways. These are as follows:

Faulty Practices of Farming

Much of soil erosion in India is caused by faulty practices of farming, which are as follows:

Faulty Ploughing It is seen in the form of fields ploughed along the slope and not along the contours. This method of tilling the land provides readymade rills at the time of rain and the flow of water concentrates in the furrows made through ploughing. It increases the velocity of run off thereby facilitating quick removal of soil.

Lack of Mulching Mulching is the process of covering the top soil with plant material such as leaves, grass, etc. It provides protection against splash erosion, restrict the velocity of run off and helps to keep the soil particles bound together and retain moisture. But it is not practiced in most parts of India due to various reasons including the use of **agricultural residue**[7] as fuel and high incidence of multiple cropping. Therefore, the soils are more exposed to erosion by running water as well as wind.

Shifting Cultivation It is responsible for soil erosion in many tropical forest areas occupied mainly by tribal communities. It is also known as Slash and Burn cultivation. This practice is done in the North-Eastern states, the hilly and tribal areas of Madhya Pradesh, Chhattisgarh, Odisha, Andhra Pradesh and Kerala.

Overgrazing

Continued grazing by animals on the same patch of land without sufficient recovery periods, leads to the removal of plant cover on a large-scale and becomes open to erosion by wind and water. The grazing animals also demolish the soil by the hoofs and teeth and the soil thus, loosened and easily washed away when heavy showers take place. Erosion due to overgrazing is very common over the hilly areas of Madhya Pradesh, Himachal Pradesh, Jammu and Kashmir and in arid and semi-arid areas of Rajasthan, Maharashtra, Karnataka and Andhra Pradesh.

4 Bad Lands A land which is unfit for cultivation is known as bad land.
5 Ravine Cutting of a gully bed into the soil with a drop of 3 to 4 metres and becomes flattened is known as ravine.
6 Abrasion The wearing down of rock particles by friction due to wind.
7 Agricultural Residue Remains of plants when the grains have been removed from them.

Deforestation

Cutting down of large areas of forests leaving an open, exposed landscape accelerates soil erosion and cause leaching or flash floods. This is done due to constructional activities by men, e.g. construction of roads, railway lines, buildings and agricultural practices which cause sheet, rill or gully erosion. The large-scale rill and gully erosion in the Shiwalik Foothills in Punjab lead to the formation of **chos**[8] and the ravine in Madhya Pradesh, Rajasthan and Uttar Pradesh.

Soil Conservation

Soil is one of the most precious asset of nature as it is essential for all life forms on the Earth. Looking at the importance of soil resources, a proper utilisation and conservation of soil is very important.

Need for Soil Conservation

Need for soil conservation is given below:

- Only a productive soil base can ensure prosperous agriculture which in turn forms the basis of economic advancement and a higher standard of living in a society.
- Soil receives organic wastes and recycles their nutrients back to plants. It also holds and breaks down some toxic wastes.
- Erosion is currently costing farmers a lot each year due to lower crop yields and the loss of nutrients from the soil.
- Soil conservation is proven to increase the quality and quantity of crop yields over the long-term because it keeps top soil in its place and preserves the long-term productivity of the soil. Hence, it ensures a secure food supply at reasonable prices.

Methods for Prevention of Soil Erosion

There are various methods for conserving soil and preventing soil erosion, which are as follows:

Farming Methods that Reduce Soil Erosion

Some farming methods that reduce soil erosion are as follows:

Strip Cropping Large fields can be divided into strips. Strips of grass are left to grow between the crops. This breaks up the force of the wind and strips of ground cover soak up rainwater and slow run off.

Contour Tillage or Cropping It is the practice of ploughing the field in which crops are planted in curving rows to follow the contour of hills. It leads to formation of ridges and furrow against the direction of flow of water. The **furrows**[9] thrown up by the plough (going in different directions) stop the flow of water and encourage **percolation**[10] in the soil.

Mulching or Stubble Plantings The old stubble of harvested crops is not ploughed back into the soil (as usually done). Instead the stable or residue is left in place in order to reduce wind and water erosion while the new crop is growing.

Wind Breaks Rows of trees are planted between fields. The trees slow down the wind and reduce wind erosion.

Terrace Farming In this farming technique, step-like terraces are built on slopes. They prevent run off from rushing downhill and carrying away the soil.

Stone Walls or Bunds In this method, low stone walls are placed along the contour of a hill. These walls capture water allowing it to filter into the soil rather than runoff downhill.

Crop Rotation It is a farming system in which a systematic succession of different crops is grown on the same piece of land so that the maximum use is made of soil nutrients. This retains soil fertility and provides soil cover.

Controlled Overgrazing

There should be controlled grazing on the same land and there are separate lands where pastures should be grown extensively.

Afforestation

Trees reduce the intensity of water run off which is responsible for soil erosion and increase the seepage of water to the underground water-table. Thus, social forestry can be developed along the banks of rivers, canals, lakes, roads and railway tracks to overcome the problem of soil erosion.

Reclamation of Saline and Alkaline Soils

To overcome problem of salinity and alkalinity of soil, some important steps can be taken such as proper levelling of land, drainage improvement, optimum irrigation, flushing the salts by flooding the fields, plantation of salt tolerant vegetation and crops such as cotton, barley, date, palm, rapeseed and fodder crops.

8 **Chos** Small seasonal streams of the Punjab plain.
9 **Furrows** A long, narrow ditch made in the ground by a plough, especially for irrigation.
10 **Percolation** The movement of water through the soil or underlying porous rock. This water collects as groundwater.

Flood Control

Flood is a major factor, causing soil erosion on a large-scale in India. Therefore, efforts should be made for the storage of flood water and diversion of additional rainwater.

CHECK POINT 02

1. What is the meaning of sheet erosion?
2. Which process helps in reducing soil erosion by using plant residue?
3. Mention any one reason for the need to conserve soil.
4. What is crop rotation?

Summary

- Soil is a non-renewable natural resource that supports all life forms on the Earth.
- Soil formation is a very long process, begins with the weathering of rocks into small fragments, with the help of various erosional agents like river, wind, sea and glacier.
- Factors that help to form soil are parent material, climate, living organisms and topography.
- According to Indian Council of Agricultural Research (ICAR) the soils of India are grouped as alluvial soils, black soils, red soils, laterite soils, forest or mountain soils and arid soils.
- Alluvial soils are the most widespread soil in India. This soil has been deposited by Himalayan rivers. This soil is very fertile for growing paddy, wheat, sugarcane, cotton, jute, oilseeds and other crops.
- Black soil is also known as black cotton soil or regur soil. It is good for cotton, sugarcane groundnut, millets and so on.
- Red and yellow soils are formed due to old crystalline rocks like igneous and metamorphic rocks in the areas of low rainfall. It is good for wheat, rice, millets, gram, etc.
- Laterite soils mainly known as brick soil due to its colour which is red because of high iron content. It is good for tea, coffee, cashewnuts, rubber, etc.
- Soil erosion takes place after the action of various natural agents such as water, wind (natural processes) and overgrazing, faulty practices of farming and deforestation (human factors).
- Soil erosion removes top soil layer which make it unfit for cultivation and pasture land.
- There is a need for soil conservation which can be possible by various soil conservation methods such as adopting appropriate farming method, controlled overgrazing, afforestation, reclamation of saline and alkaline soils and flood control.
- After adopting such useful methods we can surely reduce intensity of soil erosion.

EXAM PRACTICE

a Short Questions [2 Marks each]

1. Define soil.

Ans. Soil can be simply defined as a mixture of small rock particles and organic materials/humus which develops on the Earth's surface and support growth of plants.

2. How is soil important for us?

Ans. Importance of soil are as follows:

(i) Soil is the most important renewable natural resource and a living system which supports many types of living organisms.

(ii) Only a productive soil base can ensure prosperous agriculture which in turn forms the basis of economic advancement and a higher standard of living in a society.

3. What is the important limiting factor in soil formation?

Ans. The limiting factor of soil formation is that once it is exhausted it takes millions of years to be replenished as it is a time taking process.

4. Name the important factors that affect soil formation.

Ans. **Climate** The climate of an area that includes temperature and rainfall affects the parent rock material resulting in the formation of soil.

Living Organisms The dead and decaying parts of animals, plants, insects, birds and humans add organic matter to the formation of soil.

5. How do rocks play an important role in the formation of soil? Explain with example.

Ans. Rocks play an important role in the formation of soil as the material for soil formation is mainly derived from the rocks and is termed as the parent material by soil scientists. For example, if soils are formed from an area with large rocks (parent materials or rocks) of red sandstone, the soil will also be red in colour and has the same texture as its parent material has.

6. (i) Why does alluvial soil differ in texture? ***[2018]***

(ii) State two cash crops that grow well in alluvial soil.

Ans. (i) Alluvial soil differs in texture, as it is formed by the deposition of sediments by rivers. The alluvial soil which gets deposited in the upper reaches of the river is coarse and dry, while extremely fine and moist alluvial soil is deposited at lower reaches of the river.

(ii) Sugarcane and jute are major cash crops which grows well in this soil.

7. (i) Name the transported soil most widely found in India.

(ii) How is this soil formed?

Ans. (i) The transported soil is alluvial soil.

(ii) This soil is formed by the deposition of sediments brought down by the Himalayan rivers.

8. Why is alluvial soil also known as transported soil?

Ans. Alluvial soil is also known as transported soil as the soil has been transported by the rivers to its current location.

9. State two differences between Bhangar and Khadar. ***[2013]***

Ans. **Bhangar** The older alluvial soil, further away from the rivers is known as Bhangar. It is coarse in texture.

Khadar The newer alluvial soil near the river is known as Khadar. It is finer in texture.

10. Mention two differences between alluvial soil and black cotton soil. ***[2017]***

Ans. Two difference between alluvial soil and black cotton soil are:

(i) Alluvial soils are coarse in nature and contain kankar, pebbles and gravels. But black cotton soil are fine grained in texture with more than 60% clay. They do not contain gravel or sand.

(ii) Alluvial soils are very fertile on the whole. But black soils are less fertile in uplands.

11. (i) How is black soil formed?

(ii) Name one cash crop for which black soil is most suited.

Ans. (i) Black soil is formed by the weathering of igneous rocks that results from the lava flows from volcanic activity.

(ii) Black soil is most suited for cotton cultivation.

12. Mention any two characteristics of the black soil in India.

Ans. The two characteristics of black soil are:

(i) It has been formed by weathering of the parent rock material found in Deccan Plateau i.e. igneous rocks and is called Regur soil.

(ii) Black soils are made up of extremely fine particles i.e. clayey material.

13. Name two states in India where regur soil is found. In what way does regur soil help agriculture? *[2011]*

Ans. Black soil is also called Regur soil and it is found in the states of Gujarat and Maharashtra. Regur soil is rich in minerals that supports the growth of cotton cultivation. This soil is moisture retentive. It is also suitable for sugarcane cultivation.

14. State the characteristic of each of the soils named below that makes them most suitable for crop cultivation. *[2015]*

(i) Black soil

(ii) Red soil

Ans. (i) **Black Soil** is suitable for the cultivation of cotton as it is rich in calcium carbonate, magnesium carbonate, potash and lime.

(ii) **Red Soil** is suitable for the cultivation of wheat, rice, cotton and sugarcane as it is rich in iron, potash and magnesium.

15. With reference to black soil answer the following. *[2018]*

(i) Name one imortant crop which grows in this soil.

(ii) Give one chemical property of this soil.

Ans. (i) The important crop which grows in this soil is cotton.

(ii) The chemical property of the black soil is that it is rich in calcium, potassium and magnesium.

16. Mention two main characteristics of laterite soil. *[2011]*

Ans. Characteristics of laterite soil are as follows:

(i) The soil is compact, reddish or yellowish-red in colour and turns black on exposure to the sun.

(ii) It is not capable of retaining moisture due to its acidic nature.

17. Mention any two difference between alluvial soil and red soil. *[2014]*

Ans. Difference between alluvial soil and red soil are:

Alluvial Soil	Red Soil
This soil is very fertile due to the presence of minerals like lime, potash and humus.	This soil is less fertile as it lacks humus, lime and phosphorus.
This soil is transported soil.	This soil is in situ soil.

18. Mention two similarities between red soil and laterite soil. *[2016]*

Ans. (i) Red soil and laterite soil have similar colour i.e. red, reddish yellow and brown.

(ii) Both red soil and laterite soil are not very fertile due to lack of humus.

19. State the geographic term for each of the following processes. *[2015]*

(i) The process by which soluble minerals dissolve in rainwater and percolate to the bottom, leaving the top soil infertile.

(ii) The process by which rainwater, flowing in definite paths, removes the top soil, thus, causing deep cuts to the surface of the land.

Ans. (i) Leaching (ii) Gully erosion

20. What is soil erosion? Mention two steps that could be taken to prevent soil erosion. *[2016]*

Ans. Soil erosion is the removal of top soil by different agents of weathering such as wind, water etc. The contour bunding and afforestation are the two important measures to prevent soil erosion.

21. Name an area in India in which each of the following processes takes place. *[2017]*

(i) Sheet erosion (ii) Gully erosion

Ans. (i) **Sheet Erosion** Flood plains of Brahmaputra, Ganga, Kosi and Nilgiris.

(ii) **Gully Erosion** Chambal valley.

22. State two methods of controlling the erosion of soil caused by running water. *[2012]*

Ans. Two methods of controlling the erosion of soil caused by running water are as follow:

(i) Soil erosion can be prevented by growing more trees and grass to bind the soil.

(ii) Plugging of gullies and ravines.

23. Explain two points to show that it is the human action that has caused massive soil erosion.

Ans. The two points which shows the human actions causing massive soil erosion are as follows:

(i) Faulty farming practices leads to removal of top soil.

(ii) Cutting of trees for shifting cultivation leads to soil erosion.

24. How does the lack of vegetation cover increases soil erosion?

Ans. Lack of vegetation cover exposes the landscape to running water and wind. Heavy rains and moving wind then wash away the top soil causing massive soil erosion.

25. What is soil conservation? How does Re-afforestation help in soil conservation? ***[2010]***

Ans. Soil conservation refers to the methods of protecting the soil from erosion. Roots of trees protect soil by holding it in place against wind and water erosion. Re-afforestation means replanting trees which have been cut down. For every tree that is cut, two trees are to be planted. In this way forest cover is increased.

26. State any two methods of controlling soil erosion. ***[2014]***

Ans. Two methods of controlling soil erosion are:

(i) **Strip Cropping** Dividing large fields into strips and growing grass in between the crops breaks up the force of the wind and prevents soil erosion.

(ii) **Afforestation** Growing trees on open grounds to reduce the intensity of runoff and preventing soil erosion.

Long Questions [3 Marks each]

1. Differentiate between transported soil and in situ soil, quoting a suitable example for each. ***[2013]***

Ans. Difference between transported soil and in situ soil are as follows:

Transported Soil	In situ Soil
This soil is found at places where they got transported by agents of erosion i.e. wind and rivers.	This soil is found at places where they are formed by disintegration and weathering of rocks.
It is found in river valleys.	It is found in Deccan trap.
It is very fertile as it is rich in humus and minerals	It is less fertile as it is poor in humus.

2. How is Alluvial soil formed? Why is this soil agriculturally important?

Ans. Alluvial soil are formed by the sediments brought by the rivers. The river deposit very fine silt called Alluvium in their plains during the course of their journey starting from their source in the mountains and ending till its mouth.

Importance This soil is agriculturally very important because it is a mixture of sand, clay and silt (loam) which makes it very fertile. It is rich in potash and lime. It is light and porous therefore, easily tillable. It is suitable for growing large variety of Rabi and Kharif crops.

3. State the difference between alluvial soils found in the lower coarses and the upper coarses of the rivers. ***[ICSE 2011]***

Ans. Difference between alluvial soils in the lower and upper caorses of the river are:

Upper Coarse	Lower Coarse
It is finer in the lowest section. It is known as Khadar soil.	It is coarser i.e. particles bigger in size. It is known as Bhangar soil.
It is more moist and more compact.	It is dry, less compact.
It is more fertile than the upper coarse soil as new layers are deposited year after year during monsoonal floods.	It is less fertile than soils of lower coarses.

4. Describe alluvial soil under the following heads.

(i) Formation

(ii) Distribution

(iii) Nutrients

Ans. (i) **Formation** Alluvial soil is made-up of silt, sand and clay. It is deposited by three important Himalayan river systems i.e. the Indus, the Ganga and the Brahmaputra. It is bigger and coarser in the upper reaches of the river and becomes finer as the river flows down.

(ii) **Distribution** Alluvial soil is distributed along the river valleys of the Northern plains, strips in Gujarat, Rajasthan, Eastern Coastal Plains in the Delta region of Mahanadi, Godavari, Krishna, Kaveri and in the foothills of pediment plains.

(iii) **Nutrients** It is rich in nutrients like potash, phosphoric acid and lime.

5. State three main characteristics of the alluvial soil found in the river deltas of the Indian Coasts.

Ans. **Refer to chapter theory page no. 75.**

6. Mention three differences in the alluvial soil of the Northern plains and the alluvial soil on the Coastal Plains of India.

Ans. Difference between these soils are given below:

	Alluvial Soil of the Northern Plains	Alluvial Soil of the Coastal Plains
(i)	The Alluvial soil of the Northern Plains is formed due to the deposition of alluvium which is brought from the Himalayan region.	The Alluvial soil of the Coastal Plains is formed due to the deposition of alluvium brought mainly from the Deccan Trap region which is volcanic in origin.
(ii)	The main rivers which deposit alluvium in this region are the Himalayan rivers i.e. Indus, Ganga and Brahmaputra rivers.	The main rivers which deposit alluvium in this region are the Peninsular rivers i.e. Godavari, Krishna, Narmada and Tapi rivers.
(iii)	This soil is light in colour.	This soil is dark in colour.

7. Mention any three characteristics of black soil which makes the soil fertile. *[2012]*

Ans. Three characteristics of black soil that make it fertile are:

(i) Black soil is rich in lime, iron, potash, magnesium carbonate and calcium carbonate that is good for cotton crops.

(ii) It is made up of extremely fine clayey material that gives it a texture.

(iii) It has the capacity to hold or retain moisture that is useful for the crops.

8. Which geographical factors are responsible for the evolution of black soil? Why it is considered the most suitable for growing cotton?

Ans. Black soils are typical pedogenic features over volcanic rocks. 70 million years ago there were huge volcanic eruptions which took place in North-Western part of Indian Plateau. Due to this, lava spread from North-West to South-East direction covering a huge area, which is responsible for its evolution. Over these region the rocks are gradually degraded and black soil formed. The soil is famous for its cotton growing capacity. Conducive conditions for such cultivation is its moisture retaining capacity and extensive fertile layers along its profile. The soil is clayey in nature and rich in soil nutrients like calcium carbonate, magnesium, potash and lime.

9. Name the process by which laterite soil is formed. What climatic conditions are responsible for its formation?

Ans. Laterite soil is the result of intensive leaching brought on by heavy rains. It is formed in regions having high temperature and heavy rainfall with alternating wet and dry periods which is typical of monsoon lands. This soil has low humus content as the micro-organisms get destroyed due to high temperature. But it can be cultivable with adequate amount of manure and chemical fertilisers.

10. Define the term 'leaching'. Why it is also an environmental concern?

Ans. In agriculture, leaching may refer to the loss of water soluble plant nutrients from the soil, due to rain and irrigation. Leaching is an environmental concern also when it contributes to groundwater contamination. As water from rain, flooding or other sources seeps into the ground, it can dissolve chemicals and carry them into the underground water supply.

11. (i) State mineral composition of laterite soil.

(ii) How is red soil formed? State two reasons for low productivity of red soil.

(iii) State any three problems caused by soil erosion.

Ans. (i) **Laterite soil is rich in** iron, phosphate and aluminium compounds. Laterite soil is poor in silica, potash, nitrogen, magnesium, lime, organic matter and phosphoric acid.

(ii) Red soil is formed by the weathering of old crystalline and metamorphic rocks in the areas of low rainfall. Reasons for low productivity are:

(a) It is poor in phosphorus, lime, manganese, nitrogen and humus.

(b) It is more sandy so does not retain moisture.

(iii) Three problems caused by soil erosion are:

(a) Loss of valuable top soil

(b) Plant productivity decline

(c) Land degradation occurs

12. With reference to red soils in India, answer the following questions. *[2013]*

(i) Name two states where it is found.

(ii) State two advantages of this type of soil.

(iii) Mention two important crops grown in this soil.

Ans. (i) Tamil Nadu and Karnataka.

(ii) **Advantages**

(a) It has high iron oxide content and potash.

(b) It becomes productive with fertilisers.

(iii) Important crops are rice and sugarcane.

13. Give one geographical reason for each of the following. *[2018]*

(i) Red soil requires irrigation.

(ii) Afforestation prevents soil from getting eroded.

(iii) Laterite soil is red in colour.

Ans. (i) Red soil is a type of soil that develops in a warm, temperate, moist-climate and generally derived from crystalline rock. That is why red soil requires irrigation.

(ii) Trees reduce the rate of erosion by protecting the soil from the impact of rain and also binding soil to sloping land with their roots. Thus, afforestation prevents soil from getting eroded.

(iii) Laterite soil is made up of high level of iron oxides in the form of minerals like goethite and hematite. Thus, it appears red in colour.

14. Why is red soil red in colour? How its productivity can be increased?

Ans. The red soil is red in colour due to diffusion of iron particles into crystalline and metamorphic rocks. It looks yellow when it is in the hydrated form. It is more sandy and less clayey. It is slightly acidic and does not retain moisture. But with the application of proper fertilizers this soil becomes suitable for crops like wheat, rice, cotton and sugarcane.

15. Name the soil
(i) good for the cultivation of Jute.
(ii) that is alkaline in nature in dry areas.
(iii) good for the cultivation of coffee in Karnataka.

Ans. (i) Alluvial soil (ii) Alluvial soil (iii) Laterite soil

16. Give reason for the following.
(i) Black soil should be tilled after the first rain.
(ii) Western Coastal Plains of India have Laterite soil.
(iii) Bad lands are unfit for agriculture.

Ans. (i) Due to high moisture retention capacity, it absorbs water and becomes sticky. So, it should be tilled just after the first rain.
(iii) The Western Coastal Plains of Karnataka and Kerala get heavy rainfall. A lot of leaching takes place leading to the formation of laterite soil.
(iii) Gully erosion washes away the top soil leaving rills and ravines. This land is called Bad Lands where agriculture cannot take place.

17. Give a geographical reason for each of the following. *[2016]*
(i) Alluvial soil differs in texture.
(ii) Black soil does not get leached.
(iii) Khadar is more fertile than Bhangar.

Ans. (i) Alluvial soil is coarse in the upper valley of the rivers because the eroded matter is carried away by the fast flowing river but in the lower coarse, the river reduces its speed and the soil particles become finer due to attrition or because the load itself gets eroded.
(ii) Black soil does not get leached because it is clayey and sticky and moisture retentive and therefore the rain cannot wash out the silicates.
(iii) Khadar is more fertile than Bhangar as new layers are deposited year after year during monsoon floods.

18. Name the soil which *[2017]*
(i) is good for cultivation of sugarcane.
(ii) is acidic in nature.
(iii) occurs in situ.

Ans. (i) Black soil is considered good for sugarcane cultivation. Because it is made up of extremely fine clayey material and has self-ploughing quality and holds moisture when becomes wet.
(ii) Laterite soil is acidic in nature as it has low humus content, because the micro-organisms get destroyed due to high temperature.
(iii) Black soil is considered in situ or residual soil that means it is found where it is formed.

19. Give geographical reasons for the following. *[2012]*
(i) Laterite soil is not suitable for cultivation.
(ii) Red soil is red in colour.
(iii) Khadar soils are preferred to bhangar soils.

Ans. (i) Laterite soil is acidic in nature and has low water retaining capacity, it is poor in nitrogen and lime.
(ii) Red soil has high percentage of iron oxides which makes it red in colour.
(iii) Khadar soils are preferred to Bhangar soils as they are replenished every year by floods.

20. Give reasons for the following. *[2010]*
(i) Black soil is largely found in the Deccan Trap region.
(ii) Khadar is more fertile than Bhangar.
(iii) Soil erosion by winds is common in arid regions.

Ans. (i) The reason is that it is in situ and formed by the weathering of lava origin rocks spread over large areas of the Deccan trap region.
(ii) Khadar alluvium is more fertile than Bhangar alluvium as it is replenished by floods every year. It is free from kankar (lime nodules). Bhangar alluvium is found on river terraces. It is free from floods. It contains kankar which make it less fertile.
(iii) Arid regions have no vegetation cover. The wind blows away fine particles of sand depositing them in other areas rendering both areas unproductive.

21. Define the following: *[2015]*
(i) Pedogenesis (ii) Humus (iii) Bhangar

Ans. (i) **Pedogenesis** It is the study of the process of soil formation.
(ii) **Humus** It is the decayed organic matter present in top soil that increases the fertility of the soil.
(iii) **Bhangar** It is old alluvium soil and consists of kankars. It is coarse in texture and less fertile.

22. Name the soil which *[2014]*
(i) is good for the cultivation of cashewnuts.
(ii) covers almost all of West Bengal.
(iii) is a result of leaching.

Ans. (i) Laterite soil (ii) Alluvial soil (iii) Laterite soil

23. Name the soil which *[2010]*
(i) covers the summits of the Eastern Ghats.
(ii) makes up the Delta of the river Ganga.
(iii) is the most suitable for the cultivation of cotton.
(iv) is sticky when wet and cracks when dry.

Ans. (i) Laterite Soil (ii) Alluvial Soil
(iii) Black Soil (iv) Black Soil

24. What is soil conservation? State a method of soil conservation in the *[2017]*
(i) arid and semi-arid region.
(ii) river valleys prone to flood.

Ans. **Soil Conservation It in an effort, made by man to prevent soil erosion to retain the fertility of the soil. It includes all those measures which help in protecting the soil from erosion and exhaustion.**

(i) **Arid and Semi-arid Region** Overgrazing of forests and grassland by animals should be checked, separate grazing grounds should be provided. Belts of trees and shrubs should be planted to check the velocity of wind and thus, prevent wind erosion.

(ii) **River Valleys Prone to Flood** Soil erosion by floods can be checked by constructing dams or barrages over such rivers which are responsible for flood.

25. Name two important agents of erosion. For each, state one method of controlling the erosion caused. *[2011]*

Ans. The two important agents of erosion are as follow:
(i) Water (ii) Wind

Methods of controlling erosion are as follows:

(i) **Erosion by Water** During heavy downpours deep 'gullies' are made on account of water run off. Gully erosion can be stopped by plugging it with stones and pebbles or quick growing grasses can be grown in gullies to stop its expansion.

(ii) **Erosion by Wind** Wind erosion reduces the productive capacity of the soil by removing the loose particles of soil with the high velocity wind. Therefore, more and more trees should be planted along the edges of the fields, the waste land and also on the steep slopes. If it is difficult to grow trees, so grass should be grown but no land should be left devoid of plants.

26. (i) What is soil erosion? *[2018]*
(ii) Mention two causes of soil erosion in India.

Ans. (i) Soil erosion is a displacement of the upper layer of soil by the dynamic activity of erosion agents like water, ice, snow, wind, plants, animals and humans.

(ii) The two causes of soil erosion in India are:
1. **Running Water** It is the prime factor of soil erosion as it disturbs the agricultural pattern.
2. **Deforestation** Removal of forest cover which functions as a binder of the top layer of the soil with increasing land demand have resulted in enhancing extent of soil erosion.

27. Give a geographic reason for each of the following.
(i) Alluvial soil is extremely fertile. *[2015]*
(ii) Need for soil conservation.
(iii) Re-afforestation should be practiced extensively.

Ans. (i) Alluvial soil is extremely fertile because it is rich in various minerals such as potash, iron and lime, Moreover, it is clayey in nature and has high water holding capacity.This makes it suitable for the cultivation of various types of crops.

(ii) Soil consevation is necessary as the removal of the top soil layer results in loss of fertility, decreasing soil moisture, drying of vegetation and increase in the frequency of floods and droughts.

(iii) Re-afforestation should be practiced extensively in order to compensate for the large-scale deforestation occurring because of industrialisation and other factors, which would certainly result in soil erosion and land degradation.

28. Give a geographical reason for the following. *[2014]*
(i) Different regions in India having different kinds of soil.
(ii) Black soil being suitable for growth of cotton.
(iii) The conservation of soil as a natural resource.

Ans. (i) Factors affecting soil formation are climate, vegetation, parent rock, relief and slope of the land. India has varied relief features, land forms, climatic realms and vegetation types. These have led to the development of a variety of soils in the country.

(ii) Black soil contains lime, alumina, iron, potash, magnesium and calcium and also retains moisture which helps in the growth of cotton plants.

(iii) As the soil helps us to get most of our food and clothing directly or indirectly and also ensures agricultural prosperity of a country, availability of soil is most critical. Retaining of this valuable resource by way of soil conservation is important and essential.

29. Define the following *[2016]*
(i) Sheet erosion (ii) Soil conservation
(iii) In situ soils

Ans. (i) Sheet erosion is the removal of top layer of soil due to heavy rains as water carries away the top surface layer of soil.

(ii) Soil conservation is an effort made by man to prevent soil erosion to retain fertility of soil.

(iii) In situ soils are those soils which are formed in their original position by breaking up of parent rocks. They include black soil, red soil etc.

C *Picture Based Question*

1. Study the diagram below and answer the questions that follows.

(i) What type of farming is shown in the picture given above?

(ii) Name another method used which is similar to the one shown above.

(iii) Write a benefit of this farming.

Ans. (i) Terrace farming (ii) Contour ploughing

(iii) They prevent erosion of the top soil from running water or wind rushing downhill and carrying away the soil.

CHAPTER TEST

Short Questions

[2 Marks each]

1. How would you define 'soil'?

2. Which organic matter is responsible for soil fertility?

3. The soil forming material is obtained by which rock?

4. State two examples of 'In Situ' soil.

5. Alluvial soil is deficient in which minerals?

6. State two difference between red soil and black soil.

Long Questions

[3 Marks each]

1. Distinguish between old alluvium and new alluvium.

2. Compare and contrast between alluvial soil and laterite soil.

3. What is soil erosion? Name the causes of soil erosion with a suitable diagram.

4. State the problems which are caused by soil erosion.

5. Compare and contrast between sheet erosion and gully erosion.

6. By which process bad land and ravines are developed? Explain in brief.

7. Define the need for soil conservation and the useful farming practices which can help to reduce soil erosion.

ARCHIVES*

Collection of Questions Asked in Previous Years' ICSE Class 10th Examinations

2018

1. (i) Why does alluvial soil differ in texture? ***(2)***
(ii) State two cash crops that grow well in alluvial soil.

2. With reference to black soil answer the following. ***(2)***
(i) Name one imortant crop which grows in this soil.
(ii) Give one chemical property of this soil.

3. Give one geographical reason for each of the following. ***(3)***
(i) Red soil requires irrigation.
(ii) Afforestation prevents soil from getting eroded.
(iii) Laterite soil is red in colour.

4. (i) What is soil erosion? ***(3)***
(ii) Mention two causes of soil erosion in India.

2017

1. Mention two differences between alluvial soil and black cotton soil. ***[2]***

2. Name an area in India in which each of the following processes take place. ***[2]***
(i) Sheet erosion (ii) Gully erosion

3. What is soil conservation? State a method of soil conservation in the ***[3]***
(i) arid and semi-arid region. (ii) river valley prone to flood.

4. Name the soil which ***[3]***
(i) is good for cultivation of sugarcane. (ii) is acidic in nature. (iii) occurs in situ.

2016

1. What is soil erosion? Mention two steps that could be taken to prevent soil erosion. ***[2]***

2. Mention two similarities between red soil and laterite soil. ***[2]***

3. Give a geographical reason for each of the following. ***[3]***
(i) Alluvial soil differs in texture.
(ii) Black soil does not get leached.
(iii) Khadar is more fertile than bhangar.

4. Define the following. ***[3]***
(i) Sheet erosion
(ii) Soil conservation
(iii) In situ soils.

2015

1. State the characteristic of each of the soils named below that makes them most suitable for crop cultivation. *[2]*

(i) Black soil (ii) Red soil

2. State the geographic term for each of the following processes.

(i) The process by which soluble minerals dissolve in rainwater and percolate to the bottom, leaving the top soil infertile.

(ii) The process by which rainwater flowing in definite paths, removes the top soil, thus causing deep cuts to the surface of the land. *[2]*

3. Define the following. *[3]*

(i) Pedogenesis

(ii) Humus

(iii) Bhangar

4. Give a geographic reason for each of the following. *[3]*

(i) Alluvial soil is extremely fertile.

(ii) Need for soil conservation.

(iii) Re-afforestation should be practiced extensively.

2014

1. State any two methods of controlling soil erosion. *[2]*

2. Mention two difference between alluvial soil and red soil. *[2]*

3. Give a geographical reason for the following. *[3]*

(i) Different regions in India having different kinds of soil.

(ii) Black soil being suitable for growth of cotton.

(iii) The conservation of soil as a natural resource .

4. Name the soil which *[3]*

(i) is good for the cultivation of cashewnuts.

(ii) covers almost all of West Bengal.

(iii) is a result of leaching.

2013

1. Name the process by which Laterite soil is formed. Mention one disadvantage of this soil. *[2]*

2. State two difference between bhangar and khadar. *[2]*

3. Differentiate between transported soil and in situ soil, quoting a suitable example for each. *[3]*

4. With reference to red soil in India, answer the following questions. *[3]*

(i) Name two states where it is found.

(ii) State two advantages of this type of soil.

(iii) Mention two important crops grown in this soil.

* All these questions are covered and explained in chapter exercise 'Exam Practice'.

CHAPTER

6

Natural Vegetation of India

Natural vegetation includes all plant life such as trees, bushes, herbs, etc that grow naturally in an area that have been left undisturbed by humans for a long time. The term forest implies 'natural vegetation' of the area, existing from thousands of years and supporting a variety of biodiversity, forming a complex ecosystem. Plantation is different from natural forest as these planted species are often of same type and doesn't support a variety of natural biodiversity.

Importance of Forests

The importance of forests are as follows:

- Forests are an important part of the Earth's climate. It is primarily because of the presence of a variety of plants which due to their high density produce massive amount of oxygen and enables other organisms to breathe.
- Forests provide home to diverse animals and plant species which not only provide biodiversity on the Earth, but each species has an important role in the ecosystem.
- About one-fourth of all the medicines that is produced, originates from rainforest plants.
- The major forest products are timber, cellulose pulp, matchwood, firewood, charcoal wood, sal, teak, gurjan, deodar, etc.
- It provides recreation to humans through various Wildlife Sanctuaries, National Parks, etc.
- The forest animals provide food in the form of meat to the tribal living in the forest.
- The minor forests products are grasses, bamboo, canes, oils, fibres, gums, resins, drugs, tanning products and dye-stuffs, spices, leaves, edible products and animal products like lac, honey and wax, etc.
- Apart from the large variety of products of economic value, forests play an important role in the prevention and control of soil erosion, desertification and floods.

CHECK POINT 01

1 Natural vegetation includes which type of plants?
2 Why forests are an important part of the Earth's climate?
3 Name some of the major products of the forests.

Types of Vegetation

On the basis of climate, soil, relief and structure, Indian forests can be divided into the following categories:

1. Tropical Evergreen or Rainforest

These forests are very dense with tall trees supporting a number of lianas (climbing plants) and **epiphytes**[1] and they are practically impassable (closed). Due to continuous rainfall throughout the year, the trees do not shed their leaves at the same time and hence, such forests are called evergreen forests. Height of trees reaches 60m or above. Some of the important species of tropical evergreen forests are rosewood, gurjan, ebony, toon, mahogany and sheesham.

Climatic Conditions

These are also called 'tropical rainforests' as they are found in areas where the annual rainfall is over 200 cm with a short dry season. The average temperature is about 25°C to 27°C which is hot and extremely humid (more than 70% humidity) with almost no seasonal variation.

Distribution

These forests are found on Western slopes of the Western Ghats, both groups of islands (Lakshadweep, Andaman and Nicobar Islands), coast of Tamil Nadu, Odisha, lower slopes of Himalayas, along the foothills of Himalayas, Bhabar and Terai regions, in North-Eastern India (in parts of Assam, Meghalaya, Tripura, Manipur and Nagaland).

Note 95% of the land area in Andaman and Nicobar Islands is covered with the evergreen forests. Evergreen forests also contain a large amount of natural medicines.

Correlation with the Environment

Because of warm, moist and humid climate, the forests are quite dense with heavy undergrowth of ferns and shrubs. Trees have multi-storeyed structures with good **canopies**[2], e.g. the lower strata consists of mosses, ferns, herbs. The middle layer has a dense growth of shrubs and short trees and the topmost layer consists of the tall emergent trees.

2. Tropical Deciduous Forests

On the basis of the availability of water, tropical deciduous forests are of two types:

(i) **Tropical Moist Deciduous Forests** These forests are found in areas receiving rainfall 100 to 200 cm and temperature 26°C to 27°C. These forests exist mostly in the Eastern part of the country such as North-Eastern states, along the foothills of the Himalayas, Jharkhand, West Odisha, Chhattisgarh, Madhya Pradesh, Chotanagpur Plateau, Shiwalik including the Bhabar and Terai regions and the Eastern slopes of the Western Ghats.

(ii) **Tropical Dry Deciduous Forests** These are found in areas of slightly lower rainfall between 70 to 100 cm with a more pronounced seasonality. These forests are most widely distributed in India. They extend in an irregular wide strip running North-South direction from the foothills of the Himalayas to Kanyakumari except in Rajasthan, Western Ghats and West Bengal. They are found in the rainier parts of the Peninsular plateau and the plains of Bihar and Uttar Pradesh.

Climatic Conditions

These forests are also known as **monsoon forests** as these spread over the region receiving rainfall between 70 to 200 cm. The average annual relative humidity is about 60-75% and mean annual temperature is about 27°C.

Correlation with the Environment

Tropical deciduous forests occur in those regions which have a distinct dry season. The trees shed their leaves for about 1-2 months during spring and summer due to lack of adequate moisture in the environment.

The height of the dominating trees growing up to 30-35 m, with dense bushes and an undergrowth of grasses. Some of the important species of tropical deciduous forests are sal (Shorea Robusta), teak (Tectona Grandis), sheesham (Dalbergia sissoo), jamun (Syzygium Cumini), bamboo and sandalwood.

1 **Epiphyte** A plant which grows on the outside of another plant, using that plant just for support, e.g. lichens, mosses, orchids.
2 **Canopies** The upermost branches of the trees in a forest.

3. Tropical Desert Forests

These vegetations are limited in nature and have long roots penetrating deep into the soil in order to get moisture. Leaves are mostly thick and small to minimise evaporation. The stems are succulent (juicy) to conserve water. Some of the important species of tropical desert forests are babool, date palms, kikar, catechu and palash.

Types of Desert Forests

This type of vegetation can be divided into two broad groups:

(i) **Semi-Arid Vegetation** This vegetation is also known as dry thorn vegetation and occurs where rainfall is between 25-50 cm per year.

(ii) **Arid Vegetation** This type of vegetation is found in extreme dry condition where rainfall is less than 25 cm annually. Due to less rainfall, the land is mostly covered by **sand dunes**[3].

Climatic Conditions

The tropical desert forest is a degraded version of the moist deciduous forest. They are found in the regions having annual rainfall between 25- 50 cm and the average temperature between 25°C to 27°C.

Distribution

Semi-arid vegetation occurs mainly in the Northern Gangetic Plains (parts of Punjab, Haryana, Rajasthan and Gujarat), Deccan plateau (part of Madhya Pradesh and Maharashtra) and in the Southern Peninsula (parts of Andhra Pradesh and Karnataka). Typical arid vegetation is mainly found in the Thar Desert of Rajasthan and parts of Gujarat.

Correlation with the Environment

Plants that grow in water deficit area are called Xerophytes. Such plants can easily tolerate extreme dry conditions, low or scanty rainfall, low humidity and high temperatures. These Xerophyte vegetation have adaptation characteristics which make them to survive in the hot deserts.

4. Littoral Forests

This type of vegetation flourishes in wet marshy areas in river deltas, saline or other swampy areas, river mouths and sea coasts. These forests help in formation of delta by blocking the sediments and prevent seashore from erosion by blocking tidal waves. These regions act as nursery for the marine micro-organisms, as a source of fertility of the sea-waters and decrease the intensity of marine cyclones. Some of the important species of these forests are sundari (Haritiera) and mangrove.

Climatic Conditions

These forests are specialised tropical type of vegetation that grows in coastal areas where the saline sea water encroaches at the time of high tides and fresh water of rivers continuously mixes with the saline water. So, these can survive in salty as well as in fresh water.

These forests occur in areas receiving 100 to 150 cm rainfall and have temperatures ranging between 25°C to 27°C.

Distribution

The deltaic tracts of Ganga, Godavari, Krishna, Kaveri and Mahanadi are ideally suited for this type of forests. In India, these forest are mainly found in coast of Odisha, Andhra Pradesh, West Bengal (Sunderbans), Tamil Nadu and along the coastal areas of Kutch, Kathiawar and Gulf of Khambhat and Andaman and Nicobar Islands.

Correlation with the Environment

The areas of intermixing of the fresh water of the rivers and the saline water of the seas are best suited for the mangrove forests. As this vegetation is quite sensitive, the proper ratio of both the fresh and saline water is necessary and if there is a deficit or excess in any of the two, it may cause damage to the vegetation.

5. Mountain or Montane Forests

These forests are found in mountainous areas in high altitude and usually vary to a great extent along the slopes of mountain.

Types of mountain forests are as follows:

Wet Temperature Forests At lower altitudes between 1000-2000 m, wet temperate forests with evergreen broad leaf trees such as oak and chestnut are prominent. The height of these trees are 15-20 m with dense canopy.

Temperate Forests At altitude between **1500-3350 m,** temperate forests are found. Coniferous trees like pine, deodar, silver-fir, spruce and cedar are found. These forests cover mostly the Southern slopes of the Himalayas, places having high altitude in Southern and North-East India. These trees have a height of up to 45 m. These regions have very low rainfall as compared to wet temperate forests.

3 Sand dunes A hill of sand near an ocean or in a desert that is formed by the wind.

Temperate Grasslands It is found before giving way to alpine vegetation at an altitude above 3600 m. Silver-firs, pines, junipers, birches, etc. are common trees here. These trees progressively hinder the growth as they approach **snow line or tree line**[4].

Alpine Vegetation This vegetation is found in the higher reaches of the Himalayas (above 3500-4000 m). Alpine vegetation through shrubs and scrubs merge into alpine grassland, used by nomadic tribes like Gujjars and Bakarwals for grazing. It is dominated by **rhododendrons**[5], berberis and birch and stunted trees of junipers. Above this, mosses and lichens which are part of tundra vegetation are found.

Climatic Conditions

These forests are mainly based on relief and change with corresponding change in temperature (ranging from 20°C or cool areas upto snow line altitudes above 3600 m) as well as altitude in mountainous region. Low altitudinal areas receive annual rainfall between 100 to 300 cm.

Distribution

These forests are found in mountainous areas of Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim and Arunachal Pradesh.

Correlation with the Environment

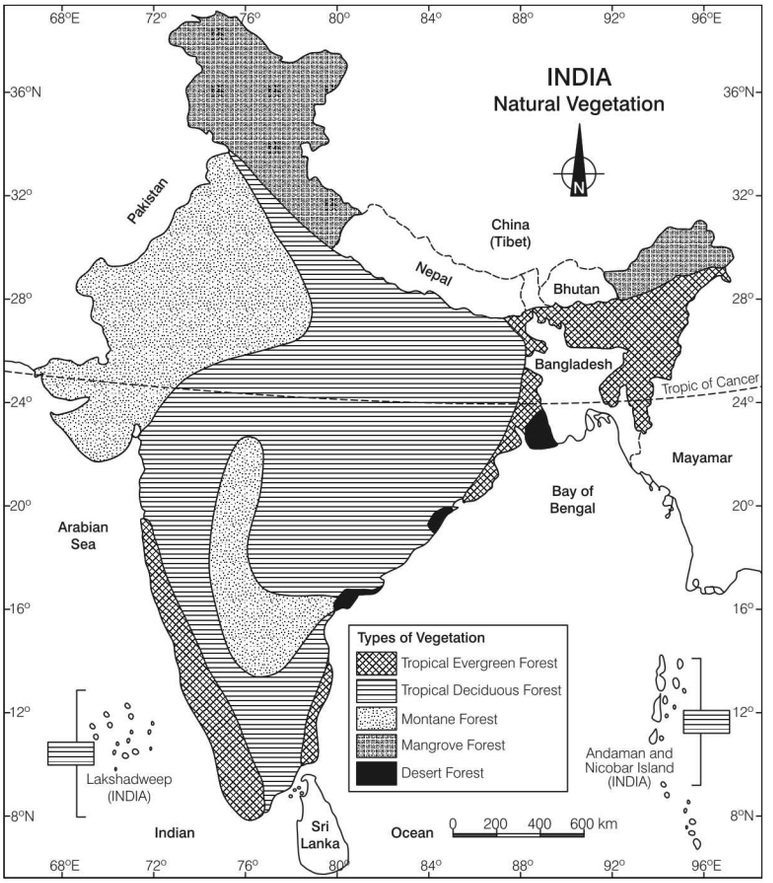
Above 1500 m height, the character of vegetation is markedly different from that on the lower slopes. At higher altitudes, temperature falls and precipitation increases. Therefore, in these forests vegetation tends to become evergreen.

The altitudinal zone between 1500 to 3350 m above the sea level where the temperature is lower and annual rainfall ranges between 100 to 250 cm, wet temperate forests are found. These forests give valuable source of softwood timber (deodar trees).

Some of the important mountain foroests are chir (Pinus Longifolia), deodar (Cedrus Deodara), silver-fir (Aries), blue-pine (Pinus Excelsa) and spruce (Picea Smithiana).

CHECK POINT 02

1. Which forests are considered as a degraded version of the moist deciduous forests?
2. Xerophytes are the characteristic feature of which type of forest cover in India?
3. Which climatic conditions are best suited for littoral type of forests?
4. Which type of vegetation is found before alpine vegetation cover?
5. In which type of climate do tropical evergreen forests sustain?



Forest Conservation

The conservation of forest resources is very important for the sustainable development of our environment and for survival of all the living beings. The measures of forest conservations are as follows:

The National Forest Policy

For the conservation and management of forest cover, India has a forest policy in operation since 1894, which was revised in 1952 and 1988. The main plank of the revised National Forest Policy of 1988 is protection, conservation and development of forests.

4 Tree line/Snow line The altitude above which no trees and plants can grow because of the intense cold and presence of ice cover.
5 Rhododendron It is large class of widely cultivated shrubs and trees with alternate leaves and showy flowers.

People's Participation

Indian tradition has its own way to preserve nature, which tradition include mountain peaks, plants, animals and springs. Many tribal communities still live in the forests of India and depend on forest products for their livelihood and also worship them. These communities, thus, are working with the government to conserve forests. Some important examples are as follows:

- In Sariska Tiger Reserve (Rajasthan), villagers fought against mining activities.
- Chipko Movement started in 1970's, in district Chamoli (Uttarakhand), was a non-violent movement based on Gandhian philosophy. It aimed at protection and conservation of trees and forests from being destroyed.

Van Mahotsav

It was launched in the year 1950 by Shri Kanhaiyalal M Munshi, the then Union Minister for Agriculture and Food to create an enthusiasm in the mind for the preservation of forest and planting of trees. It is a week long festival of tree planting, which organises every year in the month of July all across India and lakhs of trees are planted.

Social Forestry

It is defined as 'the forestry of the people, for the people, by the people'. The main objective of social forestry is to reduce pressure on traditional forests by plantation of fuelwood, fodder, timber and grasses. Agro-forestry, community forestry, commercial farm forestry, non-commercial farm forestry and urban forestry are the main components of social forestry.

Joint Forest Management (JFM) Programmes

These programmes have been launched by various state governments. Under such programmes, village communities are entrusted with the protection and management of nearby forests. The areas concerned are usually degraded or even deforested areas.

The first state to start this programme was Odisha, in 1988. The communities are required to organise forest protection committees (Van Sanraksha Samiti or VSS), development societies, etc. Each of these bodies has an executive committee that manages its day-to-day affairs.

CHECK POINT 04

1. Van Mahotsav is based on which concept?
2. In which year Van Mahotsav is launched?
3. What are JFM programmes?

SUMMARY

- Natural vegetation includes all plant life such as trees, bushes, herbs, etc that grow naturally in an area and have been left undisturbed by humans for a long time.
- Forest implies natural vegetation of the area that provides various natural resources to human beings and shelter/habitat to fauna.
- Forests provide firewood, timber and raw material for many industrial purposes in the form of oils, paints, resins etc.
- India is one of the twelve mega-biodiversity countries of the world and has varied types of forests and tree cover, ranging from the rainforest of Kerala in the South to the alpine pastures of Ladakh in the North, from the desert of Rajasthan in the West to the evergreen forests in the North-East.
- Forest cover of India is affected by a variety of factors such as relief (land, soil), climate (temperature, rainfall, sunlight) etc.
- The forests of India are classified into five major types. First is tropical evergreen/rain forests, which are found in the Western Ghats, Indian island groups (Lakshadweep and Andaman and Nicobar), Tamil Nadu and Himalayan region.
- Second is tropical deciduous forests which are mostly found in the Central and Eastern Indian states.
- Third is tropical desert forests which is mainly occurred in the North-Western part of India and Deccan Plateau region.
- Fourth is littoral/swampy/mangrove forests which are mainly found in the deltaic regions and on the sea coasts.
- Fifth type of forests are the mountain/montane forests which are widely found in the Himalayan regions.
- These forests also give a wide variety of flora and fauna which is very useful for commercial and domestic purposes like, medicinal plants, timber wood, fuelwood, etc.
- The conservation of forest resources is very important for the sustainable development of our environment and for survival of all the living beings.
- The government has took various steps in this regard and now encouraging people to conserve forest by providing sufficient incentives and technical assistance in this direction.
- So, it is also our responsibility to help the government and take participation in the conservation process.

EXAM PRACTICE

a Short Questions [2 Mark each]

1. A great variety of flora is found in India. Give three geographical factors responsible for this diversification of flora.

Ans. About 47000 plant species and 89000 species of animals are found in India.

Following are the factors responsible for a great variety of flora found in India:

(i) Varied relief features

(ii) Varied landforms

(iii) Range of daily and annual temperature

2. Briefly explain two reasons for forests being an important natural resource. ***[2013]***

Ans. Forests are important natural resource because:

(i) they provide timber, medicinal plants etc.

(ii) they help in purifying air and giving rain.

3. How do forests ***[2014]***

(i) have a favourable effect on the climate of the region?

(ii) act as a flood control measure?

Ans. (i) Forests transmit moisture into the air by means of transpiration and induce precipitation. Forests turn carbon dioxide into oxygen and thus, help to purify the air we breathe.

(ii) The roots of plants and trees hold the soil and thus, forests check or prevent soil erosion, especially in hilly areas. Hence, they also help in checking floods.

4. How do different kinds of soils provide the base for growth of different kinds of vegetation?

Ans. The soil vary place to place. Different kinds of soil provide the base for growth of different kinds of vegetation. For example, alluvial or deltaic soil of a river delta near the sea will sustain mangrove forests while slopes of hills have conical trees.

5. Name those regions which have natural vegetation in real sense.

Ans. Some inaccessible regions like Himalayas and the hilly regions of Central India have natural vegetation in real sense.

6. (i) Name an area in India where Tropical Monsoon forest is found. ***[2018]***

(ii) How is this forest of great commercial value to India?

Ans. (i) The tropical monsoon forest is found in the Andaman and Nicobar Islands, the Western Ghats and the Coastline of peninsular India and also in Assam region of North-East India.

(ii) The tropical monsoon forests contain several tree species of great commercial significance for example, teak, Indian rosewood, etc.

7. Mention two reasons why tropical evergreen forests are difficult to exploit for commercial purposes? ***[2012]***

Or

State two reasons why tropical evergreen forests are difficult to exploit. ***[2015]***

Ans. Two reasons are as follows:

(i) Tropical evergreen forests do not occur in pure strands.

(ii) The forests are dark and dense, so difficult for commercial exploitation.

8. Mention two main characteristics of tropical rainforests. ***[2013]***

Ans. Two main characteristics of tropical rainforests are as follows:

(i) Due to continuous rainfall throughout the year, the trees do not shed their leaves at the same time and hence, such forests are called 'evergreen forests'.

(ii) They are dense and have a variety of trees and shrubs.

9. (i) Name the forests which grow on the windward slope of the Western Ghats. ***[2016]***

(ii) Why do such forests grow in this region?

Ans. (i) Tropical evergreen forests grow on the windward slope of the Western Ghats.

(ii) Such forests grow in this region because of the favourable climatic condition such as rainfall is more than 200 cm, average annual temperature is between 25° to 27°C and humidity is more than 70%.

10. State two characteristics of the tropical deciduous forests. ***[2015]***

Ans. Two characteristics of tropical deciduous forests are:

(i) The trees in these forests shed their leaves for 6 to 8 weeks during spring and early summer.

(ii) It provides valuable timber and other forest products.

11. Write two reasons why monsoon deciduous forests are commercially more valuable than other types of forests. *[2014]*

Ans. Reasons why monsoon deciduous forests are commercially more valuable than other forests are:

(i) The trees in these forests occur in pure strands which make it suitable for commercial exploitation.

(ii) These forest are not so dense as the tropical evergreen forests. The tree species like Sal, Sheesham, Teak, Jamun, etc. are very durable woods and are in great demand. These are mainly used for furniture making, railway slippers, agricultural equipments, house constructional work etc.

12. (i) Name the forest which is commercially most important in India. *[2016]*

(ii) Name two trees which grow in the forest.

Ans. (i) Tropical deciduous forests (ii) Sal and Teak

13. Why are the leaves of the thorn forests small and stems succulent?

Ans. Leaves of the thorn forest are mostly small to minimise evaporation and the stems are succulent to conserve water.

14. How do trees in the tropical desert forests adapt themselves to the dry climate? *[2017]*

Ans. (i) Due to lack of moisture the trees growing here have very small leaves and long plant roots penetrating deep into the soil and spreading in a radial pattern in search of water.

(ii) Leaves are small and thick to minimise loss of water.

15. What are 'tidal forests'? Name two typical trees found there. *[2011]*

Ans. Tidal forests are found in wet marshy areas, in river deltas, saline or swampy areas along the sea coast. These forests consist of evergreen species with stilt roots which are submerged under water. Two typical trees found there are Sundari and Casuarina.

16. Give two characteristics of tidal forests. *[2012]*

Ans. Tidal forests are specialised tropical type of vegetation that grows in coastal areas where the saline sea water encroaches at the time of high tides.

Main characteristics are:

(i) These forests help in formation of delta by blocking the sea.

(ii) Mangrove forest also act as a major carbon sink.

17. Define Sunderbans.

Ans. The forests found on the Ganga-Brahmaputra delta covering the coasts of West Bengal and Bangladesh are called Sunderbans because of the abundance of Sundari trees.

18. Name the tree as per its characteristics given below. *[2017]*

(i) The wood is hard and suitable for shipbuilding.

(ii) The stilt roots are underwater during high tide.

Ans. (i) Teak (ii) Sundari

19. With reference to littoral forest, answer the following questions. *[2018]*

(i) Why do the trees in this forest grow aerial roots?

(ii) Name one area in India where this forest is found.

Ans. (i) Littoral forests refer to trees that grow at shore region. In such regions, soil is accumulated with salt and cannot be aerated as normal soils, so trees grow upwards. Such roots are called as aerial roots and they are adventitious in nature.

(ii) Littoral forests or tidal forests are found in delta regions and along the marshy coasts. Sunderbans in West Bengal is one of the areas in India where littoral forests are found.

20. Mention two objectives of forest conservation.

Ans. Two objectives of forest conservation are as follows:

(i) To check deforestation

(ii) To prevent overgrazing

21. What is JFM?

Ans. Joint Forest Management programmes have been launched by various state governments. Under such programmes, village communities are entrusted with the protection and management of nearby forests. The areas concerned are usually degraded or even deforested areas.

b Long Questions [3 Marks each]

1. What is meant by vegetation? How much natural is the natural vegetation of India today?

Ans. Natural vegetation includes all plant life such as trees, bushes, herbs, etc that grow naturally in an area and have been left undisturbed by humans for a long time.

Today, natural vegetation has not been left natural anymore because of the following reasons:

(i) Various new species of plants are raised in laboratories and they are planted to have better results.

(ii) Human interference is continuously increasing day by day which is deteriorating the quality of nature and is harmful for humans too.

2. What are the favourable climatic conditions for tropical evergreen forests? Also mention the regions where these are found.

Ans. Tropical evergreen or rainforest requires following climatic conditions:

(i) These are found in areas where the annual rainfall is over 200 cm with a short dry season.

(ii) The average temperature is about 25°C to 27°C which is hot and extremely humid (more than 70% humidity) with almost no seasonal variation.

These forest are found on Western slopes of the Western Ghats, both groups of island, coast of Tamil Nadu, Odisha, lower slopes of Himalayas, along the foothills of Himalayas, Bhabar and Terai regions, in North-Eastern India (in parts of Assam, Meghalaya, Tripura, Manipur and Nagaland).

3. Name the type of forests found in the Western part of the Western Ghats. Give two reasons why these forests are so named? ***[2011]***

Ans. The tropical evergreen forests are found in the Western part of the Western Ghats. These forests are named tropical evergreen Forests because:

(i) the trees in these forests do not have a fixed time to shed their leaves. Thus, they appear evergreen throughout the year.

(ii) this region receives an annual rainfall over 200 cm with short dry season.

4. Write any three difference between tropical evergreen and tropical desert forest.

Ans. The difference between tropical evergreen and tropical desert forest are as follows:

	Tropical Evergreen Forest	Tropical Desert Forest
1.	These are found on Westward slope of the Westward Ghats and North-Eastern parts of Assam, Meghalaya.	These are found in the Punjab, Haryana and in the Southern peninsula.
2.	These are found where rainfall is over 200 cm.	These are found where rainfall is less than 50 cm.
3.	The main species are ebony, rosewood, sheesham etc.	The main species are neem, babool, kikar etc.

5. State the correlation of tropical evergreen forests with their surrounding environment.

Ans. Correlation of tropical evergreen forest with their surrounding environment are:

(i) Trees have multi-storeyed structures with good canopies.

(ii) Due to dense canopy, the sunlight does not reach the ground, which always remains moist and shady and makes the soil poor because high rainfall tends to leach out soluble nutrients.

(iii) Because of warm, moist and humid climate, the forest are quite dense with heavy undergrowth of ferns and shrubs.

6. State the correlation of tropical deciduous forests with their surrounding environment.

Ans. Correlation of tropical deciduous forests with their surrounding environment are:

(i) These forest occur in regions which have a distinct dry season. The trees shed their leaves for about 1-2 months during spring and summer due to lack of adequate moisture in the environment.

(ii) The height of the dominant trees growing upto 30-35 m with dense bushes and an undergrowth of grasses.

(iii) The canopy of these forest is not as dense as in the tropical rainforests.

7. Name any three trees found in monsoon deciduos forests and state one use of each of these trees. ***[2012]***

Ans. Three trees of deciduous forests and their uses are as follows:

(i) **Sal** used for furniture making, railway sleepers etc.

(ii) **Teak** used for house construction, furniture making.

(iii) **Sandalwood** used in cosmetic and making handicrafts, perfumes etc.

8. Explain three main features of tropical moist deciduous forests.

Ans. The main features of tropical moist deciduous forests are:

(i) These forests are found in areas receiving rainfall 100 to 200 cm.

(ii) The height and density of the trees in these forest are much lower than the tropical evergreen forests.

(iii) Due to seasonality of moisture the trees in these forests shed their leaves for about 6 to 8 weeks in dry summer.

9. Explain three characteristics of tropical dry deciduous forests.

Ans. Characteristics of tropical dry deciduous forests are as follows:

(i) These are found in areas of slightly lower rainfall between 70 to 100 cm with a more pronounced seasonality.

(ii) Most of the trees shed their leaves during the long dry season.

(iii) These are economically very important.

10. Differentiate between moist deciduous forests and dry deciduous forests.

Ans. The difference between moist deciduous and dry deciduous forests are as follow:

	Moist Deciduous Forests	Dry Deciduous Forests
1.	Found in areas with annual rainfall between 100 to 200 cm.	Found in areas with annual rainfall between 70 to 100 cm.
2.	Teak, bamboo, sal, sheesham, sandalwood, khair, kusum, arjun and mulberry trees are found.	Teak, sal, neem and peepal trees are found.
3.	Not many have been cleared.	Large areas have been cleared for cultivation and grazing.

11. In which geographical or climatic condition do tropical desert forests thrive?

Ans. Geographical condition for tropical desert forest are:

(i) They are found in the regions having annual rainfall of 50 cm.

(ii) They need the average temperature between 25°C to 27°C.

(iii) Evaporation rate is higher than precipitation due to high temperature.

12. Mention regions of India which are covered by scrub and thorn forests.

Ans. Areas covered by scrub and thorn forest are:

(i) Semi-arid vegetation also known as dry thorn vegetation and occur where rainfall is between 25-50 cm per year.

(ii) These vegetation mainly found in the Northern Gangetic Plains (Parts of Punjab, Haryana, Rajasthan and Gujarat), Deccan plateau (Parts of Madhya Pradesh and Maharashtra) and in the Southern Peninsula (Parts of Andhra Pradesh and Karnataka).

13. Explain any three features of the tropical desert forests or thorn and scrubs.

Ans. Characteristics of the thorn and scrubs are as follow:

(i) Trees are scattered and have long roots penetrating deep into the soil in order to get moisture.

(ii) The stems are succulent to conserve water.

(iii) Leaves are mostly thick and small to minimise evaporation.

14. What are the favourable conditions for the growth of mangrove forests?

Ans. Mangrove forest are best grown in following favourable conditions:

(i) These forest are specialised tropical type of vegetation that grows in coastal areas where the saline sea water encroaches at the time of high tides and fresh water of rivers continuously mixes with the saline water. So, these can survive in salty as well as in fresh water.

(ii) These forest occur in areas receiving 100-150cm of rainfall and have temperatures ranging between 25°C to 27° C.

15. Name the regions where mangrove forests are found.

Ans. Mangrove forests are mainly found in the Deltaic tracts of Ganga, Godavari, Krishna, Kaveri and Mahanadi are ideally suited for this type of forests. In India, these forests are mainly found in the coast of Odisha, Andhra Pradesh, West Bengal (Sundarbans), Tamil Nadu and along the coastal areas of kutch, Kathiawar and Gulf of Khambhat and Andaman and Nicobar Islands.

16. State the correlation of mangrove forests with their surrounding environment.

Ans. Correlation of mangrove forest with their surrounding environment are as follows:

(i) The area of intermixing of the fresh water of the rivers and the saline water of the seas are best suited for mangrove forests.

(ii) The trees have supporting roots which help in respiration process. These breathing roots remain submerged underwater and are called pneumatophores.

(iii) As this vegetation is quite sensitive the proper ratio of both the fresh and saline water is necessary and if there is a deficit or excess in any of the two, it may cause damage to the vegetation.

17. Name the natural vegetation extensively found at the following altitudes.

(i) At lower altitudes between 1000-2000 m.

(ii) At altitudes between 1500-3000 m.

(iii) At higher reaches of the Himalayas above 3500-4000 m.

Ans. (i) Wet temperate forests are found at lower altitudes between 1000-2000m with evergreen broad leaf trees such as oak and chestnut.

(ii) Temperate forests are found at altitude between 1500-3350 m. Coniferous trees like pine, deodar, silver-fir, spruce and cedar are found in these forests.

(iii) Alpine vegetation is found at altitude between 3500-4000m.

18. Give reason for the following.
(i) Forests have importance in agriculture.
(ii) Indo-Gangetic plains have very little vegetation cover.

Ans. (i) Forests play an important role in various ways both directly and indirectly in agriculture. In the direct role they provide woods for making farm tools and equipments. In the indirect way forest has a significant role in climatic conditions and soil modifications too. As the fallen leaves of trees add humus to the soil after decomposition and hence, increase soil fertility. And also they are helpful in checking floods and preventing soil erosion.
(ii) The Indo-Gangetic plain is a very fertile plain. Therefore, most of the plain has been cleared for farming practices and being a vast plain the amount of rainfall is varying, i.e. decreasing from East to West.

19. (i) Name a state in India where thorn and scrub forest is found. ***[2018]***
(ii) Give two ways by which the trees that are found here have adapted to the climate.

Ans. (i) The thorn and scrub forests are found in regions where the rainfall is less than 70 cm. Rajasthan, Punjab, Haryana and Deccan are the major states where thorn and scrub forests are found.
(ii) The thorn and scrub forest trees have long tapering roots which go deep to tap water. The trees are stunted as there is no enough rain for tree growth. The thorny branches reduce loss of water by transpiration. The fleshy leaves prevent loss of water by evaporation. The wax on the leaves closes pores. Therefore, the thorn trees and scrubs can survive in the arid climate.

20. Identify the tree as per its characteristics mentioned below. ***[2015]***
(i) It yields wood that is hard and scented and is usually found in high altitudes.
(ii) It is generally found in deltaic regions and is used to make boats.
(iii) The furniture made from the wood of this tree is generally the most expensive.

Ans. (i) Deodar
(ii) Sundari
(iii) Mahogany

21. Name the natural vegetation largely found in the following regions. ***[2014]***
(i) The delta of the Ganga river.
(ii) The windward side of the Western Ghats.
(iii) The Deccan Plateau.

Ans. (i) Mangrove or Littoral forests.
(ii) Tropical Evergreen forests.
(iii) Tropical Deciduous forests.

22. Name the tree, the timber of which could be used for the following. ***[2013]***
(i) A soft and white timber used for making toys and match boxes.
(ii) A hard durable timber used for ship building and furniture making.
(iii) A sweet smelling timber which yields an oil, used for making handicrafts.

Ans. (i) Semal (ii) Teak (iii) Sandalwood

23. (i) Name one region of India for each of the following. ***[2013]***
(a) Tidal forests (b) Thorn and scrub
(ii) Explain why thorn and scrub forests are found in the above mentioned regions.

Ans. (i) **Tidal Forests** Deltas of Ganga, Mahanadi, Godavari, Krishna and Kaveri.
Thorn and Scrub Forest Rajasthan and Gujarat.
(ii) They are found in the above mentioned regions because these areas get less than 25 cm of rainfall and average temperature of 25° to 27°C.

24. To which type of forest do the following trees belong? ***[2016]***
(i) Hintal and Sundari
(ii) Rosewood and Ebony
(iii) Deodar and Chir Pine

Ans. (i) Littoral or Tidal forest
(ii) Tropical Evergreen or Rainforest
(iii) Montane forest

25. Name the natural vegetation found in the following regions. ***[2017]***
(i) The Western slopes of the Western Ghats
(ii) The Nilgiris
(iii) Western Rajasthan

Ans. (i) Tropical Evergreen forest
(ii) Montane forests
(iii) Desert and semi desert vegetation and scrub and thorn forests.

26. State one important use of each of the following types of trees. *[2014]*

(i) Sundari (ii) Sandalwood

(iii) Rosewood

Ans. (i) **Sundari** Used mainly for making boats.

(ii) **Sandalwood** Used for making incense sticks, furniture goods etc.

(iii) **Rosewood** Used in manufacture of furniture plyboards etc.

27. Explain why the forest cover in India is shrinking. *[2017]*

Or Give three reasons for rapid depletion of forest resources in India in the past. *[2016]*

Ans. The forest cover in India is shrinking as a consequences of indiscriminate cutting down of the trees. This deforestation has brought complete deficiency of flora and fauna in our country.

The main reasons of deforestation are:

(i) It is a consequence of indiscriminate cutting down of the trees due to Jhooming (or slash and burn) practices to clear the forests for cultivation and construction purposes.

(ii) There is uncontrolled and unauthorised cutting down of trees by unscrupulous timber merchants for the purpose of trade.

(iii) Trees have been cut due to agricultural expansion, development of railways, mining and commercial and social forestry.

28. Mention three reasons why forests must be conserved. *[2012]*

Ans. Reasons for conservation of forests are as follow:

(i) Forest conservation is needed to prevent soil erosion.

(ii) Forest conservation helps to save the habitat of the wild animals.

(iii) It also prevents desertification and floods.

29. (i) Give two ways in which forests are important.

(ii) Mention one forest conservation method followed in India. *[2018]*

Ans. (i) The two ways in which forests are important are:

1. **Forests help us Breathe** They pump out oxygen and absorb the carbon dioxide.
2. **People Live in Forests** Some 300 million people live in forests worldwide and their survival depends almost on the forests.

(ii) To conservate the forest in India, one can follow the method of regulating and planing the cutting of trees and checking over forest clearance for agricultural habitation purpose.

30. Differentiation between afforestation and deforestation. State a disadvantage of deforestation. *[2015]*

Ans. **Afforestation** It is the planting of trees in abandoned areas or any other suitable place, in order to improve our environment.

Deforestation It is the process of cutting down of trees for various purposes like industrialisation, urbanisation etc.

One disadvantage of deforestation is loosening of soil particles, which eventually results in soil erosions and land degradation.

C Picture Based Questions

1. Study the diagram below and answer the questions that follows.

(i) Identify the type of vegetation.

(ii) Name the two regions where the vegetation is found.

Ans. (i) Tropical Evergreen forests.

(ii) Western slopes of Western Ghats, Coast of Tamil Nadu and Odisha.

2. Study the diagram below and answer the questions that follows.

(i) Identify the type of vegetation.

(ii) Name the two regions where the vegetation is found.

Ans. (i) Mangrove forest/vegetation.

(ii) The deltaic tracts of Ganga, Godavari, Krishna, Kaveri and Mahanadi.

CHAPTER TEST

Short Questions

[2 Marks each]

1. Define the term 'Forest'.
2. How does Photoperiod affect the growth of vegetation?
3. What do you understand by the term 'xerophytes'?
4. Why are tidal forests important for us?
5. Which state of India has proposed a plan to start the World's First Mangrove Zoo?
6. Mention two difference between Reserved Forests and Protected Forests.

Long Questions

[3 Marks each]

1. Which factors are responsible for variation in natural vegetation?
2. Explain why are forests important for human beings.
3. Differentiate between Thorn and Scrubs Desert forest and Mangrove forests.
4. Discuss the various measures and schemes that the government had adopted in order to conserve forests resources.
5. Briefly explain about social forestry.
6. State the important features of Joint Forest Management (JFM) programme.

ARCHIVES*

Collection of Questions Asked in Previous Years' ICSE Class 10th Examinations

2018

1. (i) Name an area in India where Tropical Monsoon forest is found. ***(2)***
(ii) How is this forest of great commercial value to India?

2. With reference to littoral forest, answer the following questions. ***(2)***
(i) Why do the trees in this forest grow aerial roots?
(ii) Name one area in India where this forest is found.

3. (i) Name a state in India where thorn and scrub forest is found. ***(3)***
(ii) Give two ways by which the trees that are found here have adapted to the climate.

4. (i) Give two ways in which forests are important. ***(3)***
(ii) Mention one forest conservation method followed in India.

2017

1. How do trees in the Tropical desert forests adapt themselves to the dry climate? ***[2]***

2. Name the tree as per its characteristics given below. ***[2]***
(i) The wood is hard and suitable for shipbuilding.
(ii) The stilt roots are underwater during high tide.

3. Explain why the forest cover in India is shrinking? ***[3]***

4. Name the natural vegetation found in the following regions. ***[3]***
(i) The Western slope of the Western Ghats
(ii) The Nilgiris
(iii) Western Rajasthan

2016

1. (i) Name the forest which is commercially most important in India. ***[2]***
(ii) Name two trees, which grow in this forest.

2. (i) Name the forest which grow on the windward slope of the Western Ghats. ***[2]***
(ii) Why do such forest grow in this region?

3. To which type of forest do the following trees belong? ***[3]***
(i) Hintal and Sundari
(ii) Rosewood and Ebony
(iii) Deodar and Chir Pine

4. Give three reasons for rapid depletion of forest resources in India in the past. ***[3]***

2015

1. State two characteristics of Tropical Deciduous forests. *[2]*
2. State two reasons why Tropical Evergreen forests are difficult to exploit. *[2]*
3. Identify the tree as per its characteristics mentioned below. *[3]*
   (i) It yields wood that is hard and scented and is usually found in high altitudes.
   (ii) It is generally found in deltaic regions and is used to make boats.
   (iii) The furniture made from the wood of this tree is generally the most expensive.
4. Differentiate between afforestation and deforestation. State a disadvantage of deforestation. *[3]*

2014

1. Write two reasons why Monsoon Deciduous forests are commercially more valuable than other types of forests. *[2]*
2. How do forests: *[2]*
   (i) have a favourable effect on the climate of the region?
   (ii) act as a flood control measure?
3. Give one important use of each of the following types of trees. *[3]*
   (i) Sundari
   (ii) Sandalwood
   (iii) Rosewood
4. Name the natural vegetation largely found in the following regions. *[3]*
   (i) The delta of Ganga river
   (ii) The windward side of the Western Ghats
   (iii) The Deccan Plateau

2013

1. Mention two main characteristics of Tropical Rainforests. *[2]*
2. Briefly explain two reasons for forests being an important natural resource. *[2]*
3. Name the tree, the timber of which could be used for the following. *[3]*
   (i) A soft and white timber used for making toys and match boxes.
   (ii) A hard durable timber used for shipbuilding and furniture making.
   (iii) A sweet smelling timber, which yields an oil, used for making handicrafts.
4. (i) Name one region in India for each of the following. *[3]*
   (a) Tidal forests
   (b) Thorn and Scrub
   (ii) Explain why thorn and scrub forests are found in the above mentioned region.

***** All these questions are covered and explained in chapter exercise 'Exam Practice'.

CHAPTER

7

Water Resources

Water is essential for human civilisation, living organisms and natural habitat. Water resources are used for drinking, cleaning, agriculture, transportation, animal husbandry, hydroelectricity, industrial and commercial use. 97.5% of water available on the Earth is saline water and the remaining 2.5% is fresh water. Slightly over 2/3rd of this fresh water is frozen in glacier and polar ice caps.

India's Water Resources

India is blessed with hundreds of large and small rivers, which drains the length and breadth of the country. India is an agricultural country and hence, water become essential component for agriculture.

Sources of Water

The main sources of water are:

Surface Water It is water on the surface of the planet such as in a river, lake, wetland or ocean. The total water available from the precipitation in a year in India is about 4000 cubic km. Out of this, 1150 cubic km flows as surface runoff. India's 60% of surface water is provided by the rivers like Indus, Ganga and Brahmaputra, etc.

Groundwater It is water that is located below the Earth's surface. Overtime, water from rain and rivers migrate through the ground and is stored in porous soils and rocks. It is unevenly distributed through cracks and **crevices**[1] into the ground. Groundwater makes up 98% of the fresh water on the planet. About 3/4th of the total groundwater is used for irrigation.

Irrigation

The artificial means of supplying water to the agricultural plant from well, tanks, canals, etc. is known as irrigation. There are various types of systems of irrigation practices in different parts of India.

1 Crevices A narrow opening in a rock or wall.

Importance of Irrigation

Agriculture production and productivity depends on the availability of water. The erratic and unpredictable monsoon of India makes irrigation necessary for sustained agricultural development. Hence, irrigation is very much necessary for the production and productivity of Indian agriculture.

The following points visualise the importance of irrigation in India:

Unpredictable Rainfall Only four months in a year are influenced by monsoon and the remaining eight months are dry which required control of drought and femines. Insufficient, uncertain and irregular rain causes uncertainty in agriculture.

Multiple Cropping Possible Irrigation facilities help in the growing of two or three crops in a year which enhance agriculture production and productivity.

Bringing more Land under Cultivation Irrigation helps in maximisation of land under cultivation as India's agricultural land requires substantial capital investment to make land fit for cultivation.

Employment Increases Irrigation not only benefits agricultural production but also in employment potential by developing allied activities like means of transport, etc. Regular water supply strengthen the sense of security and stability in farmers by increasing their productivity and income.

CHECK POINT 01

1 Name two sources of water.
2 State any one importance of irrigation.
3 What is the role of irrigation in providing employment?

Methods of Irrigation

The means of irrigation depend on the topography, soils, rainfall, availability of groundwater, nature of rivers and requirements of crops. Various means of irrigation are practiced in India, which are discussed below:

Canal Irrigation

This type of irrigation is very popular in Northern part of the country due to **perennial**[2] flow of water on flat **terrain**[3]. Water is stored in **reservoirs**[4] by building dams across the rivers. There are two main requirements for digging canal which are as follows:

(i) Fertile soil with low level relief.
(ii) Sources of water should be perennial which means snow-fed rivers.

The erratic and unpredictable monsoon of India make canal irrigation indispensable during dry seasons. There are two types of canal in India as follows:

(i) **Inundation Canals** These canals are taken out from the rivers and do not have any kind of **weirs**[5] and barrages to regulate the flow of water from the rivers. These types of canal are found on the Sutlej-Ganga plains and Brahmaputra valley.

(ii) **Perennial Canals** These canals maintain its water flow throughout the year either from the river or from reservoir of the river projects. A weir is built below the intake of the canal, the intake itself being regulated by **sluice**[6] gates.

Important Canal Systems in India

Northern India Upper Ganga canal, lower Ganga canal, East Yamuna canal, Sharda canal and Agra canal are the important canal systems of Uttar Pradesh. Sirhind canal, Upper Bari Doab canal and Nangal dam canal in Haryana. Indira Gandhi canal and Chambal Project canal in Rajasthan.

Southern India Godavari canal system, Krishna delta canal, Tungabhadra project canal are the important canal systems of Andhra Pradesh. The Koyana project in Maharashtra, the Hirakud project in Odisha, the Kakrapar project are the important canal systems in peninsular India.

Tank Irrigation

These are constructed by building earthen walls built across a depression or valley behind which rainwater collects. Tank is a reservoir of any specific size. It is popular in the peninsular plateau area i.e. Andhra Pradesh, Tamil Nadu and Maharashtra because these areas have uneven and seasonal rainfall. Rocks found in Southern India is **impermeable**[7] which prevent rainwater to store beneath the surface.

2 **Perennial** It means something which last or exist for a long or infinite time.
3 **Terrain** A piece of ground having specific characteristics.
4 **Reservoir** A large natural or artificial lake used as a source of water supply.
5 **Weirs** A low dam built across a stream to raise its level or divert its flow.
6 **Sluice** A sliding gate for controlling the flow of water.
7 **Impermeable** Not allowing water to pass through.

Well Irrigation

India's irrigated area through wells is about 40%. Wells are also the traditional method for supplying water for domestic purpose, agriculture and drinking. Wells are important means of irrigation in Punjab, Haryana, Uttar Pradesh, Bihar and other North Indian States. Suitable conditions for digging wells are as follows:

- Water table should be high.
- Ground should have soft rocks.
- It is most suitable to dig wells along the river beds.

There are three different methods adopted for the lifting of water from the well for the purpose of irrigation in India. They are lever method, inclined method and Persian wheel method.

Tube Well Irrigation

Tube well was firstly constructed in Ganga, Yamuna river by Sir William Stamp in 1930. It is the vast accumulation of water found deep inside the Earth and is drawn out by digging a deep borewell and taking out the water with the help of an electric or diesel motor. Tube wells are important means of irrigation in Northern India especially in Punjab, Haryana, Uttar Pradesh, Bihar, West Bengal, etc.

Modern Methods of Irrigation

The modern methods of irrigation are as follows:

Sprinkler Irrigation

It is a method of distributing water through a system of pipes in which water is supplied to plants uniformly. In other words, it is a kind of overhead irrigation. This is the best method of conserving water because irrigation does not involve any loss of water by seepage or evaporation. It is suitable for arid and semi-arid region.

Drip Irrigation

It is also known as 'trickle irrigation'. In this method of irrigation, a plastic tube with small hole is used to keep water dripping steadily to the roots of plants, either on to the soil surface or directly into the root zone.

Spray Irrigation

It has two sides, on one side a long **hose**[8] is set to a water source and on the other side water is released by spray guns to the cultivated land. It is an expensive, but water efficient method. However, evaporation takes place in this method and plant diseases occur due to excess moisture by over watering.

Bamboo Irrigation System

In Meghalaya of North-East India, a 200 years old system of tapping stream water by using bamboo pipes is prevalent. About 20 litres of water enters the bamboo pipe system per minute and is transported over hundreds of metres to the plants requiring water.

CHECK POINT 02

1. How is inundation canal different from perennial canals?
2. How is tank irrigation different from well irrigation?
3. Which method of irrigation is used in semi-arid regions?

Conservation of Water

Conservation of water means prevention and controlling of fresh water which encompasses through policies, strategies and activities to meet current and future human demands.

Need for Conservation of Water

Needs for the conservation of water are given below:

- Rapid industrialisation and urbanisation coupled with continuous decline in availability of water and are putting a lot of pressure on the available water resources in the country.
- Greater demand for water due to growing population, leads to falling ground water level.
- Hydro-electric power also requires water for its production.
- Only 2.5%-2.75% of the water on the Earth is fresh.
- Rainfall is unevenly distributed over time and space.
- Increased demand in coastal areas is threatening the fresh water aquifers with sea water intrusion.
- In inland saline areas, the fresh water is becoming saline due to excessive withdrawal of ground water.
- Watershed programmes tended to concentrate on harvesting rainwater through surface structures.

Hence, it is necessary to conserve water, not only to restore the fast declining eco-system of the country but also to meet the inevitable emergency of shortage even for drinking and domestic water in the near future.

8 Hose A flexible tube for conveying a liquid or gas.

Practices for Conservation of water

Water Harvesting

It is incorporated with all the different methods of conserving and collecting rainwater. It is feasible and one of the easiest ways of water conservation.

Rainwater Harvesting

In this method, rain water is collected, stored and used for land irrigation. There are two ways of rainwater harvesting which are as follows:

(i) Surface Runoff Harvesting or Recharge of Groundwater

It is a new concept of rainwater harvesting. It has various structures which are used to recharge groundwater such as:

Recharge Pits These pits are constructed for recharging the shallow acquifers, where permeable rocks are exposed on the land surface or near the ground.

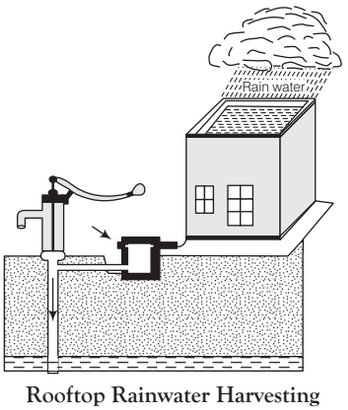
Trenches These are built when the permeable strata is present at shallow depths.

Dug Wells The dug well is recharged by drainpipes which carry the water *via* filtration tank. Rain water that is collected on rooftop of buildings is also diverted to the dug wells.

Trench with Recharge Well In areas, where the surface soil is impervious and large quantities of roof water or surface run-off is available within a very short period of heavy rainfall, the use of trench/pits is made to store water in a filter media. It subsequently recharge the groundwater through especially constructed recharge wells.

(ii) Rooftop Rainwater Harvesting (RTRWH)

It is a system of catching rainwater where it falls. In this technique, the roof becomes the catchments and the rainwater is collected from the roof of the building. This method is less expensive and very effective and if implemented properly, helps in augmenting the groundwater level of the area.



Rooftop Rainwater Harvesting

This system mainly constitutes of following sub-components:

Catchment The surface that receives rainfall directly is the catchment, e.g. sloping roof or flat roof.

Transportation Rainwater from rooftop should be carried through down take water pipes or drains to storage/ harvesting system. Water pipes should be UV resistant (PVC pipes/ISI) of required capacity.

First Flush It is a device used to flush off the water received in first shower as this first rain contains contaminants of the atmosphere and catchment roof. Provisions of first rain separator should be made at outlet of each drain pipe.

Filteration Filters are used for treatment of water to effectively remove turbidity. There are different types of filters in practice which are as follows:

- **Sand Gravel Filter** It is constructed by brick masonry and filled by pebbles, gravels and sand. Each layer is separated by wire mesh.
- **Charcoal Filter** It is made in a chamber filled by pebbles, gravels, sand and charcoal. Each layer is separated by wire mesh.
- **PVC-Pipe Filter** It this filter, the diameter of pipe depends on the areas of roof. Pipe is divided into three compartments by wire mesh.

Advantages of Rainwater Harvesting

Advantages of rainwater harvesting are as follows:

- Makes use of water and reduces flood like situation from water runoff, erosion and contamination of surface water with pesticides, sediments, metals and fertilisers.
- Excellent source of water for landscape irrigation, with no chemicals such as fluoride and chlorine and no dissolved salts and minerals from the soils.
- Promotes both water and energy conservation.

Disadvantages of Rainwater Harvesting

Disadvantages of rainwater harvesting are as follows:

- Limited and uncertain local rainfall.
- The payback period varies depending on the size of storage and complexity of the system.
- Requires some technical skills to install and regular maintenance.
- Rainwater collected during the first rain season is generally not needed by plants until the dry season.

Areas of Rainwater Harvesting

It is very popular in **Rajasthan, Gujarat, Andhra Pradesh, Assam** and **Karnataka**. Some of the regional names of rainwater harvesting systems in India are as follows:

- Johads (Eastern dam), Kunds (covered underground tanks) in Rajasthan.
- Tankas (underground small tanks) and Khadin (a long Eastern embankment to store runoff water) in Gujarat.
- Cheruvu (reservoirs) in Andhra Pradesh.
- Dongs (ponds) in Assam used by Bodo tribes.
- Kere (tanks) in Karnataka.

CHECK POINT 03

1. Name two factors responsible for continuous decline in availability of water.
2. What do you mean by rainwater harvesting?
3. Mention any one method to recharge groundwater.
4. Name some areas of rainwater harvesting.

SUMMARY

- Water is essential for human civilisation, living organisms and natural habitat.
- India has 4% of the world's water resources which is used for drinking, irrigation, production of hydroelectricity and navigation.
- Surface water and groundwater are the sources of water.
- Major river basin in India are Indus system, Ganga-Brahmaputra system and East and West flowing peninsular rivers.
- India has an annual average precipitation of 1170 cm and about 80% of the total area of the country experiences annual rainfall of 650 mm or more.
- Indian agriculture is totally dependent on monsoon system, but the distribution of water is highly uneven. Thus, irrigation system is required.
- Canal irrigation, inundation canals, wells, tank irrigation, sprinkler irrigation and drip irrigation are the few means of irrigation.
- Government of India adopted various steps for efficient water management to tackle the problem of drought and floods.
- Conservation of water means prevention and controlling of fresh water which encompasses through policies, strategies and activities to meet the current and future human demands.
- Water harvesting is incorporated with all the different methods of conserving and collecting rainwater.
- Rainwater harvesting is the method of collecting, storing and using water for landscape irrigation.
- Johads, Tankas, Cheruvu, Dongs and Kere are the name of rainwater harvesting techniques in India.

EXAM PRACTICE

Short Questions [2 Marks each]

1. What is the percentage of water on Earth?

Ans. 71 per cent of the Earth's surface is covered with water and the oceans holds 97.5 per cent of Earth's total water which is saline.

2. Name the sources of surface water.

Ans. The sources of surface water are rivers, lakes, ponds, lagoons and backwater.

3. What do you mean by groundwater resource?

Ans. Water beneath the surface of Earth which saturates the pores and fractures of sand gravel and rock formation.

4. What do you understand by irrigation?

Ans. Irrigation refers to the process of supplying water to agricultural plants through wells, tanks, tube wells and canals.

5. Why do we need different modes of irrigation?

Ans. We need different modes of irrigation because of topographical features, availability of surface water, groundwater, soils and climatic condition.

6. Mention any two factors on which the source of irrigation depend.

Ans. Topography and rainfall are two main factors on which the source of irrigation depends.

7. "Without irrigation, development of agriculture is difficult in India." Clarify the statement by giving two reasons. ***[2016]***

Ans. "Without irrigation, development of agriculture is difficult in India" because of:

(i) the spatio-temporal variation in monsoon i.e. rainfall by monsoon is not same at every place.

(ii) it fluctuates every year i.e. there may be good rainfall in one year and may be brought to another year.

8. What are inundation canals?

Ans. These canals are taken out from the rivers and do not have any kind of weirs and barrages to regulate the flow of water from the rivers.

9. Why are inundation canals being converted to perennial canals? Give two reasons. ***[2012]***

Ans. Inundation canals are converted to perennial canals because:

(i) The former depend on flood water and dry up during the summer.

(ii) While perennial canals can provide water throughout the year.

10. How people of West Bengal harvest water in the flood plains?

Ans. People of Bengal harvest water by building inundation canals.

11. What are perennial canals?

Ans. These canals maintain its water flow throughout the year either from the river or from reservoir of the river projects.

12. From which river does the Mettur canal draw water?

Ans. Mettur canal draws water from the Kaveri river. It irrigates about 1.2 lakh hectares and in Salem and Tiruchirapalli.

13. What is a tank?

Ans. Tank is a man made/natural structure which is used for preserving rainwater.

14. There is plenty of rain in India during the rainy season, yet we need irrigation. Give two reasons to support this statement. ***[2018]***

Ans. Yes, there is plenty of rain in India, but yet we need irrigation because:

1. The spatio-temporal variation in monsoon i.e. rainfall by monsoon is not same at every place.
2. It fluctuates every year i.e. there may be good rainfall in one year and may be brought to another year.

15. State two reasons why tank irrigation is popular in South India. ***[2014]***

Ans. Tank irrigation is popular in South India due to following reasons:

(i) South India consists of rock surface which makes it difficult to dig canals and wells.

(ii) It is the simplest and cheapest source of irrigation.

16. Give a reason for the significance of irrigation in (i) Punjab (ii) Rajasthan ***[2017]***

Ans. (i) **Punjab** The demand for irrigation is greater in the Northern part as this predominantly an agricultural region. With supply of water, i.e. proper irrigation crops like rice and wheat can have two growing seasons in a year.

(ii) **Rajasthan** Rajasthan receives less rainfall over the year. Thus, irrigation through canal system is adopted here. In Rajasthan, Indira Gandhi canal, (Rajasthan canal) Chambal project canal are important projects for irrigation which are adopted by the government.

17. Name two modern methods of irrigation. State one important reason for their growing popularity. *[2015]*

Ans. Two modern methods of irrigation are as follows:

(i) Drip irrigation method

(ii) Sprinkler irrigation method

In the conventional methods of irrigation a large quantity of water is wasted due to waterlogging and often results in gradual salinity of the soil. This has made the modern methods of irrigation more popular.

18. Which are the states of India where well irrigation is used?

Ans. Uttar Pradesh, Goa, Punjab, Haryana, Bihar, Rajasthan, Gujarat, Maharashtra, Madhya Pradesh, Andhra Pradesh, Karnataka and Tamil Nadu are the states where well irrigation is used.

19. Mention two factors which are essential for the development of tube well irrigation. *[2016]*

Ans. Factors essential for the development of tube wells irrigation are as follows:

(i) Water level should be high with perennial water supply.

(ii) The ground should be soft, preferably alluvial soil, so as to facilitate deep digging.

20. (i) Name three traditional means of irrigation. *[2018]*

(ii) Give a reason why traditional means of irrigation are still important in most parts of India.

Ans. (i) The three traditional means of irrigation are:

1. Basin Irrigation 2. Strip Irrigation
3. Furrow Irrigation

(ii) Traditional means of irrigation are still important in most parts of India because these are less efficient but more sustainable due to which farmers use water judiciously.

21. Name two states in which tube wells are extensively used. Give a reason to explain its importance as a source of irrigation. *[2013]*

Ans. Uttar Pradesh and Punjab states has extensive use of tubewells. The importance of tube wells as a source of irrigation are as follows:

(i) Tube wells are very useful during drought conditions when surface wells dry up.

(ii) Tube wells can irrigate a large number of area as compared to surface wells.

22. Why is sprinkler irrigation method suitable for arid and semi-arid region?

Ans. Modern irrigation method is suitable for arid and semi-arid region because these do not involve any loss of water by seepage or evaporation.

23. Which area of India is famous for bamboo irrigation system?

Ans. The bamboo irrigation system is very popular in North-East part of India. This is 200 years old system used by the tribal farmers of Khasi and Jaintia hills.

24. What are check dams?

Ans. Check dams are small barriers built across the direction of water flow on shallow rivers and streams for the purpose of water harvesting.

25. Give two main reasons why water scarcity occurs in India. *[2013]*

Ans. The two main reasons, why water scarcity occurs in India are as follows:

(i) The most important source of water are rivers such as Ganga, Yamuna and many others, all are in danger, due to industrialisation, rapid growth of modernisation of agriculture and urbanisation, These all lead to turn the river into toxic streams.

(ii) Rainfall is eratic and unreliable in India.

26. (i) What is rainwater harvesting? *[2016]*

(ii) Mention two objectives of rainwater harvesting.

Ans. (i) Rainwater harvesting is the system of collecting rainwater directly or rechanging it into the ground to improve groundwater storage in aquifer. It is the most important method for storing water and later using it for various purpose. The rainwater is collected on roof top and is directed to dry tanks.

(ii) Two objectives of rainwater harvesting are as follows:

(a) Recharging the groundwater and raising its level.

(b) Preventing the rainwater from being wasted as there is water scarcity.

27. Mention two techniques of rooftop rainwater harvesting.

Ans. The two techniques of rooftop rainwater harvesting are as follows:

(i) Catchment (ii) First Flush

28. Mention two advantages of rainwater harvesting.

Ans. Two advantages of rainwater harvesting are as follows:

(i) Makes use of water and reduces flood like situation from water runoff, erosion and contamination of surface water with pesticides, sediments, metals and fertilisers.

(ii) Excellent source of water for landscape irrigation, with no chemicals such as fluoride and chlorine and no dissolved salts and minerals from the soils.

29. Name any two traditional rainwater harvesting methods.

Ans. Kuls of Himachal Pradesh and Khadins of Gujarat are two traditional rainwater harvesting method.

30. What do you mean by tanka and kul?

Ans. Tankas are underground tank for storing drinking water. Kul is a circular village tank from which water is released as and when required.

31. Why is per capita availability of water getting decline?

Ans. The per capita availability of water is getting declined because of rapid industrialisation and urbanisation which is putting a lot of pressure on the available water resources. Hence, it is necessary to conserve water.

b Long Questions [3 Marks each]

1. (i) How is fresh water obtained?

(ii) How is fresh water being renewed?

Ans. (i) The fresh water is obtained from surface run off and groundwater that is continually being renewed.

(ii) The fresh water is being renewed through the hydrological cycle.

2. State any three reasons why irrigation is important to a country like India.

Ans. **Refer to chapter theory page no. 105.**

3. Give one geographical reason of each of the following. *[2014]*

(i) Irrigation is necessary despite the monsoon.

(ii) The drip method of irrigation is the best method among all modern methods of irrigation.

(iii) Canal irrigation leads to the ground around it becoming unproductive.

Ans. (i) It is because Indian monsoon is erratic and unpredictable.

(ii) Drip method adheres highest water application efficiency and directly reaches the roots of plant, thus conserving water.

(iii) It is because the canal irrigation never avoid the situation of waterlogging.

4. (i) Name two states where perennial canals are widely used. *[2013]*

(ii) Briefly explain two reasons for perennial canals being a popular form of irrigation in the named states.

Ans. (i) The two states where perennial canals are widely used are Punjab and Haryana.

(ii) The two reasons for perennial canals being a popular form of irrigation in the named states are:

(a) As these canals serve throughout the year, the agricultural production in the areas of less or uncertain rainfall has increased considerably.

(b) During hot season, the large traits of land of these states can also be cultivated through these perennial canals.

5. Where are tanks most widely used in India? Why?

Ans. Tanks are mostly used in peninsular India i.e. Andhra Pradesh, Tamil Nadu and Maharashtra. This is because:

(i) The undulating relief and hard rocks make it difficult to dig canals and wells.

(ii) There is little percolation of rainwater due to hard rock structure and groundwater is not available in large quantity.

(iii) There are several streams which become torrential during rainy season. The only way to make best use of this water is to impound it by constructing bunds and building tanks. Otherwise this water would go waste to the sea.

6. Give one geographical reason for each of the following. *[2017]*

(i) Sprinkler irrigation is practiced in arid and semi-arid regions.

(ii) A tube well should be installed in a fertile and productive regions.

(iii) Canal irrigation is more suitable in the Northern Plains.

Ans. (i) Sprinkler irrigation is practiced in arid and semi-arid regions because this type of irrigation does not involve any loss of water by seepage or evaporation, as water is supplied through pipes, it is not exposed to the Sun.

(ii) A tube well should be installed in a fertile and productive regions because water table should be high with perennial water supply for tube well.

(iii) Canal irrigation is more suitable in the Northern Plains because here the rivers are perennial and flow through flat terrain.

7. Give one reason for each of the following. *[2016]*

(i) The Northern Plain of India is found suitable for canal irrigation.

(ii) Tank irrigation is an important method of irrigation in Karnataka.

(iii) Although expensive, yet sprinkler irrigation is gaining popularity in recent times.

Ans. (i) The Northern Plain of India is suitable for canal irrigation because it has low level relief, deep fertile soils and perennial source of water.

(ii) Tank irrigation is an important method of irrigation in Karnataka because most of the area here is uneven with many natural depression where the tanks can be built.

(iii) Although considered as an expensive source, sprinkler irrigation is gaining popularity in recent times because there is no loss of water by seepage and evaporation.

8. (i) Why is well irrigation still a popular means of irrigation? Give two reasons to support your answer. *[2013]*

(ii) State the significance of rainwater harvesting.

Ans. (i) Well irrigation is a popular method of irrigation due to the following reasons:

(a) Wells can be dug very easily in areas of soft soil.

(b) By the use of pumps and tube wells, water can be lifted even from great depths.

(ii) The significance of rainwater harvesting are as follows:

(a) This method helps to raise the groundwater table by recharging of groundwater reserves.

(b) It helps to reduce surface runoff and avoid flooding.

9. Why is drip irrigation called 'trickle irrigation'? Give its two advantages.

Ans. Drip irrigation is called 'trickle irrigation' because in this method irrigation is done through dripping steadily rather than fast flow of water.

Its two advantages are as follows:

(i) Water keeps on dripping steadily which avoid wastage.

(ii) It takes water directly to the roots of the plants or trees.

10. What do you understand by bamboo irrigation system?

Ans. **Refer to chapter theory page no. 106.**

11. What are the factors of water scarcity?

Ans. The factors of water scarcity are as follows:

(i) Industrialisation and urbanisation

(ii) Lack of water management

(iii) Disposition of waste substance

(iv) Low water table

(v) Unequal access of water among different social groups.

12. Write down the different regional names of rainwater harvesting in India.

Ans. The different nomenclature of rainwater harvesting in India are as follows:

(i) Johads (Eastern dam) Kunds (covered underground tanks) in Rajasthan.

(ii) Tankas (underground small tanks) and Khadin (along Eastern embankment to store runoff water) in Gujarat.

(iii) Cheruvu (reservoirs) in Andhra Pradesh.

(iv) Dongs (ponds) in Assam used by Bodo tribes.

(v) Kere (tanks) in Karnataka.

13. Give three reasons for conservation of water resources. *[2011, 14]*

Ans. Conservation of water resources is essential in India due to following reasons:

(i) To safeguard ourselves from health hazards as the quality of water is badly affected by discharge of urban wastes, industrial effluents, pesticides and fertilisers.

(ii) The underground water has been exploited and the water table has been lowered.

(iii) The underground water has been exploited and the water table has been lowered.

14. State any three components of rooftop rainwater harvesting system.

Ans. **Refer to chapter theory page no. 107.**

15. Mention any three water harvesting systems practiced in India. *[2011]*

Ans. The three water harvesting systems practiced in India are as follows:

(i) **Rooftop Rainwater Harvesting** It is a system of catching rainwater where it falls. In this technique the roof becomes the catchment and the rainwater is collected from the roof of the building.

(ii) **Kuls** In hills and mountainous regions people built diversion channels like the 'guls' or 'kuls'. It is common in Western Himalayas and largely used for irrigation.

(iii) **Johads and Khadins** In arid and semi-arid regions agricultural fields were converted into rain fed storage structures that allowed the water to stain and moisten the soil. This is known as 'khadins in Jaisalmer' and 'Johads' in other parts of Rajasthan.

16. (i) Differentiate between surface water and groundwater. ***[2018]***

(ii) Mention two reasons to explain as to why we are facing water scarcity in recent times.

Ans. (i) Surface water is found in a river or a lake. It is exposed to many different contaminants such as animal wastes, pesticides, algae, etc and not useful for drinking directly. Whereas ground water is contained by a sub-surface layer of soil or rock and contaminants found in it are dissolved minerals, therefore it is used as drinking water directly.

(ii) The two reasons of water scarcity are:

1. The most important source of water are rivers which are in danger due to industrialisation, rapid growth of modernisation of agriculture and urbanisation.
2. Rainfall is erratic and unreliable due to climate change and other changes in temperature.

17. Explain, how is rainwater harvesting carried out?

Or Explain the entire process of rainwater harvesting to conserve and store water.

Ans. **Refer to chapter theory page no. 107.**

18. (i) Name two methods of water harvesting in India.

(ii) Mention any two objectives of rainwater harvesting. ***[2018, 2013]***

Ans. (i) The two methods of water harvesting in India are as follows:

(a) Rooftop rainwater harvesting.

(b) Recharge of groundwater.

(ii) The two objectives of rainwater harvesting are:

(a) Checking the rainwater from flowing far away so, as to prevent soil erosion or flooding of the surrounding area.

(b) Meeting the demands of water requirement in dry season.

19. (i) What type of regions are expected to face water shortage?

(ii) In which areas rainwater harvesting is used?

(iii) Name regions where these rainwater harvesting techniques are used.

(a) Dongs (b) Cheruva

Ans. (i) Regions with low rainfall, low water table, desert and drough prone areas are expected to face water shortage.

(ii) Rainwater harvesting is used in the states of Rajasthan, Gujarat, Andhra Pradesh, Assam and Karnataka.

(iii) (a) Dongs technique is used in Assam by Bodo tribes.

(b) Cheruna technique is used in Andhra Pradesh.

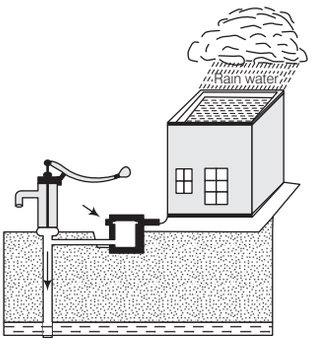
20. Differentiate between modern methods of irrigation and traditional methods of irrigation.

Ans. Difference between modern methods and traditional methods are as follows:

	Modern Methods	Traditional Methods
(i)	Modern methods include sprinklers, drip irrigation techniques and water pump sets.	Traditional methods rely more on tanks, ponds and wells.
(ii)	Modern methods are more efficient but less sustainable.	Whereas traditional methods are less efficient but more sustainable.
(iii)	These methods can irrigate large traits of land.	These methods irrigate small areas.
(iv)	In these methods wastage of water takes place.	In these methods, farmers use water judiciously.

C *Picture Based Questions*

1. Study the diagram below and answer the questions that follow. ***[2017]***



(i) Name the activity shown in the diagram.

(ii) Give two objectives of the activity.

Ans. (i) The activity shown in the diagram is of rooftop rainwater harvesting method.

(ii) Two objectives of rainwater harvesting method are:

(a) It is simple scheme to replenish the groundwater and increase its level.

(b) The purpose is to utilise the rainwater to its maximum and not to let it runoff or go waste.

2. Study the diagram below and answer the questions that follow.

(i) What does the picture shows?

(ii) What can be done in this regard?

Ans. (i) The picture shows to save the precious water on the Earth.

(ii) We can do various things to save water such as:

(a) Recycle and reuse water.

(b) Use rainwater harvesting system to avoid rainwater runoff.

CHAPTER TEST

Short Questions

[2 Marks each]

1. Give the name of the various sources of surface water.

2. Name the states of India where well irrigation is in practice.

3. In Rajasthan and Meghalaya which type of water harvesting is popular?

Long Questions

[3 Marks each]

1. Why irrigation is important in India? Give any three reason.

2. Explain three modern methods of irrigation.

3. Why there is a need to conserve water resource? Explain.

ARCHIVES*

Collection of Questions Asked in Previous Years' ICSE Class 10th Examinations

2018

1. There is plenty of rain in India during the rainy season, yet we need irrigation. Give two reasons to support this statement. ***(2)***

2. (i) Name three traditional means of irrigation. ***(2)***

(ii) Give a reason why traditional means of irrigation are still important in most parts of India.

3. (i) Differentiate between surface water and groundwater.

(ii) Mention two reasons to explain as to why we are facing water scarcity in recent times. ***(3)***

4. (i) What is rainwater harvesting? ***(3)***

(ii) What are the advantages of rainwater harvesting?

(iii) Name two water harvesting systems practised in India.

2017

1. Give a reason for the significance of irrigation in : ***[2]***

(i) Punjab (ii) Rajasthan

2. Name a state where ***[2]***

(i) Tube wells are common. (ii) Tank irrigation is popular.

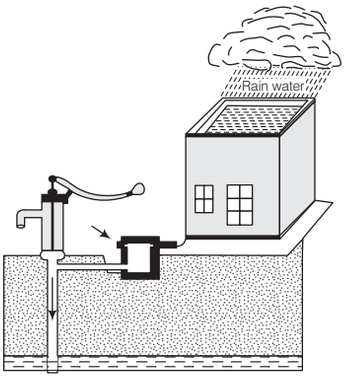
3. Give one Geographical reason for each of the following. ***[3]***

(i) Sprinkler irrigation is practised in arid and semi-arid regions.

(ii) A tube well should be installed in a fertile and productive region.

(iii) Canal irrigation is more suitable in the Northern Plains.

4. Study the diagram given below and answer the questions that follow. ***[3]***



(i) Name the activity shown in the diagram.

(ii) Give two objectives of the activity.

2016

1. "Without irrigation, development of agriculture is difficult in India." Clarify the statement by giving two reasons. *[2]*

2. Mention two factors which are essential for the development of tube well irrigation. *[2]*

3. Give one reason for each of the following. *[3]*

(i) The Northern Plain of India is found suitable for canal irrigation.

(ii) Tank irrigation is an important method of irrigation in Karnataka.

(iii) Although expensive, yet sprinkler irrigation is gaining popularity in recent times.

4. (i) What is rainwater harvesting? *[3]*

(ii) Mention two objectives of rainwater harvesting.

2015

1. State two reasons why irrigation is important to a country like India. *[2]*

2. Name two modern methods of irrigation. State one important reason for their growing popularity. *[2]*

3. (i) Why is well irrigation still a popular means of irrigation? Give two reasons to support your answer. *[3]*

(ii) State the significance of rainwater harvesting.

2014

1. State two reasons why tank irrigation is popular in South India. *[2]*

2. Give one geographical reason for each of the following statements. *[3]*

(i) Irrigation is necessary despite the monsoon.

(ii) The drip method of irrigation is the best among all modern methods of irrigation.

(iii) Canal irrigation leads to the ground around it becoming unproductive.

3. Give three reasons for conservation of water resources. *[3]*

2013

1. Name two states in which tube wells are extensively used. Give reason to explain its importance as a source of irrigation. *[3]*

2. Give two main reasons why water scarcity occurs in India. *[3]*

3. (i) Name two methods of water harvesting in India. *[3]*

(ii) Mention any two objectives of rainwater harvesting.

***** All these questions are covered and explained in chapter exercise 'Exam Practice'.

CHAPTER

8

Minerals and Energy Resources

Minerals

A mineral is a combination of two or more than two elements through definite chemical composition which is formed by inorganic processes. It is generally found in the Earth's crust in the form of ore which is used for various purposes by processing. All these minerals get potential value after extraction and processing.

Types of Minerals

Minerals are found in three forms i.e. metallic minerals, non-metallic minerals and energy minerals.

(i) **Metallic Minerals** These are found in igneous rocks and contain metals. There minerals play important role in the industrialisation and economic growth of the country, e.g. iron-ore, manganese, bauxite, nickel, copper and gold.

(ii) **Non-Metallic Minerals** These minerals are found in sedimentary rocks and contain no metal, e.g. mica, limestone, gypsum, etc.

(iii) **Energy Minerals** These minerals are also known as 'fossil fuels'. They are major sources of energy, e.g. coal, petroleum, natural gas, etc.

Metallic Minerals

Some major minerals of India are described below:

Iron Ore

Haematite and magnetite are the best quality of iron-ore having 50% to 70% iron content. Iron is one of the parameters of economic growth of a country. There are four types of iron-ore found in India. They are as follows:

(i) **Magnetite 'Blado Ore'** It is another name of magnetite and constitutes best quality of iron-ore (70% iron content). It has strong magnetic property, hence, it is called 'black iron'. It is obtained from Andhra Pradesh, Goa, Tamil Nadu and Karnataka.

(ii) **Haematite** It is the second best quality iron-ore (50% to 60% iron content) which contains pure iron and is known as 'oxide of iron'. It is obtained from Andhra Pradesh, Jharkhand, Odisha, Chhattisgarh, Madhya Pradesh, Goa, Karnataka and Maharashtra.

(iii) **Limonite** It is also known as 'hydrated iron-oxide'. It is inferior quality of iron-ore which contains 40% to 60% pure iron. It is found in yellow or brown colour and is obtained from Raniganj (West Bengal), Uttar Pradesh, Uttarakhand and Himachal Pradesh.

(iv) **Siderite** It is also known as 'iron carbonate'. It is low containing iron-ore with 10% to 40% of pure iron and has many impurities.

Uses

The uses of iron ore are given below:

- 90% of iron ore is used by iron and steel industries through extraction and processing which is used for construction, automobiles, railways machineries, etc.
- It is used as **pigments**[1] in polishing compounds, medicine and magnetic inks.
- Low grade iron-ore is utilised in manufacturing sponge iron, converted into pellets and then exported.

Distribution

Around 20% of world's total reserves of iron ore are found in India. It is obtained from peninsular India. Important iron-ore producing states of India are as follows:

- **Odisha** ranks 1st in production of iron ore in the country. Important mines are located at Gorumahisani, Sulaipat and Badampahar in Mayurbhanj district, Bagiaburu in Kendujhar district and Bonai in Sundergarh district.
- **Karnataka** ranks 2nd in iron ore production. Important mines are located at Donai Malai in Bellary-Hospet region, Bababudan in Chikmagalur district, Kudremukh in Chitradurga district.
- **Chhattisgarh** ranks 3rd in the iron ore production in the country. Important mines are located at Dalli Rajhara in Durg district and Bailadilla in Bastar district.
- **Jharkhand** ranks 4th in production with its mines located at Noamundi, Singhbhum, Hazaribagh.

Manganese

It is an iron like metal that occurs as natural oxide. It is a hard and black metal that is used in industries like in steel industry where it is served as the basic raw material for manufacturing ferro-manganese alloy, in dry battery industry and dye manufacturing.

Uses

Some of the uses of manganese are given below:

- It is used to improve the quality of many **alloys**[2], e.g. iron and steel. For manufacturing one tonne of steel, 10 kg of manganese is used.
- It is used in industries for manufacturing bleaching powder and insecticides.
- It is use to prepare alloys or mixture of different metals to accquire special properties for the minerals, e.g. ferro-manganese alloys.
- It is use to manufacture coloured glass.
- It is used in dry cell batteries.

Distribution

India is the 7th largest producer of manganese ore after China, South Africa, Australia, Brazil, Gabon and Kazakhstan. Production of manganese ore in India remains more or less static. India's manganese ore is produced by following states:

Madhya Pradesh The main belt extends in Balaghat and Chhindwara districts.

Maharashtra The main belt is in Nagpur and Bhandara districts. High grade ore is found in Ratnagiri district.

Odisha It is obtained from Gondite deposits in Sundergarh and Keonjhar districts and Khondolite deposits in Kalahandi and Koraput districts. Manganese is also mined from the lateritic deposits in Bolangir and Sambalpur districts.

Andhra Pradesh The main belt is found between Srikakulam and Visakhapatnam districts. Vijayanagaram, Cuddapah and Guntur are other manganese ore producing districts.

Other Producers These are Karnataka, Goa, Jharkhand, Rajasthan, West Bengal and Gujarat. They produce about 8% of India's manganese.

Copper

Copper, 'the red metal', is a chemical element and a non-ferrous base metal. Copper is one of the few metals that occur in the nature in directly usable metallic form. Copper is malleable, easy to shape and ductile. Copper has variety of uses ranging from space programmes, railways, telecommunication, cables etc.

1 Pigment Dry colouring material, especially a powder to be mixed with a liquid to produce paint and hard coating.

2 Alloy A mixture containing two or more metallic elements or non-metallic elements usually dissolving into each other when molten.

Uses

Some of the uses of copper are given below as follows:

- It is used in electrical industry in the form of copper wires and other numerous kinds of electrical equipments.
- It is used in meteorological sector as rain gauges.
- Copper is good conductor of heat, so it is extremely useful in refrigeration, utensils and in wires.
- It is also used in space programmes and telecommunication.

Distribution

Copper production in India is only about 3.4 per cent of the world production.

The leading producers of copper are as follows:

Jharkhand Singhbhum and Hazaribagh have good reserves.

Madhya Pradesh Malanjkhand copper belt and the state has rich reserves in Balaghat district. It is the largest copper producing state of India.

Rajasthan Khetri copper belt in Rajasthan, Singhana and Udaipur belt are most important.

Bauxite

It is the ore of aluminium. It is mainly found in tertiary deposits and related to laterite rocks either found on the plateau region or hilly area of peninsular India and also from coastal tracts.

Uses

Some of the uses of bauxite are enlisted below:

- It is used for making aluminium that is obtained in the form of hydrated aluminium oxides from bauxite.
- Aluminium is used for making aircrafts, ships and utensils, as it is light in weight and resists rust.
- It is good conductor of electricity , hence, it is used in electrical industry.

Distribution

India is the 5th largest producer of bauxite in the world. The major bauxite producing states in India are as follows:

Odisha It constitutes the largest producer of bauxite in the country. The main bauxite producing districts are Kalahandi, Balangir, Koraput, Sundergarh and Sambalpur.

Gujarat It occupies second position in producing bauxite ore in India. The main bauxite producing districts are Jamnagar, Sabarkantha, Kutch and Surat.

Jharkhand It is constituted as the third largest producer of bauxite in India. The main bauxite producing districts are Ranchi, Palamu, Lohardaga and Singbhum.

Chhattisgarh The major producing areas are Surguja, Durg, Raigarh, Bilaspur and Jashpur districts.

Maharashtra Exploitation of bauxite started much later in Maharashtra. lt started first in Thane district, but now it is mined in Kolaba, Ratnagiri and Kolhapur districts.

Madhya Pradesh The major bauxite producing areas in Madhya Pradesh are Amarkantak plateau area in Shahdol district, Mandla and Balaghat districts and Katni area of Jabalpur.

Other Producers The principal deposits of bauxite in Karnataka occur in Belgaum district. Bauxite deposits also occur in Nilgiris, Madurai districts of Tamil Nadu.

CHECK POINT 01

1 Name two metallic and non-metallic minerals.
2 Which variety of iron-ore contains maximum amount of pure iron?
3 Name the metal which is hard and black in nature.
4 Name two leading states producing bauxite.

Conventional Sources of Energy

These are energy sources which are fixed in nature. These sources are also called as non-renewable sources, e.g. coal, petroleum, natural gas and hydel power. Except hydel power, these sources are costly and present in limited quantity. Coal and petroleum are fossil fuels that are depleting environment. They are also responsible for air pollution and global warming. However, these are widely used in many industries.

Coal

India has secured third rank in the world in the production of coal. It is a kind of fossil fuel found in sedimentary rocks, which is a conventional source of energy and also inflammable organic substance. Good quality of coal in India is produced in Bihar and West Bengal. There are mainly four types of coal such as peat, lignite, bituminous and anthracite.

Distribution

The coal is distributed in the following states:

- **Jharkhand** It has the highest coal reserves of India. The important coal fields are Jharia, Giridih, North Karanpura, South Karanpura, Ramgarh, Bokaro, Daltonganj. The Jharia coalfield is the largest in India which produces the best variety of coking coal.

- **Odisha** It ranks second in coal reserves. The important coalfields are Talcher, Rampur. They are situated in the Mahanadi basin.
- **Chhattisgarh** It is the state with third highest coal reserves in India. The important coal fields are Korba coal mine Totapari, Jhilimili and Bishrampur.
- **West Bengal** The important coalfields of this area are found in Raniganj, Mejia. Raniganj coal field is the second largest coalfield in India while Mejia in Bankura district of West Bengal is a recently discovered large coal field.
- **Andhra Pradesh** It occupies the fifth position in coal reserves in India. The major coalfields are Singareni, Tandur, Kothagudem, Yellandu.
- **Maharashtra** It holds the sixth position in coal reserves in the country. The major coalfields are found in Nagpur-Wardha region. The important mining areas are Wardha, Ballarpur, Chanda and Kampati.
- **Madhya Pradesh** It is the fourth largest coal producing state. The major coal mines are Umaria, Sohagpur, Singrauli and Pench valley.
  India exports some coal to Bangladesh, Sri Lanka, Pakistan, Myanmar, Japan, Hong Kong and Malaysia.

Advantages

Advantages of coal are as follows:

- It is easy to burn.
- It produces high energy upon its combustion.
- It is available in an abundant supply.
- It is safer as compared to nuclear energy.
- It is a primary source of energy for poor people as it is cheap.

Disadvantages

Disadvantages of coal are as follows:

- Its mining activity is dangerous for mining workers.
- Due to its mining, deforestation, land degradation take place and also habitats of wildlife get affected.
- Carbon emissions due to burning of coal have a negative impact on environment and cause climate change and global warming, acid rain, etc.
- It is a non-renewable source.

Petroleum

The word 'petroleum' has been derived from two Latin words '*Petra*' which means 'rock' and '*Oleum*' which means 'oil'. Thus, it signifies 'rock oil'. It is the main source of kerosene, diesel oil, paraffin wax, vaseline and benzene.

India is poor in petroleum resources. It has an organic origin and is found in sedimentary basins, shallow depressions and in the seas. Crude petroleum consists of a mixture of hydrocarbons, solid, liquid and gas. Hence, it is also known as 'mineral oil'.

Distribution

The rank of India in the production of petroleum is 24th in the world. The petroleum resources of India are distributed in three important oil field region:

(i) **North Eastern Region** Major oil fields are located in Upper Assam Valley, Nagaland and Arunachal Pradesh.

Assam Digboi (oldest in India), Naharkatiya, Moran, Galeki, Rudrasagar, and Hugrijan. This region is known as upper 'Assam or Naharkatiya, Moran Region'.

Arunachal Pradesh Nigru oil field in Tirap district.

Nagaland Borholla oil field close to the Assam-Nagaland border.

(ii) **Western Region** Major oilfields are located in Khambhat basin, Gujarat plain and Mumbai coast.

Gujarat Ankleshwar, Kalol, Navagam, Sanand and Lunej.

(iii) **East Coastal Region** Major oilfield of this region are located in Krishna, Godavari and Kaveri basin.

Maharashtra is largest petroleum producing state in India.

State wise distribution of major oil refineries in India are as follows:

State	Oil Refineries
Assam	Assam oil company, Digboi, Bongaigaon refinery and petrochemical, Bongaigaon Indian Oil Corporation Guwahati
Bihar	Indian Oil Corporation, Barauni
West Bengal	Indian Oil Corporation, Haldia
Gujarat	Indian Oil Corporation, Koyali, Jamnagar Refineries
Maharashtra	Bharat Petroleum Corporation, Mumbai Hindustran Petroleum Corporation, Mumbai
Andhra Pradesh	Hindustan Petroleum Corporation, Vishakhapatnam
Tamil Nadu	Madras Refineries, Chennai
Kerala	Kochi Refineries
Uttar Pradesh	Mathura Oil Refinery

Advantages

Advantages of petroleum are as follows:

- Petroleum is a major energy source in India after coal.
- Transportation is easy and can be done through pipelines or tankers to areas which uses it.
- It leaves no ash.
- It supports many industries, mainly the petrochemical, fertilisers and chemical industries.
- Other fuels derived from petroleum includes ethane, gasoline, kerosene and LPG.

Disadvantages

Disadvantages of petroleum are as follows:

- The burning of petroleum emits large amounts of Carbondioxide (CO_2), or greenhouse gas, which leads to global warming.
- It is a non-renewable source of energy.
- It is toxic to humans, animals and other forms of wildlife like plants.
- Everything surrounding the use and processing of petroleum is expensive. The equipment and time it takes to harness the oil is also very expensive.
- If petroleum spills in water bodies such as oceans and seas adverse effects in marine life are expected. This spill can cause massive ocean pollution, causing the death of animals and fishes.

Natural Gas

It is a naturally occurring hydrocarbon gas mixture consisting primarily methane. It is toxic, colourless and odourless gas. Natural gas is a fossil fuel used as a source of energy for heating, cooking and electricity generation. Natural gas is becoming an important source of energy in India. It occurs where oil reserves are found.

Distribution

A huge mass of India's natural gas production comes from the Western offshore regions. Natural gas is found mainly in the following regions:

Mumbai The largest gas reserves have been found in this region. (about 70% of India's natural gas reserves).

Andhra Pradesh The Reliance Group of Industries have discovered gas near Krishna-Godavari basin in Andhra Pradesh.

Rajasthan Natural gas reserves are found in Khambhat Basin, Jaisalmer. It is also found in Tamil Nadu, Gujarat, Assam, Tripura.

Advantages

Advantages of natural gas are as follows:

- It can be directly used for burning.
- It is cheaper and eco-friendly.
- It has multiple uses e.g. generating electric power, powering vehicles, fertilisers etc.
- It is an ingredient in dyes and inks.

Disadvantages

Disadvantages of natural gas are as follows:

- Its reserves are limited.
- Leakage of natural gas can be proved extremely dangerous, e.g. causes fire or explosions.
- It is non-renewable source of energy.
- When it is used as a fuel in cars, the mileage is lower than gasoline.

CHECK POINT 02

1 Good quality of coal is found in which two states of India?
2 Mention any one advantage of petroleum
3 Name the region with largest gas reserves in India.

Hydel Power

India is the 5th largest producer of hydro, electric power in the world. Hydro power or hydel power is derived from the energy of falling water or fast running water. It is a source use for generating electricity. It is cheap, clean, environmental- friendly and renewable. It plays an important role in reducing, greenhouse gas emissions. The major dams used to generate hydel power are as follows:

Bhakra Nangal Dam

The Bhakra Nangal mulitpurpose dam was among the earliest river valley development schemes undertaken by India after independence. The Bhakra Nangal project is a joint venture of Punjab, Rajasthan and Himachal Pradesh. This project consist of two dam, one at Bhakra and other at Nangal. The Bhakra dam is the second highest (226 metres) dam which is 518 metres long and 362 metres wide.

The main aim of this dam was to prevent floods in the Sutlej Beas river valley to provide irrigation to nearby states and to generate electricity. Tourism has become very popular due to the artificial Gobind Sagar Lake Reservoir of Bhakra Dam. Many water sports such as fishing and boating, have attracted people from all over the world.

Hirakud Hydel Dam

Hirakud dam is built across the Mahanadi river about 15 km from Sambalpur in the State of Odisha in India. It is one of the first major multipurpose river valley projects started after India's independence. The Hirakud dam is a composite structure of Earth, concrete and masonry and is the longest major Earthen dam in India. The dam support two different hydroelectric power houses.

The dam helps to control floods in the Mahanadi Delta, irrigate 75000 km of land and generate electricity. Hirakud Dam has three canals, Bargarh main canal, Sason canal and Sambalpur canal. Water from the Hirakud dam is also used in various industries, e.g. in minerals processing and thermal power plants.

Non-Conventional Sources of Energy

Non-conventional or Renewable energy sources are automatically replenished by nature, i.e. sun's rays, water, tides, wind, air, etc. The abundant supply of renewable energy sources contrast with the limited supply of non-renewable sources of energy. If not replenished, non-renewable sources of energy will eventually get exhausted completely. Non-conventional sources are discussed below:

Solar Energy

Energy produced through the sunlight is called solar energy. Indian solar grid had a cumulative capacity of 15.60 GW with about 300 clear and sunny days in a year.

Generation

Following are used to generate solar energy:

Electric Collectors It transforms solar radiation from Sun rays into heat which is then transformed to some fluid.

Photovoltaic Cells It use special mirrors to produce electricity. It is then used for lightning purposes.

Solar Cooker It consist of a glass topped box into which the light enters and gets trapped. The heat produced is generally used for cooking or heating up the house.

Solar Heater A number of curved mirror are installed on roof tops. Water is then passed through pipes in the panels. Hot water is collected in insulated tanks and supplied to bathrooms.

Advantages

Some of the advantages of solar energy are given below:

- Solar energy is renewable and inexhaustible source of energy.
- Solar energy is long time expense sector.
- Large amount of free energy produced due to high return on investment.
- It can be used in heating, drying, cooking and electricity.

Wind Energy

It is generated by the motion of wind turbines. It involves the use of windmills to produce power for heating and lighting purposes. Wind speed may vary within minutes and affect the power generation.

Generation

Wind power generation capacity in India has significantly increased in recent years. The windmills are installed in open areas, in costal regions or in hilly areas. India had the 4th largest installed wind power capacity in the world. The total installed wind power capacity was 32.72 GW, mainly spread across the South-West and North regions.

Advantages

The advantages of wind energy are given below as follows:

- Wind power is cost-effective.
- Wind power is clean fuel source.
- Wind is a domestic source of energy. It is abundant and inexhaustible.
- It is sustainable source of energy.
- It has low operational cost.

Tidal Energy

India boasts of 7500 kilometre long coastline, and the surface water of the sea rise and fall twice a day. India has been looking at generating electricity via tidal power since the 1980s. The Gulf of Cambay and the Gulf of Kutch in Gujarat on the West coast have the maximum tidal range.

Water flows over the turbines which moves the electric generator. This source of energy is inexpensive, inexhaustible and does not cause pollution. The Gulf of Kutch provides ideal conditions for harnessing tidal energy.

Generation

It is generated by movement of oceanic tides, which can be used to generate electricity. For this, floodgate dams are built across inlets. During high tide, water flows into the inlet and gets trapped when the gate is closed. After the tide falls outside the floodgate, the water inside it flows back to the sea via a pipe that carries it through power generating turbine. In this way, electricity is generated.

Advantages

Advantages of tidal energy are enlisted below as follows:

- Cleaner and safer form of energy generation.
- Simple and less complex procedures.
- It has high energy capacity.
- Efficiency of tidal energy is more compared to solar or wind.
- Maintenance of tidal plant are quite low.

Geothermal Energy

It is obtained from the heat in the interior of the Earth. Geothermal energy is enormous and clean power resource.

Generation

Water seeps into the Earth's crust through cracks and gets heated due to high temperature inside. The heated water becomes steam. This steam is channelised to rotate turbines that activates a generator which produces electricity. The geothermal energy is important in both electricity production and direct use. Two experimental projects have been set-up to harness this energy in India which are as follows:

(i) Puga valley in Ladakh.
(ii) Parvati valley in Himachal Pradesh.

Advantages

Advantages of geothermal are given below as follows:

- This is renewable energy resource.
- It is eco-friendly energy resource.
- It is inexpensive and widely available resource.
- High efficiency coupled with low maintenance.

Nuclear Power

Nuclear power is the fourth largest source of electricity in India. India developed its nuclear power in August 1956 and it is among the 6 countries which have succesfully established power station in their countries.

Generation

It is created by nuclear reactions in controlled nuclear reactors. Inside the nuclear reactor, energy is generated by means of a chain reaction involving uranium atoms. When the nuclear of the uranium atom is split then, it releases heat and energy. Thus, by splitting uranium atoms inside the nuclear reactor, we can generate energy that can be turned into electricity. Uranium and thorium both are used for generating nuclear power.

Advantages

Advantages of the nuclear energy are given below:

- The nuclear power plant is more economical compared to thermal power plant.
- There is no problem of fuel transportation, storage and handling.
- Man power required for the operation of nuclear power plant is less.
- Nuclear power plant occupies less space than thermal power plant.
- It is a clean source of energy.

Biogas

It typically refers to a mixture of different gas produced by decomposition of organic matter in the absence of oxygen.

Generation

Biogas can be produced from raw material such as agriculture waste, manure, municipal waste, plant material, sewage, green waste or food waste. The biogas is a renewable energy that can be used for heating, electricity and many other operations.

Advantages

Advantages of biogas are given below:

- Biogas is eco-friendly.
- It reduces soil and water pollution.
- It produces organic fertiliser.
- It is available all the time and is cost effective.

CHECK POINT 03

1 Name two main Hydel Power Plants in India.
2 Name few non-conventional energy sources.
3 Mention two advantages of wind energy.
4 Name any two nuclear power plants in India.

Summary

- A mineral is a combination of two or more than two elements through definite chemical composition which is formed by inorganic processes.
- Minerals are found in the three forms i.e. metallic minerals, non-metallic minerals and energy minerals.
- Iron-ore is used in the production of iron and steel and is used in the making of all machinery.
- Manganese is mainly used in the manufacturing of steel and ferro-manganese.
- Major producers of most of the minerals in India are Jharkhand, Odisha, Chhattisgarh and Madhya Pradesh.
- Copper is a non-ferrous base metal and used in railways, space programmes, telecommunication and cables.
- India contributes about 8.1% of total coal production of the world i.e. 659 million tonnes.
- Coal, petroleum and natural gas are important sources of energy in India that are conventional and non-renewable.
- Bauxite is the ore of aluminium. It is mainly found in tertiary deposits.
- India produces about 38 million tonnes of world total petroleum production. India ranks 24th in the production of petroleum in the world.
- India is the 5th largest producer of hydro-electric power in the world.
- Bhakra Nangal Dam project is a joint venture of Punjab, Rajasthan and Himachal Pradesh.
- India Solar grid had a cumulative capacity of 15.60 GW.
- India had the 4th largest installed wind power capacity in the world.
- It is estimated that India can produce 7000 MW of tidal power in the Gulf of Khambhat.
- Puga valley in Ladakh and Parvati valley in Himachal Pradesh are two experimental geothermal project of India.
- Nuclear Power is another important source of energy in India.
- Biogas helps in reducing soil and water pollution and also produce organic fertiliser.

EXAM PRACTICE

a Short Questions [2 Marks each]

1. What do you understand by minerals?

Ans. Minerals are the combination of two or more than two elements through definite chemical composition which are formed by inorganic processes.

2. Name two metallic and non-metallic minerals each.

Ans. **Metallic Minerals** Iron and aluminium.
Non-Metallic Minerals Coal and salt.

3. What are ferrous minerals?

Ans. The minerals which contain iron are known as 'ferrous minerals'. E.g. nickel, manganese, cobalt etc.

4. What is an ore? Name any two iron ores.

Ans. A naturally occurring solid materials from which a valuable metallic mineral can be extracted profitably as called as 'ore'. Two iron ores are haematite and magnetite.

5. Which iron ore is called 'Blado ore'? State any one characteristics of this.

Ans. Magnetite is called 'Blado ore'.
Characteristics It is a black, magnetic mineral that leaves a black streak when rubbed across a hard rough surface.

6. What grade of iron ore is mostly mined in India? Name two leading iron ore producing states. *[2011]*

Ans. Haematite variety of iron ore is mostly mined in India. Odisha and Chhattisgarh are the two leading iron ore producing states of India.

7. Give the names of four important types of iron ore found in India. *[2017]*

Ans. The four important type of iron ore in India are as follows:
Magnetite, haematite, limonite and siderite are four important iron ores found in India.

8. (i) Name two varieties of iron ore used in industry.
(ii) How is the low grade iron ore utilised?

Ans. (i) Haematite, magnetite.
(ii) The inferior variety is often used in manufacturing sponge iron and converted into pellets and then exported.

9. State the most important use of the following.
(i) Iron ore (ii) Bauxite *[2015]*

Ans. (i) **Iron ore** It is mainly used to make steel. Raw iron is alloyed with other elements to make good quality steel which is used for construction, automobiles and other forms of transportation etc.
(ii) **Bauxite** It is the main source of aluminium which is light weight, strong and rust resistant. Aluminium is mainly used for making automobiles, aircrafts, wagons, coaches and used in shipping industry etc.

10. How many kilograms of manganese are needed to manufacture one tonne of iron and steel?

Ans. 10 kilograms of manganese is needed to manufacture one tonne of iron and steel.

11. (i) Name two manganese producing states in India.
(ii) Name one use of the mineral.

Ans. (i) Odisha and Karnataka.
(ii) It is used to improve the quality of many alloys e.g. iron and steel.

12. Mention any two uses of manganese. *[2014]*

Ans. Uses of manganese are as follows:
(i) Manganese is used to increase the strength of steel.
(ii) It is also used as raw material for manufacturing paints, glass wares, insecticides, bleaching powder and dry cell batteries.

13. Name the ore of aluminium. Describe two main uses of aluminium. *[2013]*

Ans. Bauxite is the ore of aluminium. Two uses of aluminium are as follows:
(i) Aluminium is used in the air craft industry.
(ii) It is used in a huge variety of products including cans, foils, kitchen utensils, window frames etc.

14. Mention the name of four bauxite producing state.

Ans. Four bauxite producing states are Bihar, Madhya Pradesh, Gujarat and Maharashtra.

15. What are conventional source of energy?

Ans. These are the non-renewable source of energy which cannot be used again. For example, petroleum and coal.

16. Mention the name of four coal producing states.

Ans. Four coal producing states are Jharkhand, Meghalaya, Assam and Nagaland.

17. Which of the different varieties of coal is used for domestic purposes and why? *[2014]*

Ans. Bituminous is used for domestic purposes as it has very high carbon content and emits very less smoke.

18. Which is the most important energy resource of India?

Ans. Coal is the most important energy resource of India as this produces high energy upon its combustion process.

19. (i) Name any three types of coal found in India *[2016]*

(ii) Which type of coal is mostly used in iron and steel industries?

Ans. (i) There are four variety of coal found in India i.e. lignite, peat, bituminous and anthracite.

(ii) Anthracite is mostly used in iron and steel industries.

20. What is lignite? Name the two areas where lignite is found in India. *[2011]*

Ans. Lignite refers to inferior variety of coal which contains about 60% of carbon and a good amount of moisture and less of combustible matter. Two states where lignite is found are Tamil Nadu and Kashmir.

21. From which two Latin words, the word petroleum is derived?

Ans. The word 'petroleum' has been derived from two Latin words '**Petra**' which means 'rocks' and '**Oleum**' which means '**oil**'.

22. Why is petroleum called 'mineral oil'?

Ans. Petroleum has an organic origin and is found in sedimentary basins, shallow depressions and in the seas. It consists of mixture of hydrocarbons, solid, liquid and gas. This is known as 'mineral oil'.

23. Name the following. *[2016]*

(i) An offshore oil field of India.

(ii) An iron ore mine of Karnataka.

Ans. (i) Mumbai High is offshore oil field of India.

(ii) Kemmangundi is iron ore mine of Karnataka.

24. Name the following. *[2017]*

(i) An off-shore oil field in the Gulf of Cambay.

(ii) An oil refinery in Bihar.

Ans. (i) Aliabet island close to Bhavangarh in the Gulf of Cambay.

(ii) An oil refinery in Bihar is Barauni refinery.

25. Give two advantages that non-conventional energy sources have over conventional energy sources. *[2018]*

Ans. Two advantages that non-conventional energy sources have over conventional energy sources are:

1. Most of the non-conventional energy sources are cheaper and renewable.
2. The overall limitation and scarcity of fossil fuels has given rise to the urgent need for exploiting alternative energy sources.

26. Write two advantages of Hydro electric power?

Ans. Two advantages of hydro electric power are as follows:

(i) Hydel power is inexhaustible and pollution free source of energy.

(ii) It produces many benefits like flood control, irrigation and water supply.

27. Mention two purposes of solar energy.

Ans. Two purposes of solar energy are as follows:

(i) Solar energy is used for solar heating and solar electricity production.

(ii) Hot water through solar heater is collected in insulated tanks and supplied to bathrooms.

28. Name two projects which is set to harness geothermal energy.

Ans. Parvati Valley—Mani Karan (HP) and Puga Valley—Ladakh (J & K) are two projects which are set to harness geothermal energy.

29. Name any two industrial products for which limestone is used as a source of raw material. *[2013]*

Ans. Two industrial products for which limestone is used as source of raw material are as follows:

(i) Iron and steel

(ii) Cement

30. State two reasons, why limestone is a valuable mineral? *[2015]*

Ans. Limestone is considered as a valuable mineral due to its various uses such as:

(i) Limestone is mainly used as a raw material in the cement industry.

(ii) It is used as flux in the iron and steel industry.

b Long Questions [3 Marks each]

1. State four economic uses of mineral resources.

Ans. Mineral resources are useful in four ways such as:
(i) They form the basis for industries.
(ii) They are the important sources of energy for example, coal and petroleum.
(iii) Railways, computers, cars, sky scrapers, etc in modern society depends upon the exploitation by cultural processes.
(iv) Earn foreign exchange by exports.

2. Explain about the four types of iron ore found in India.

Ans. **Refer to chapter theory page no. 117 and 118.**

3. Mention the important iron ore belts found in India. Explain any two of them.

Ans. **Refer to chapter theory page no. 118.**

4. Name the leading producer of manganese in India. Name two important industrial uses of manganese. *[2011]*

Ans. Odisha is the leading producer of maganese in India.
(i) It is used in manufacture of chemical and electrical equipments.
(ii) It is used in chemical industries for manufacturing bleaching powder.

5. Explain the distribution of copper in India.

Ans. **Refer to chapter theory page no. 119.**

6. Mention any three uses of bauxite.

Ans. **Refer to chapter theory page no. 119.**

7. Which state is the leading producer of the following minerals? *[2014]*
(i) Coal (ii) Oil (iii) Manganese

Ans. (i) **Coal** Jharkhand leads in coal production and coal reserves in the country.
(ii) **Oil** Maharashtra is the largest producer of oil in India. Mumbai high is an oil field of the state.
(iii) **Manganese** Odisha is the leading producer of manganese in India.

8. Name the following. *[2015]*
(i) Largest oil refinery in the Public sector.
(ii) State that is the largest producer of coal.
(iii) Best variety of iron ore.

Ans. (i) Panipat refinery is the largest oil refinery in the public sector in India.
(ii) Jharkhand is the largest producer of coal in India.
(iii) The best variety of iron ore is magnetite which constitutes best quality of iron ore.

9. (i) Name the metal extracted from Bauxite.
(ii) Mention two uses of this metal. *[2016]*

Ans. (i) Aluminium is the metal extracted from Bauxite.
(ii) (a) Aluminium is a good conductor of electricity, hence, it is used in electrical industry.
(b) Aluminium is used for making aircrafts and utensils.

10. Name the following. *[2016]*
(i) Largest coal field of India
(ii) Oldest oil-field of India
(iii) Best variety of iron ore.

Ans. (i) Jharia in Jharkhand is the largest coalfield in India.
(ii) The oldest and one of the largest oil fields in India is at Digboi in Assam.
(iii) Magnetite is best quality iron ore.

11. State an important industrial use of *[2017]*
(i) Manganese (ii) Coal (iii) Aluminium

Ans. (i) Manganese is used to improve the quality of many alloys, e.g. iron and steel.
(ii) Coal is used in generating power and thermal electricity.
(iii) Aluminium sheet used mainly in automobiles manufacturing passenger car doors, fittings, protection board.

12. (i) Name two industries that use high quantity of coal.
(ii) Name one important area that has large coal deposit in the state of Jharkhand and West Bengal.

Ans. (i) Iron and steel industry and sugar industry use high quality of coal.
(ii) Jharia in Jharkhand and Raniganj in West Bengal have large coal deposits.

13. (i) Which state is the largest producer of mineral oil?
(ii) Name two coastal and two inland oil refineries in India. *[2013]*

Ans. (i) (Mumbai High) Maharashtra is the largest producer of mineral oil in India.
(ii) **Coastal Refineries**
Mumbai High is an off shore oil field which is about 176 km off the coast of Mumbai. The oil operations are run by India's Oil and Natural Gas Corporation.
Kochi Oil refinery is a public crude oil refinery in the city of Kochi, Kerala. It was acquired by Bharat Petroleum Corporation Limited in the year 2006.

Inland Refineries

Barauni refinery in the Bihar state was built in collaboration with the Soviet Union, in 1964. It is situated 125 km from Patna.

Bongaigaon is located in Assam. It was incorporated in 1974 by the Government of India.

14. Name the mineral used in the manufacture of
(i) Cement (ii) Aluminium (iii) Synthetics *[2014]*

Ans. (i) **Cement** Limestone is used in the manufacturing of cement.
(ii) **Aluminium** Bauxite is used in the manufacturing of Aluminium.
(iii) **Synthetics** Petroleum is used to manufacture synthetics.

15. Name the mineral. *[2012]*
(i) Which is converted to aluminium.
(ii) Which is used in the manufacture of cement.
(iii) The largest deposit of which are found in Balaghat in Madhya Pradesh.

Ans. (i) Bauxite in converted to aluminium.
(ii) Limestone is used in the manufacturing of cement.
(iii) The largest deposits of manganese are in Balaghat in Madhya Pradesh.

16. (i) Mention one advantage of use of natural gas over coal or petroleum. *[2018]*
(ii) Name one offshore oil field in India.

Ans. (i) Natural gas is the cleanest burning fossil fuel because the combustion process for natural gas is almost, very perfect as very few by-products are emitted into the atmosphere as pollutants.
(ii) Mumbai High is one of the offshore oil field in India.

17. What is geothermal energy? Name any two project which are set-up to harness this energy.

Ans. Geothermal energy refers to the heat produced in the interior of the Earth. This heat when turn into steam is used to drive turbines and generates electricity.

Two experimental projects have been set-up in India to harness the geothermal energy, one is Parvati valley in Himachal Pradesh and other is Puga valley in Ladakh.

18. Name the two states where limestone is found. Mention two important uses of limestone. *[2011]*

Ans. Limestone is found in Rajasthan and Madhya Pradesh.

Two important uses of limestone are as follows:
(i) Limestone is used as flux in the iron and steel industry.
(ii) It is used in production of chemicals such as bleaching powder, caustic soda, glass, fertilisers etc.

19. Give geographical reasons, why?
(i) Anthracite is used for domestic purposes.
(ii) Oil refineries are located close to oil fields or near ports.
(iii) The location of coal fields is an important factor in industrial development.

Ans. (i) Anthracite is used for domestic purposes as it has very high carbon content and emits very less smoke.
(ii) Oil refineries located near the oil fields help to transport crude oil through pipelines and hence, reduce the transport cost. Moreover, if located near the port it helps to import the crude oil and export of its products.
(iii) Coal is a bulky and heavy raw material. Industries located away from coalfields incur huge transport cost and affects the cost of production on a large scale.

20. Give a geographical reason for each of the following. *[2015]*
(i) Many port cities have their own oil refineries.
(ii) Petroleum is called a 'fossil fuel'.
(iii) Coal is called a 'versatile mineral'.

Ans. (i) Many port cities have their own oil refineries as the location of the oil refineries near the coast minimises the cost of transport and also reduces the risk of transporting the oil inside the country due to its inflammable nature.
(ii) Petroleum is formed by the accumulation of vegetative matter. This vegetative matter when subjected to heat and pressure results in physical and chemical changes due to the increasing weight of the overlying layers of sediments and Earth movements.
(iii) Coal is known as a 'versatile mineral' due to its varied uses such as:
- It is used as a source of power for running machines, trains, ships etc.
- It is used in manufacturing of steel.

21. (i) Name the state that produces the largest amount of limestone. *[2017]*
(ii) State two uses of limestone.

Ans. (i) Rajasthan is the largest producer of limestone.
(ii) Limestone is used for making soda ash, caustic soda, bleaching powder, paper, cement, iron and steel, glass and fertilisers.

22. Answer the following. *[2018]*

(i) State one industrial use of copper.

(ii) Mention one advantage of generating power from biogas.

(iii) Name the mineral that toughens steel and makes it rust-proof.

Ans. (i) Copper is used in electrical industry in the form of copper wires and other numerous kinds of electrical equipments.

(ii) Biogas is a renewable, as well as a clean source of energy and reduces greenhouse emissions.

(iii) Chromium is hard and tough in nature, therefore it is used in steel industries to make steel tough and rust-proof.

23. (i) Name the metal obtained from bauxite. Give any one use of the metal mentioned by you. *[2018]*

(ii) Which multipurpose project provides power to both Punjab and Himachal Pradesh?

Ans. (i) Aluminium metal is obtained from bauxite. The bauxite is purified to yield a white powder called aluminium oxide, from which aluminium can be extracted. Aluminium is used in a huge variety of products including cans, foils, kitchen utensils, aeroplane parts, etc.

(ii) The Bhakra Nangal multipurpose dam provides power to both Punjab and Himachal Pradesh. It is built on river Sutlej.

C Picture Based Questions

1. Study the picture given below and answer the following questions.

(i) Identify the dam given in the picture.

(ii) What is the main aim of this dam?

Ans. (i) The dam given in the picture is Bhakra Nangal Dam.

(ii) The main aim of this dam was to prevent floods in the Sutlej Beas river valley to provide irrigation to nearby states and to generate electricity. Tourism has become very popular due to the artificial Gobind Sagar Lake Reservoir of Bhakra Dam. Many water sports such as fishing and boating, have attracted people from all over the world.

2. Study the picture given below and answer the following questions.

(i) Which energy is generated by the activity given in the picture?

(ii) Mention any four advantages of this energy.

Ans. (i) Wind energy is generated by this activity.

(ii) The advantages of wind energy are as follows:

(a) Wind power is cost-effective.

(b) Wind power is clean fuel source.

(c) Wind is a domestic source of energy. It is abundant and inexhaustible.

(d) It is sustainable source of energy.

CHAPTER TEST

Short Questions

[2 Marks each**]**

1. Define minerals.
2. Which minerals are considered as the 'backbone' of the development of metallurgical industry?
3. Metallic minerals are found in which type of rocks.
4. Name the plateau region where more than 90% of the mineral deposits of India are located.
5. Which metal is considered as 'iron like metal'?
6. Which state of India is the largest producer of bauxite?

Long Questions

[3 Marks each**]**

1. State any three difference between metallic minerals and non-metallic minerals.
2. Mention the important properties of anthracite coal.
3. Name a lignite coalfield of the following states.
   (i) Tamil Nadu (ii) Rajasthan (iii) Kashmir
4. Name any three recently discovered oil fields of India.
5. Name the oil refineries found in the following locations.
   (i) Visakhapatnam (ii) Bongaigaon (iii) Koyali

ARCHIVES*

Collection of Questions Asked in Previous Years' ICSE Class 10th Examinations

2018

1. Give two advantages that non-conventional energy sources have over conventional energy sources. ***(2)***

2. (i) Mention one advantage of use of natural gas over coal or petroleum. ***(2)***

(ii) Name one offshore oil field in India.

3. Answer the following. ***(3)***

(i) State one industrial use of copper.

(ii) Mention one advantage of generating power from biogas.

(iii) Name the mineral that toughens steel and makes it rust-proof.

4. (i) Name the metal obtained from bauxite. Give any one use of the metal mentioned by you. ***(3)***

(ii) Which multipurpose project provides power to both Punjab and Himachal Pradesh?

2017

1. Give the names of four important types of iron ore found in India. ***[2]***

2. Name the following. ***[2]***

(i) An off-shore oil field in Gulf of Cambay.

(ii) An oil refinery in Bihar.

3. (i) Name the state that produces the largest amount of limestone. ***[3]***

(ii) State two uses of limestone.

4. State an important industrial use of ***[3]***

(i) Manganese

(ii) Coal

(iii) Aluminium

2016

1. (i) Name any three types of coal found in India. ***[2]***

(ii) Which type of coal is mostly used in iron and steel industries?

2. Name the following. ***[2]***

(i) An offshore oil field of India.

(ii) An iron ore mine of Karnataka.

3. Name the following. ***[3]***

(i) Largest coal field of India.

(ii) Oldest oil field of India.

(iii) Best variety of iron ore.

4. (i) Name the metal extracted from Bauxite.

(ii) Mention two uses of this metal. ***[3]***

2015

1. State two reasons why limestone is a valuable mineral. *[2]*

2. State the most important use of the following. *[2]*

(i) Iron ore

(ii) Bauxite

3. Name the following. *[3]*

(i) Largest oil refinery in the Public sector.

(ii) State that is the largest producer of coal.

(iii) Best variety of iron ore.

4. Give a geographical reason for each of the following. *[3]*

(i) Many port cities have their own oil refineries.

(ii) Petroleum is called a 'fossil fuel'.

(iii) Coal is called a 'versatile mineral'.

2014

1. Mention any two uses of manganese. *[2]*

2. Which of the different varieties of coal is used for domestic purposes and why? *[2]*

3. Name the mineral used in the manufacture of *[3]*

(i) Cement (ii) Aluminium (iii) Synthetics

4. Which state is the leading producer of the following minerals? *[3]*

(i) Coal (ii) Oil (iii) Manganese

2013

1. Name the ore of aluminium. Describe two main uses of aluminium. *[2]*

2. Name any two industrial products for which limestone is used as a source of raw material. *[2]*

3. (i) Name two industries that use a high quantity of coal. *[3]*

(ii) Name one important area that has large coal deposits in the states of Jharkhand and West Bengal.

4. (i) Which state is the largest producer of mineral oil? *[3]*

(ii) Name two coastal and two inland oil refineries in India.

***** All these questions are covered and explained in chapter exercise 'Exam Practice'.

CHAPTER

9

Agriculture in India

The term agriculture has been taken and formed from two Latin words, '*Ager*' which means 'Land' and '*Culture*' which means 'Cultivation'. Man has been practicing agriculture since early ages. The basic purpose of agriculture is to produce food and fodder to human beings and **livestock**[1]. It is also the source of raw material for further manufacturing of finished goods by agro-industries like textiles, sugar, food processing, etc.

Importance of Agriculture

Importance of agriculture are as follows:

- Agriculture sector provides employment to a vast section of the population of our country.
- It provides food and food products to human population and fodder for livestock.
- It is the source of raw material for many agro-based and well as non-agro-based industries.
- It brings foreign exchange through export of many crops like tea, jute, cotton etc.
- Agricultural practices have provided **impetus**[2] to the automobiles and machine producing industries like tractors, threshers, harvesters and *vice-versa*.

Problems of Indian Agriculture

The government is making serious efforts to mitigate the problems regarding Indian agriculture. There are many problems in agriculture which lead to low yield. These are as follows:

Erratic Rainfall The agricultural sector in India is still dependent on rainfall which is very unreliable and irregular. Monsoon in India is often affected by many factors and its failure or late arrival causes serious problems for the farmers.

Limitations in Irrigational Facilities India is a vast country with large irrigated area but still a large portion of area lacks good irrigation facilities and still dependent on rainfall.

Small and Fragmented Landholdings Fragmented landholdings refers to a small or incomplete part or piece of land broken off or separated from the whole land to which it originally belongs. Majority of farmers in India are not rich and they possess very small landholding. It limits the usage of latest machineries and modern irrigation equipments. Even fertile land and productive labour cannot give good returns on small landholdings.

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1 Livestock These are domesticated animals raised by farmers to produce food (meat) and other products for commercial and domestic purposes.

2 Impetus It is the force which makes a process or activity to occur or happen more quickly.

Soil Erosion It is also an increasing problem causing loss of soil fertility and productivity. The indiscriminate clearing of forests, overgrazing by cattles have led to the degradation of soil quality.

Old Method of Cultivation Majority of Indian farmers are illiterate and lack in technical know how. They adopt old and inefficient methods of farming, e.g. wooden plough, bullocks, which lead to low production per hectare.

Poor Quality of Seeds The poor farmers of India are often out of reach of good high yielding varieties of seeds. This limitation causes low productivity.

Frequent Floods and Drought Flood is the most detrimental element which leads to damage of crops as well as decrease the fertility of soil. Flood is more common in Northern part of India while drought is common in Deccan Peninsular part mainly in Eastern Maharashtra which leads to drying up of crops.

Poverty and Lack of Knowledge Due to poverty or lack of knowledge farmers are not able to buy or use good quality manure, fertilisers or pesticides. This reduces agricultural production greatly. They are not able to understand the various crop diseases or find their remedies due to lack of education.

Pests and Crop Diseases Farmers in India are still facing the problems of pests and various diseases relating to their crops. Government provides **subsidy**[3] on various pesticides and herbicides in order to make it easy and cheaper for farmer to use it. Farmers should be educated properly for effective usage of these biocides.

Reforms of Agriculture

Agriculture forms the backbone of Indian economy but its declining share in GDP calls for aggressive reforms. The major agricultural reforms are discussed below:

Institutional Reforms Major insitutional reforms include **collectivisation**[4], consolidation of land holdings (Chakbandi), development of cooperative societies, abolition of zamindari, Right of inheritance, fragmentation of landholding, etc. These are land reforms that improve the agricultural condition for farmers.

Technological Reforms These reforms improve the way of crop production by use of modern technology. In 1960s, Indian Government introduced Green Revolution where modern technology like HYV seeds, modern machinery, fertilisers were introduced in the production of rice and wheat.

Reforms for Farmers These reforms improve the condition of the farmers. This is done by providing crop insurance to farmers against drought, flood, cyclone, fire, crop disease, etc. Government also provide loans at lower rate of interest to farmers. For this, it established grameen banks, cooperative societies, etc.

Other Reforms

- Promoting agricultural research by establishing Indian Council of Agricultural Research & Agricultural Universities.
- Issue of Kisan Credit Cards to farmers so that they could get cheap and early loans. Government also provides Personal Accident Insurance Scheme (PAIS) to KCC holders.
- Providing subsidy to farmers by reducing the cost of agricultural inputs like seeds, electricity, irrigation facility at subsidised rates.
- Announcing minimum support price for essential agricultural products by the Government to ensure that farmers are able to sell their produce at proper rates.

National Agricultural Policy (NAP)

The National Agricultural Policy is the Government initiative which came in 2000, to increase the untapped growth potential of Indian agriculture. The policy aims

- To strengthen rural infrastructure
- To support faster agricultural development
- Promote value addition
- Accelerate the growth of agro-business
- Create employment in rural areas
- Secure a fair standard of living of farmers and agricultural workers
- Face the challenge arising out of economic liberalisation and globalisation.

CHECK POINT 01

1 Which crops bring foreign exchange in India? Name them.
2 Mention any one problem faced by Indian farmers in agriculture.
3 Name one technological change introduced by government.

3 Subsidy It is the sum of money granted by government to keep the price of a commodity very low.
4 Collectivisation This is meant that small farms would be gathered together to form one large massive one.

Types of Farming in India

India is an agricultural country with undulating **topography**[5] and varied climate. Keeping these characteristics of India, different types of farming are practiced in different parts of the country. Different types of farming are as follows:

Shifting Farming

It is also known as 'slash and burn' agriculture. This type of agriculture is mainly practiced in North-East India and hilly areas. A patch of forest is cleared by cutting trees and setting the stub on fire. The cleared ground is then cultivated for 2-3 years until the fertility of the soil is exhausted. After couple of years, the farmer abandons the land and moves to a fresh piece of land to repeat the same process for few years. This type of cultivation is known by different local names in different areas like **Jhum** in Assam, **Podu** in Andhra Pradesh/Telangana, **Ponam** in Kerala, **Koman** in Odisha, **Kuruwa** in Jharkhand and Bewar, **Masha**, **Penda** and **Hera** in Madhya Pradesh. This type of agriculture being effectively discouraged by the government due to its **detrimental**[6] effect on the environment.

Subsistence Farming

This method of farming is practiced by majority of the farmers in India who produce exclusively for their own consumption. In this type of farming, the farmers have very scattered and small land holding and they use primitive tools. As the farmers are poor, they are devoid of the facilities like fertilisers, high quality seeds, electricity and irrigation. This results in very low production and hence, they use it for their own consumption and seldom sell in the market. This type of farming is highly dependent on monsoon since there is no irrigation facilities and also depends on the natural fertility of the soil.

Intensive Farming

This is the type of farming in which small piece of land is cultivated intensively (due to its reduced land size). The main focus is on increasing the yield per hectare by using fertilisers, high quality seeds, best irrigation facilities. It is practiced in densely populated areas and employs huge manual labour. The crops grown in this type of farming is rice and wheat. It is popular mainly in Northern plains of India and the coastal areas of South India which has proper irrigation facilities.

Extensive Farming

This type of farming is practiced on lands of comparatively large size in which considerable amount of capital and labour are used. In this farming, farmer focuses on one or two important commercial crops, which mainly includes rice, wheat, sugarcane, etc. This type of agriculture is practiced in North-Western parts of India and Tarai region.

Plantation Farming

This type of agriculture is practiced on a large (continuous) piece of land or estates where cultivation of a single crop (mainly cash crops) like tea, coffee, rubber, spices, etc is done on a large scale. Such type of agricultural practice involves large capital, vast agricultural estate, managerial ability, fertilisers, modern and sophisticated machineries as well as scientific techniques. Plantation practice was introduced by the Britishers in the 19th century. The planters in India still lacks technical know how and fluent transport facilities which is the main demand for this type of farming. Plantation farming is mainly practiced in Assam hills, Northern Bengal, hills of South India like Nilgiri, Anaimalai and Cardamom hills where tea, coffee, rubber, coconut, palm oil, banana, spices, cinchona, etc are cultivated.

Mixed Farming

The practice of cultivation of crops as well as raising of animals/livestock simultaneously is popularly known as 'mixed farming'. Sometimes, fruits and vegetables are also grown along with poultry farming. Modern technology and machineries, high quality seeds, chemical fertilisers are used to grow two or more crops together, having different maturing periods.

Mixed farming is very helpful for the farmers because even if the crops fail they can rely on their rearing for income. This type of agriculture is most common mainly in developed countries as they are possessed with large land holdings and latest technology.

Commercial Farming

In this type of agriculture, crops are cultivated mainly for commercial purpose i.e for selling in the market, e.g. sugarcane, tobacco, oilseeds, etc. Cotton and jute are fibre crops that are the major cash crops.

5 Topography It is the distribution of natural physical features on the surface of an area.

6 Detrimental The things which cause harm or damage.

This type of farming incorporates high quality seeds, expensive fertiliser, pesticides, etc. It is generally practiced in those areas where farms are large and population is sparse. Commercial farming have been successful mainly in Punjab, Haryana, Gujarat, Western Uttar Pradesh and Andhra Pradesh. This type of farming is still not prevalent in rest of India due to small landholdings.

Green Revolution

It is the term used for depicting the revolutionary increase in India's agricultural production in late 1960s, particularly in major cereal crops like wheat. It was characterised by the usage of High Yielding Varieties (HYV) of seeds, proper use of chemical fertilisers, use of modern scientific methods, use of insecticides and pesticides and consolidation of land holding.

Agricultural Seasons

India has three main crop seasons. These are:

(i) Kharif These crops are grown during the month of June and July and harvested in September and October during autumn months.

Major kharif crops are rice, bajra, ragi, maize, sugarcane, cotton and jute.

(ii) Rabi These crops are grown in October and November, as the winter season sets in and harvested in March and April. The major crops are of sub-tropical or temperate type like wheat, barley, peas, linseed, rapeseed, gram, mustard, etc which are helped by the low temperature condition during this season.

(iii) Zaid These crops are grown in August and September, while harvested in December and January. All the oilseeds like mustard and other crops like jowar, maize, watermelons, cucumber are zaid crops.

CHECK POINT 02

1. In which type of farming a land is cultivated for only 2-3 years?
2. Name the farming practice which is done only for the farmer's own consumption.
3. Name two commercial crops in India.
4. Mention the name of the crops grown in rabi season.

SUMMARY

- Agriculture is the backbone of Indian economy and provides employment and livelihood to about 47% of Indian population in 2017.
- Government of India made concerted efforts to modernise agriculture through establishment of Indian Council of Agriculture Research (ICAR), agricultural universities, veterinary services and animal breeding centres, horticulture research and development in the field of meteorology and weather forecast, etc along with improving the rural infrastructure.
- Apart from these, many other reforms development programmes and schemes for farmers have taken place in order to improve the scenario of the Indian farming and boost-up the Indian economy.
- Many types of agricultural practices have developed in India. Shifting agriculture, subsistence farming, intensive farming are done in small piece of land.
- Extensive farming, plantation farming, commercial farming are done on large land areas with use of machinery.
- In India, there are three agricultural seasons i.e. Kharif, Rabi and Zaid.
- Kharif crops are grown during the month of June and July and harvested in September and October, e.g. rice, jowar, bajra, ragi, etc.
- Rabi crops are grown in October and November, e.g. wheat, barley, peas, gram, etc.
- Zaid crops are grown in August and September, while harvested in December and January, e.g. watermelon, maize, cucumber, etc.

EXAM PRACTICE

a Short Questions [2 Marks each]

1. What do you understand by the term 'agriculture'?

Ans. The term agriculture is formed from two latin words, 'Ager' which means 'Land' and 'Culture' which means 'Cultivation'. The basic purpose of agriculture is to produce food and fodder.

2. What is the importance of agriculture in India? Mention two factors. ***[2012]***

Or Mention any two reasons for the importance of agriculture in India. ***[2016]***

Ans. Two factors of importance are as follows:

(i) Agriculture sector provides employment to vast section of the population of our country.

(ii) It provides food and food products like rice, wheat milk, etc to human population and fodder for livestock.

3. Name the major factors which significantly influence the method of cultivation in India.

Ans. Physical environment, technological know how and socio-cultural practices are some major factors that influence the method of cultivation in India.

4. How have poverty and fragmentation of land become problems of agricultural India? ***[2014]***

Ans. Majority of farmers in India are not very rich and they possess very small landholding which limits the usage of latest machinery, fertilisers and modern irrigational equipments on theirpiecas land. These small and fragmented pieces of lands lead to wastage of time, labour and a lot of fertile land is wasted in raising boundaries. These limitations do not allow high yield and proper income.

5. Mention any two problems of agriculture in India. ***[2011]***

Ans. There are many problems in agriculture which lead to low yield, these are :

(i) **Erratic Rainfall** The agriculture sector in India is still dependent on rainfall which is very unreliable and irregular. Its failure or late arrival causes serious problem for the farmers.

(ii) **Limitations in Irrigational Facilities** India is a vast country with large irrigated area but still a large portion of area lacks good irrigation facilities and is still dependent on rainfall.

6. What do you understand by commercial farming?

Ans. In this type of agriculture, crops are cultivated mainly for commercial purpose i.e. to sale it in the market. Sugarcane, oilseeds, fibre crops like cotton and jute are the main cash crops.

7. What do you mean by jhooming?

Or

Explain shifting cultivation. ***[2016]***

Ans. Shifting agriculture is also known as 'slash and burn agriculture' or 'jhooming'. Shifting cultivation involves a patch of forest which is cleared, trees are cut down and the stumps are set on fire. The patch is then cultivated for a few years and when the soil becomes infertile, the cultivator moves to a fresh piece of land and repeats the same procedure.

8. Mention two disadvantages of shifting agriculture in India.

Ans. Disadvantages of shifting agriculture are as follows:

(i) When the land is abandoned, it leads to soil erosion

(ii) It amounts to low production of crops.

9. Mention two difference between shifting agriculture and plantation agriculture.

Ans. Two difference between shifting and plantation are as follows:

	Shifting	Plantation
(i)	It is practised on a small piece of land for a few years.	This is practised on a large piece of land continuously.
(ii)	It is primitive type of agriculture.	It uses modern technology.

10. Mention any two features of extensive agriculture.

Ans. Two features of extensive agriculture are as follows:

(i) This type of farming is practised on lands of comparatively large size in which small amount of capital and labour are used.

(ii) This farming is mainly carried out with the help of big machines. The farmer focusses on a few important commercial crops.

11. Distinguish between intensive commercial farming and extensive commercial farming. ***[2013]***

Ans. Difference between intensive and extensive farming are as follows:

	Intensive	Extensive
(i)	This type of farming is practised on a small piece of land.	This is practised on comparatively large piece of land.
(ii)	It employs huge manual labour.	It is carried out with the help of big machines.

12. Explain two important characteristics of plantation farming. Name two important plantation crop.

Or Mention any two features of plantation farming stating two examples. ***[2014]***

Ans. Two important characteristics of plantation farming are as follows:

(i) This type of agricultural practice involves large capital and vast agriculture estate for cultivation of single crop.

(ii) These farms employ labour on large scale. Tea, coffee, rubber, spices (mainly cash crops) are its examples.

13. What do you mean by mixed farming? Give its one advantage.

Or What is mixed farming? Mention any one benefit of mixed farming. ***[2017]***

Ans. The practise of cultivation of crops as well as raising of animals/livestock simultaneously is popularly known as 'mixed farming'. Sometimes, fruits and vegetables are also grown along with poultry farming.

Benefit Mixed Farming is very helpful for the farmers because even if the crops fail they can rely on their cattle rearing for income.

14. Name some crops of commercial farming. State any one characteristics of this farming.

Ans. Tea, coffee, rubber, sugarcane etc. are crops of commercial farming.

Characteristics The use of high doses of modern inputs, like high yielding varieties of seeds, chemical, fertilisers, insecticides and pesticides in order to obtain higher productivity.

15. Mention any two difference between subsistence agriculture and commerical agriculture.

Ans. Two difference are as follows:

	Subsistance	Commercial
(i)	In this type of agriculture farmer produces exclusively for his own consumption.	In this type of agriculture crops are cultivated for commercial purpose.
(ii)	It is devoid of facilities like fertilisers, high quality seeds.	It incorporates high quality seeds, expensive fertilisers etc.

16. Answer the following questions.

(i) When are kharif crops sown and harvested?

(ii) Name the cash crop which is also a kharif crop.

Ans. (i) Kharif crops are sown in June and July with the arrival of the monsoon rains. They are harvested in October and November.

(ii) Cotton is a cash crop and also a kharif crop in Peninsular India.

b Long Questions [3 Marks each]

1. Explain how lack of quality seeds and modern technology have affected the agriculture?

Ans. Lack of quality seeds and modern technology have severely affected the agriculture in India by the following ways:

(i) **Poor Quality Seeds** The poor farmers of India are often out of reach of good high yielding varieties of seeds. This limitation causes low production.

(ii) **Lack of Reach of Modern Technology** Farmers are out of reach of latest technology and methods. Due to this, they do not get proper yield per hectare. Efforts should be made to provide education for modern means of farming to the farmers through radio, television, schools etc.

2. How is proper use of manure important in agriculture?

Ans. Agriculture in India is the primary sector. Farmers in India grow crops continuously throughout the year which is very detrimental for the quality of the soil. The agriculture in India is of subsistence type due to over population. Proper use of manure and fertilisers are very essential for keeping the quality of the soil intact and to raise the productivity from agriculture.

3. Explain the features of subsistence farming including its primary aim.

Ans. It is a type of agriculture practised by majority of the farmers in India who produce exclusively for their own consumption. In this type of farming, the farmers have very scattered and small land holdings and they use primitive tools. As the farmers are poor, they are devoid of the facilities like fertilisers, high quality seeds, electricity and irrigation. This results in very low production and hence, they use it for their own consumption and seldom sell in the market.

4. State any three important features of plantation farming in India. ***[2011]***

Ans. Important features of plantation farming are as follows:

- Plantation farming includes vast extensive estates, managerial ability, large capital, technically developed, good fertilisers, well developed transport, etc.
- This farming also facilitates their workers by providing schools, houses, market places, hospitals and other facilities. In India, it is practised in Assam, Darjeeling, Nilgiri and Ansamalai, etc.
- The important crops grown on plantations are tea, coffee, coconut, oil palm, spices, banana, cinchona and rubber. Many of these crops are developed as single cash crops on a vast scale and are exported.

5. Differentiate between a rabi crop and a kharif crop. ***[2015]***

Ans. Difference between the two are as follows:

	Rabi Crop	Kharif Crop
(i)	Rabi crops are sown in October-November and harvested in March-April.	Kharif crops are sown in June-July and harvested in September-October.
(ii)	It is sown mainly in winter season.	It is sown mainly in summer season.
(iii)	For example, wheat, peas, gram, oilseeds, barley etc.	For example, rice, maize, cotton, groundnut, jowar, bajra etc.

6. (i) Why is agriculture important in India? ***[2018]***

(ii) Name the two main agricultural seasons in India.

(iii) What is mixed farming?

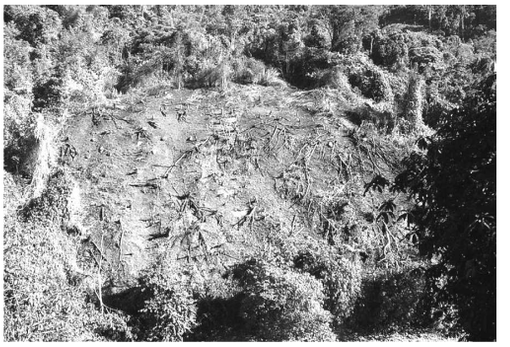
Ans. (i) Agriculture is important in India because it provides vast number of employment to the population of our country.

(ii) The two main agricultural seasons in India are Rabi season and Kharif season.

(iii) The practice of cultivation of crops as well as raising of animals/livestock simultaneously is popularly known as mixed farming.

C Picture Based Question

1. With reference to the given picture answer the following questions.



(i) Which type of farming is shown in above picture? Name two places where this farming takes place.

(ii) Mention the another name of this farming.

Ans. (i) The farming shown in the picture is known as shifting cultivation.

The two places where shifting farming takes place are Andhra Pradesh and Kerala.

(ii) Another name of shifting cultivation is slash and burn method.

CHAPTER TEST

Short Questions

[2 Marks each]

1. How does the monsoon affect cultivation in India?
2. How is soil erosion becoming a problem for Indian agriculture?
3. Where is Jhooming practised in India and what are its disadvantages?
4. State two characteristics of plantation agriculture.
5. What is the importance of agriculture?
6. Mention any two problems of Indian agriculture.
7. State any two reforms of agriculture.
8. Give any two features of shifting farming.
9. Differentiate between mixed farming and commercial farming.

Long Questions

[3 Marks each]

1. Why is agriculture known as 'backbone of India's economic system'?
2. What are the types of agriculture practised in India? Which is the most common farming in India and why?
3. Explain Green Revolution.

ARCHIVES*

Collection of Questions Asked in Previous Years' ICSE Class 10th Examinations

2018

1. (i) Why is agriculture important in India? *[3]*
(ii) Name the two main agricultural seasons in India.
(iii) What is mixed farming?

2017

1. What is mixed farming? Mention any one benefit of mixed farming. *[2]*

2016

1. Mention any two reasons for the importance of agriculture in India. *[2]*

2. Explain shifting cultivation. *[2]*

2015

1. Differentiate between a rabi crop and a kharif crop. *[3]*

2014

1. How have poverty and fragmentation of land become problems of agricultural India? *[2]*

2. Mention any two features of plantation farming stating two examples. *[2]*

2013

1. Distinguish between intensive commercial farming and extensive commercial farming. *[2]*

* All these questions are covered and explained in chapter exercise 'Exam Practice'.

CHAPTER

10

Food and Fibre Crops of India

Food Crops of India

Rice, wheat, millets and pulses are major food crops of India. Their climatic conditions, soil requirements, methods of cultivation, processing and distribution of these crops are discussed below:

Rice

It is the most important staple food crop of India. It supports half of the Indian population. India is the second largest producer of rice in the world after China. It is grown all over country mainly in North-East and Southern parts of the country. Rice is a kharif crop in North India while it can be grown throughout the year in South if proper irrigation is available. Rice grows in well watered lowland plain that can be flooded. The rice grown in low land fields are called low land rice. They are rainfed or irrigated.

The supply of water to hilly regions is not as much as on the plains, hence the rice grown in hilly areas is called 'dry' or 'upland rice' where the rice is grown without flooding the fields.

Climatic Conditions

The geographical and climatic conditions suitable for the growth of rice are as follows:

Temperature Rice requires an average temperature of about 24°C. The mean temperature for flowering and fertilisation ranges from 16°C to 20°C whereas during ripening, it needs temperature from 18°C to 32°C. Temperature beyond 35°C is not suitable and it needs ample amount of sunshine as well as water.

Rainfall Rice cultivation requires ample amount of water and the average rainfall required is about 150 cm to 300 cm. Flooded fields with **stagnant**[1] water during the early part of growing season is very helpful. Therefore, the monsoon lands are best suited for rice cultivation.

1 Stagnant The standing or immobile fluid which shows no activity.

Soil Requirements

Deep fertile clayey or loamy soils are ideal for rice cultivation. Rice is cultivated in the alluvial soils around the river banks.

Methods of Cultivation

Rice can be cultivated by different type of methods as given below:

Broadcasting Method It involves the sowing of inferior quality of seeds by sprinkling them all over the field by hand, after ploughing it. The yield is low in this method of cultivation.

Drilling Method This method is prevalent in peninsular India. In this method, seeds are dropped in the **furrow**[2] through a bamboo shaft attached to the plough. The seeds fall in the furrows thereby saving the wastage of seeds, but it is time consuming. The germination rate of the seeds in this method is high.

Dibbling Method In this type of method, seeds are sown at regular intervals in the furrows made by the farmers with the help of plough.

Transplantation This method is dominant in the areas of fertile, deltaic soil with abundant rainfall and plenty of sunshine. Here, the seeds are first sown in nurseries after soaking them in water for 24 hours. After about 4 to 5 weeks when the seedlings attain about 20 to 25 cm of height, they are removed with their roots and transplanted in the flooded fields, so that they can grow again.

Japanese Method In Japanese method, good quality seeds are used but in less quantity. The seeds are sown on a raised nursery bed at a regular distance of 20 to 25 cm, so that the **weeding**[3] and fertilising process are made easy.

In this method, heavy use of fertilisers and hybrid seeds are included which results in high yield of rice.

Harvesting

Harvesting of rice is done by hand but in commercial farming it is done by machines. The crop which is cut is kept in the field to let it dry for about 3 to 4 days. After that, it is threshed and crushed by bullocks to separate the **kernel**[4] from the seed. The rice is then polished which makes it attractive but lesser in nutrients. Thus, hand pounded rice is considered more nutritious.

Regions of Rice Cultivation

Rice is cultivated in almost all parts of the country except higher parts of Himalayas in the North. The main rice producing area in India are as follows:

- Lower and Middle Gangetic Plain
- Brahmaputra Valley
- East and West Coastal Regions
- Parts of Peninsular Plateau
- States producing rice are West Bengal (largest producer), Tamil Nadu, Bihar, Odisha, Punjab, Haryana and Western Uttar Pradesh.

Wheat

It is the second most important staple food in India after rice. It is high in protein, vitamins and carbohydrates. India is the second largest producer of wheat after China. Wheat is a rabi crop grown in winter and harvested in March or April.

Climatic Conditions

The geographical conditions suitable for the growth of wheat are as follows:

Temperature Wheat is a temperate crop and needs a cool climate with moderate amount of rainfall. It requires an average temperature of about 10°C to 15°C at the time of sowing but higher temperature at the time of ripening and harvesting (20° C to 25° C), though sudden rise of temperature is harmful. Winter temperature of the North India is more favourable for wheat production. Wheat is generally not grown in South and North-East due to very high temperature even in winters.

Rainfall Wheat requires rainfall of about 50 cm to 100 cm during growing period. Too much rainfall is harmful for wheat while the shortage of rain may dry the crop. Irrigation becomes important when there is shortage of rainfall.

Soil Requirements

Its cultivation is practised best in well drained, fertile, loamy, alluvial soils of clayey type. In India, it is mainly grown in flat alluvial plains of North India. Wheat is sown in winter after rain. The deep soil provides the required moisture to wheat crop. Wheat can be grown in black cotton soil as well.

2 Furrow It is a long, narrow trench made in the ground by a plough, especially for planting seeds or irrigation.
3 Weeding Removal of unwanted plants from the field.
4 Kernel A soft, edible part of a nut, seed or fruit contain within its hard shell.

Methods of Cultivation

As wheat is a rabi crop, hence the field is prepared by the end of November and the crops are harvested in March. There is enough moisture available in the soil in November to help the crop to grow. Seeds are sown by various methods like broadcasting, dibbling and drilling. The condition of fairly low temperature in the month of October November and the rainfall in winters by the Westerly depressions are very helpful for wheat.

Harvesting

The crops are harvested generally in the month of March before the summer heat sets in. Harvesting is carried out by sickle, but it is being replaced by machines now. Warm and sunny weather condition is helpful in the ripening of the crop. Hailstorms, frost or rain are very harmful at the time of harvesting.

Regions of Wheat Cultivation

Uttar Pradesh is the largest producer of wheat in India. Uttar Pradesh, Punjab and Haryana are called 'Grainary of India' which has been possible due to the Green Revolution Programme in 1960's. The other major wheat producing states are Madhya Pradesh, Rajasthan, Bihar, Maharashtra, Gujarat, Karnataka, West Bengal and Uttarakhand.

Millets (Jowar, Bajra and Ragi)

Millets are kharif crops grown in comparatively inferior areas where rice and wheat cannot be cultivated. Millets are food of the poor and provide an important fodder for cattle. These are drought resistant crops and do not require specific soil but loamy, sandy and clayey soils are better for production.

Jowar

Jowar can be both kharif as well as rabi crop. Jowar can be grown in **regur, clayey black soils**. Kharif jowar is grown in sandy soil while rabi jowar is grown in black regur soils. It requires 27°C to 32°C of **temperature** for its optimum cultivation. It requires **rainfall** ranging from 40 to 100 cm. Rainfall above 100 cm causes damage to the crop. Maharashtra is the largest producer of jowar. It is also grown in Karnataka, Madhya Pradesh, Andhra Pradesh, Tamil Nadu, Rajasthan, Gujarat and Uttar Pradesh.

Bajra

It is a kharif crop which is used both as food as well as fodder in our country. In some parts of the country it is used as thatching material for the roof. It is produced on different types of soil. It can be grown in poor, **light sandy soils** as well as **black** and **red** or **gravelly** soils. It requires a **temperature** ranging from 25°C to 30°C. It requires a **rainfall** between 40 to 50 cm. It grows very well in bright sunshine just after showers. It is grown mainly in Rajasthan, Maharashtra, Gujarat, Uttar Pradesh, Tamil Nadu and Haryana.

Ragi

Ragi is not a season bound crop and hence can be cultivated throughout the year, if moisture is available. The main season of Ragi is from June to September. Ragi is cultivated mostly in red laterite soils. Relatively **fertile** and **well drained** soils are the most suitable. The average **temperature** required for Ragi is about 20°C to 40°C. It is suited for cultivation in areas with **annual rainfall** of 50 to 100 cm. It does not tolerate heavy rainfall and requires a dry spell at the time of grain ripening. Karnataka is the leading producer of ragi in India. Tamil Nadu is the second largest producer. Maharashtra and Uttar Pradesh also produce ragi.

Pulses

Pulses are main source of protein in a vegetarian diet. India is the largest producer and consumer of pulses in the world. It is a rabi crop which provides essential vegetable proteins. Pulses are leguminous plants with root nodules which have the capacity to fix and use atmospheric nitrogen in the soil. These are often rotated with other crops to keep the fertility of the soil intact. They are often used as food for cattle. Gram, tur (arhar), urad (black gram), moong (green gram), masoor (lentil), metar (peas) and moth are examples of pulses.

Climatic Conditions

The geographical conditions suitable for the growth of pulses are as follows:

Temperature It can be cultivated in a wide range of climatic conditions but it grows best in mild, cool and comparatively dry climate having a range of 20°C to 25°C of temperature.

Rainfall It needs rainfall of about 50 to 75 cm.

Soil Requirements

Pulses are produced in loamy, alluvial and dry type of soil. Heavier soils with more water retention capacity are considered ideal for cultivation of pulses. Pulses cannot be grown on saline and acidic soils.

Methods of Cultivation

Being a rabi crop, pulses are sown between September and November and harvested in February and April. After maturing in about 5-6 months, it is pulled out and

is kept in the open to dry. It is thrashed by sticks or trampled by bullocks after that the seeds come out.

Regions of Pulse Cultivation

Pulses are mainly grown in Madhya Pradesh, Maharashtra, Uttar Pradesh, Himachal Pradesh, Rajasthan, Haryana, Andhra Pradesh, West Bengal, Karnataka, etc.

CHECK POINT 01

1. What kind of soil is required for the cultivation of rice?
2. In which season wheat is harvested?
3. Name a crop, which can be grown in both Kharif and Rabi season?
4. State any one reason which made pulses an important crop in India.

Fibre Crops

Cotton and Jute are the main fibre crops that are produced on a large scale in India.

Cotton

It is very important fibre crop that supplies raw material to textile industry. Cotton seed is an important source of edible oil. India is the second largest producer of cotton in the world after China. Cotton is a tropical crop and it is grown in India as a kharif crop. Its types are as follows:

Short Staple Cotton Its length is less than 20 mm. This is an inferior quality of cotton and is produced in the upper Ganges valley. It is produced in Punjab.

Medium Staple Cotton It has a length of about 20 to 24 mm. In India, majority of cotton output is of this type. It is produced in North-Western Deccan region.

Long Staple Cotton It has the longest fibre whose length ranges from 24 to 30 mm. The fibre is of superior quality and shiny. It is used to make fine quality of cotton clothes. It is produced in Central and Southern Deccan region.

Climatic Conditions

The geographical conditioons suitable for the growth of cotton are as follows:

Temperature Cotton needs mild, cool and comparatively dry climate having temperature 21°C to 27°C and abundant sunshine is necessary during its growth period. A long period of 200 (frost free) days are essential for the plant to mature.

Rainfall Cotton plant need a moderate rainfall of 50 cm to 80 cm which should be well distributed throughout the year. Stagnant water and excessive rainfall are injurious for the growth of the plant.

Soil Requirements

Cotton is grown on variety of soils, but it is grown mainly in the **black** (regur) **soil** of the Deccan Plateau and Malwa Plateau, as these soils have the ability to retain moisture. It also grows well in the alluvial soil of Sutlej-Ganga plains.

Methods of Cultivation

Cotton is sown in April-May and mainly as kharif crop. It takes 6 to 8 months to mature but depending upon the geographical conditions, they are sown at different time in different parts of the country. In Punjab and Haryana, it is sown as a rabi crop while in peninsular India, it is grown as kharif crop because of the fear of frost. The seeds are sown by the broadcasting method. Irrigation helps the crops to grow better. In peninsular India, it is harvested between January and March whereas in Northern India, it is harvested in December and January before the winter frost which is very harmful for the crop.

Processing

Picking and ginning are the main activities under processing which is mostly done by hand. The picking season normally continues for 3 months as the balls continue to mature. A lot of labour is required for picking process because it cannot be mechanised.

Ginning is the process of separation of seeds and fibre from the raw material known as 'lint'. It is known as 'roller gins' in India. After separating, the lint is tied in bales and sent to the cotton mills for cleaning and spinning into threads. After cleaning by washing, these bales are combed and made into an untwisted rope called a 'sliver'. Then a spinning frame turns these slivers directly into cotton yarns. Finally, the yarn is dyed and looms are used to weave it into garments and fabrics.

Cotton seeds are obtained from cotton after ginning which are used to obtain oil. The oil cake is used as a fodder for the cattle and also as a manure.

Regions of Cotton Cultivation

India is not the largest producer of cotton but has the largest area under cultivation. It is grown mainly in three regions:

(i) **Northern Region** It includes Punjab, Haryana, Rajasthan and Western Uttar Pradesh.

(ii) **Southern Region** It includes Tamil Nadu, Andhra Pradesh and Karnataka.

(iii) **Central Region** It includes Madhya Pradesh, Gujarat (largest producer) and Maharashtra (second largest producer).

Jute

This is also an important fibre crop. India is the second largest producer after Bangladesh. It is known as **golden fibre** of India because it earns valuable foreign exchange by exporting good quality of jute.

It is also known as **brown paper bag** as its sacks are used for packing wheat, rice, sugar, cement, etc. However, it is getting stiff competition from plastic and synthetic fibres. India is the largest exporter of jute. It is used for making gunny bags, ropes, strings, carpets, etc.

There are two types of jute produced in India:

(i) **White Jute** This is grown in deltas of lowlands and highland.

(ii) **Tossa Jute** It is grown only on uplands because it cannot grow in flooded area.

Climatic Conditions

The geographical conditions suitable for the growth of jute are as follows:

Temperature Jute requires a temperature ranging from 24°C to 37°C. Hot and humid climate is very useful for jute production.

Rainfall Jute requires high relative humidity of about 80% to 90%. It requires huge rainfall of 150 cm to 200 cm. However, incessant and untimely rainfall and prolonged droughts are harmful for the plants.

Soil Requirements

Jute grows best on the soil rich with alluvium i.e. flood plains, hence light sandy or clayey loams are considered to be best for jute cultivation. The clayey soil gives the heaviest yield but the fibre becomes sticky while sandy soil produce coarse fibre.

Methods of Cultivation

Jute is generally sown in February on lowlands and in March-June on upland. Sowing is mostly done by drilling or broadcasting method. Weeding is very important in the early stages of growth. The Jute plant is harvested from July to September. The plant are generally uprooted, if the area is flooded, otherwise it is cut to ground length. Some part of the crops is left behind in the fields to develop the seed.

Processing

After harvesting the plant, it is tied into bundles. It is dried and stripped of unwanted leaves and is kept submerged in water for 2 to 3 weeks. This process is known as 'retting'. Retting is a micro-biological process.

It softens the outer bark and facilitates the easy removability of the fibres from the stalk. As soon as it is easy to separate the fibre from the stalk, the bark is peeled and fibres are removed. After it is dried, the fibres are loosely spun, woven and pressed into large bundles called bales.

Regions of Jute Cultivation

West Bengal is the leading producer of jute in India. Bihar, Assam and Odisha are the other states which produce jute. West Bengal is the leading jute producer in India due to the following reasons:

- West Bengal has hot and humid climate which is favourable for jute production.
- West Bengal is rich in alluvial and loamy soil.
- It has plenty of cheap labour availability.
- More than 60% of the total area is under the cultivation of jute.

CHECK POINT 02

1 Which part of cotton is an important source of edible oil?
2 In which region long staple cotton is produced?
3 What is the other name for jute?

SUMMARY

- Rice is the most important staple food crop of India. It is a kharif crop and requires 18°C to 32°C temperature with 150 to 300 cm rainfall.
- India is the second largest producer of wheat after China. Wheat requires rainfall of about 50 to 100 cm.
- Millets are foodgrains that grow well even in dry areas. They are major food of the poor people.
- Pulses are rabi crops which have the capacity to fix and use atmospheric nitrogen in the soil. They are major source of protein.
- Cotton and jute are important non-food crops of India and form the base of agro-based industries.
- Cotton is important fibre crop. India is the second largest producer of cotton in the world.
- Jute is a very important fibre crop in India after cotton. It is also known as 'golden fibre' of India. India is the second largest producer of jute in the world.

EXAM PRACTICE

a Short Questions [2 Marks each]

1. What do you understand by cereals?

Ans. Cereals are all kinds of grass like plants, which have starchy, edible seeds. The most common cereals are rice, wheat, maize, barley, oats, millets etc. They have formed a basic diet for humans due to its high nutritional value.

2. Name all the types of soils in which rice can be grown.

Ans. The major soil groups where rice is grown well are montane, terai, laterite, coastal alluvium, red sandy, mixed red and black and medium and shallow black soils.

3. What are the different methods for sowing rice?

Ans. Rice can be cultivated by different types of methods. For example, broadcasting, dibbling, drilling method, transplantation, Japanese method.

4. Which is the most preferred method of sowing of rice? In which areas it is dominated?

Ans. Transplantation method is the most important method for sowing of rice. This method is dominant in the areas of fertile, deltaic soil with abundant rainfall and plenty of sunshine.

5. With reference to rice cultivation, answer the following. ***[2016]***

(i) Why does rice grow well in a soil with clay like subsoil?

(ii) What is the advantage of growing rice in nurseries before it is transplanted?

Ans. (i) Rice grow well in a clay like subsoil because the rice fields need standing water and clay like subsoil do not let the water percolate.

(ii) By planting the rice seeds in nurseries before transplantation, fertilisers and pesticides can be properly added. This also quickens the germination process and reduces wastage as unhealthy seeds and weeds are eliminated.

6. State two geographical requirements for the growth of wheat in India. ***[2011]***

Ans. Two geographical requirements for growth of wheat are as follows:

(i) **Temperature** Wheat requires an average temperature of about 10°C to 15°C at the time of sowing but higher temperature at the time of ripening and harvesting.

(ii) **Rainfall** It requires rainfall of about 50 cm to 100 cm during growing period.

7. State the three grains (millets) grown in India. Name three major producing states of these crops.

Ans. The three types of millet grown in India are Jowar, Bajra and Ragi. The major producing states are Maharashtra, Rajasthan and Karnataka.

8. Name a pulse crop cultivated in India.

(i) During the rabi season.

(ii) During the kharif season.

Ans. (i) Pulses grown during rabi season are gram and masoor.

(ii) Pulses grown during kharif season are tur and urad.

9. Name a state which produces short staple cotton. Which climatic and soil conditions favour the cultivation of cotton in the state mentioned? ***[2012]***

Ans. Punjab produces short staple cotton. The climatic conditions favouring the cultivation of cotton are mild, cool and dry climate with no frost. The soil here is alluvial and light, which suits this crop.

10. Name the state in India which leads cotton cultivation. Mention two climatic factors which affect the cotton cultivation adversely. ***[2010]***

Ans. Maharashtra leads in cotton cultivation. Frost and excess cold at the time of ripening of cotton balls affect cotton cultivation adversely.

11. With reference to rice cultivation answer the following. ***[2018]***

(i) Why does the cultivation of rice require a lot of manual labour?

(ii) Mention two geographical conditions which suit the cultivation of rice.

Ans. (i) Cotton is a labour intensive crop because it needs temperature between 21°C and 27°C and abundant sunshine. Its processes are more labour intensive because a lot of labour is required for picking process.

(ii) Retting is a processing method of jute under which bundles of jute are immersed in soft running water for 2 to 3 weeks to remove fibre from the stalk.

(iii) The growing of pulses is important in India because pulses are rich in proteins and found to be a main source of protein for vegetarian people. It is also second most important Indian diet after cereals.

12. In which season is wheat grown in Northern India? What are the rainfall and soil requirements of this crop?

Ans. In Rabi season i.e. winter wheat is grown in Northern India. Its cultivation is practised best in well drained, fertile, loamy, alluvial soils of clayey type. In India, it is mainly grown in flat alluvial plains of North India.

13. Why are millets called 'dry crops'? Name any two millet crops grown widely in India.

Or Millets are known as dry crops. Give a geographical reason. ***[2017]***

Ans. Millets are hard and tough crops. These can be grown in regions of low rainfall and poor soils, thus are called 'dry crops'. They are drought resistant crops which grows well even in high temperature (27°C to 32°C) and little rainfall i.e. (less than 40 cm).

14. Explain why

(i) Pulses are grown as rotation crops.

(ii) Millets are referred to as dry crops.

Ans. (i) They are grown because of their leguminous characteristics which restore the soil fertility by fixing atmospheric nitrogen.

(ii) Millets are grown in regions of low rainfall and poor soil and thus, are referred to as dry crops.

15. Give two reasons for pulses being grown extensively in India. Name any two pulses.

Ans. Pulses are grown extensively in India because:

(i) It forms a major part of the diet of vegetarian, supplying their requirement of proteins.

(ii) It is a leguminous crop which increases the nitrogen content of the soil. Two pulses are gram (chana) and tur (arhar).

b Long Questions [3 Marks each]

1. What do you understand by the following.

(i) Drilling Method (ii) Dibbling Method

Ans. (i) **Refer to chapter theory page no. 143.**

(ii) **Refer to chapter theory page no. 143.**

2. Mention three differences in the geographical conditions and cultivation of rice and wheat. ***[2014]***

Ans. The difference between geographical conditions of rice and wheat are as follows:

	Rice	Wheat
1.	It is a kharif crop that requires 18°C to 32°C of temperature.	It is a rabi crop that requires 10°C to 15°C of temperature.
2.	It needs rainfall of 150 to 300 cm and fertile alluvial soil that allows water to stand.	It needs rainfall of 50 to 100 cm and loamy black soils.
3.	The methods of farming are broadcasting, dibbling, drilling and transplanting. Japanese method is also there.	The farming method is drilling.

3. Explain the transplantation method of rice cultivation.

Ans. The transplantation method of rice cultivation is dominant in regions of deltaic soil that get abundant rainfall and plenty of sunshine. In this method, seeds are sown in rows in nurseries after soaking them for 24 hours. When the seeds germinate into seedlings and are 20 to 25 cm tall, then the seeds are uprooted and planted in fields. Therefore, the seeds are transplanted from nurseries to the field hence, it is named as transplantation method.

4. State three important aspects of the Japanese method of rice cultivation.

Ans. Important aspects of the Japanese method of rice cultivation are as follows:

(i) Use of good quality seeds which are of the high yielding variety.

(ii) Sowing the seeds in raised nursery beds.

(iii) Transplanting the seedlings in rows to make weeding and fertilising easier.

5. Name any three rice producing areas in India.

Ans. Three rice producing areas in India are as follows:

(i) **Lower and Middle Gangetic Plains** Rice is the staple food crop of this region. Here soil is very fertile, which is favourable for rice cultivation.

(ii) **Brahmaputra Valley** In the Brahmaputra valley three crops of rice in an agricultural year are grown. Here the rice seasons include

Sali During winter paddy season

Bao During March and April months

Ahu During Autumn season

Boro During Rabi season (December and January).

(iii) **East and West Coastal Regions** West Coastal region includes Kerala and Konkan Coasts. East Coast includes the non-delta regions of Tamil Nadu.

6. Why pulses are important food crops? ***[2015]***

Ans. Pulses are important for the following reasons:

(i) Pulses are rich in proteins and found to be main source of protein to vegetarian people.

(ii) It is second important constituent of Indian diet after cereals.

(iii) They provide raw material to various industries. For example, dal industry, roasted grain industry, papad industry etc.

7. Name the state which is
(i) largest producer of rice.
(ii) largest producer of wheat.
(iii) largest producer of jowar.

Ans. (i) West Bengal (ii) Uttar Pradesh (iii) Maharashtra

8. Cotton grows widely in Maharashtra, give a geographical reason for it. ***[2014]***

Ans. Cotton is grown widely in Maharashtra as it grows well in well drained clayey soil i.e. black soil which is widely found there. Also while growing cotton, the minimum temperature should not drop below 21°C and rainfall temperature should be moderate. All these climatic conditions exist in Maharashtra and thus, it is widely grown here.

9. State an important difference between the climatic requirements for growing cotton and jute. ***[2015]***

Ans. Difference between climatic requirements for growing cotton and jute are as follows:

	Cotton	Jute
1.	Cotton is the crop of tropical and subtropical areas.	Jute is the crop of hot and humid climate.
2.	It requires a temperature 21°C to 27°C.	It requires temperature 24°C to 37°C.
3.	It requires rainfall between 50 cm to 80 cm.	It requires rainfall between 150 cm to 200 cm.

10. State main characteristics of each type of cotton.

Ans. **Refer to chapter theory page no. 145.**

11. Name three important places where cotton is grown extensively.

Ans. **Refer to chapter theory page no. 145.**

12. Answer the following questions.
(i) Name the most important fibre crop in West Bengal.
(ii) Describe two geographical conditions which favour the growth of this crop.

Ans. (i) Jute is the most important fibre crop in West Bengal.
(ii) **Refer to chapter theory page no. 146.**

13. Explain in brief the following. ***[2013]***
(i) Retting (ii) Ginning (iii) Broadcasting

Ans. (i) **Retting** It is a processing technique of jute, under which the bundles of jute are immersed in soft running water for 2 to 3 weeks to remove fibre from the stalk.
(ii) **Ginning** It is associated with cotton. Ginning is a process by which fibre is seperated from the raw-material.
(iii) **Broadcasting** It is a method of sowing rice seeds under which seeds are scattered in the field by hand.

14. (i) With reference to rice cultivation, name two leading states in the production of rice. ***[2013]***
(ii) Give two advantages of growing rice in nurseries.

Ans. (i) West Bengal and Uttar Pradesh.
(ii) The advantages of growing rice in nurseries are as follows:
(a) The process of transplantation allows better penetration (deeper penetration) of the roots in the soil.
(b) The process of transplantation greatly increases the yield of the crop.

15. Give a geographical reason for each of the following. ***[2018]***
(i) Cotton is a labour intensive crop.
(ii) Jute is retted after it has been harvested.
(iii) The growing of pulses is important in India.

Ans. (i) Agriculture is important in India because it provides vast number of employment to the population of our country.
(ii) The two main agricultural seasons in India are Rabi season and Kharif season.
(iii) The practice of cultivation of crops as well as raising of animals/livestock simultaneously is popularly known as mixed farming.

C Picture Based Question

1. Study the picture given below and answer the following questions. ***[2010]***

(i) Name the crop which is being planted. Give one benefit of this method of planting this crop.
(ii) Mention the climatic conditions which favour the cultivation of the crop being planted.

Ans. (i) Rice is being planted using the transplantation method. One benefit is that weeds are removed at the time of transplantation.
(ii) It require 16°C to 32°C temperature and rainfall ranging from 150 to 300 cm.

CHAPTER TEST

Short Questions

[**2 Marks** each]

1. Agricultural crops in India can be divided into how many categories?
2. Name any two food crops.
3. Name the most important staple food crop of India.
4. Which crop is high in protein, vitamins and carbohydrates?
5. Millets are grown in which crop season of India?
6. What are the soil requirements for cultivation of rice?
7. Mention the climatic conditions required for the cultivation of wheat.
8. Name some regions of cotton cultivation.
9. Sowing in jute cultivation is done by which method?

Long Questions

[**3 Marks** each]

1. Name the improved method of transplantation. State any three features of this method.
2. Give geographical reasons for each of the following
   (i) West Bengal is the largest producer of both rice and jute.
   (ii) Puloes increases soil fertility .
   (iii) Karnataka is the leading producer of Ragi.
3. What are the two types of jute produced in India? What are thein regina of grouath?

ARCHIVES*

Collection of Questions Asked in Previous Years' ICSE Class 10th Examinations

2018

1. Give a geographical reason for each of the following. ***(3)***

(i) Cotton is a labour intensive crop.

(ii) Jute is retted after it has been harvested.

(iii) The growing of pulses is important in India.

2. (i) Why is agriculture important in India? ***(3)***

(ii) Name the two main agricultural seasons in India.

(iii) What is mixed farming?

2017

1. Millets are known as dry crops. Give a geographical reason. ***[2]***

2016

1. With reference to rice cultivation, answer the following.

(i) Why does rice grow well in a soil with clay like subsoil?

(ii) What is the advantage of growing rice in nurseries before it is transplanted? ***[2]***

2015

1. Why pulses are important food crops? ***[3]***

2. State an important difference between the climatic requirements for growing cotton and jute. ***[3]***

2014

1. Mention three differences in the geographical conditions and cultivation of rice and wheat. ***[3]***

2. Cotton grows widely in Maharashtra, give a geographical reason for it. ***[3]***

2013

1. (i) With reference to rice cultivation, name two leading states in the production of rice.

(ii) Give two advantages of growing rice in nurseries. ***[3]***

2. Explain in brief the following.

(i) Retting (ii) Ginning

(iii) Broadcasting ***[3]***

* All these questions are covered and explained in chapter exercise 'Exam Practice'.

CHAPTER

11

Cash Crops of India

Some crops like **oilseeds, sugarcane, beverage crops** (tea and coffee) are cash crops. The cash crops are grown for commercial purposes i.e. to provide raw materials to agro-based industries. Fibre crops like cotton and jute are also called cash crops.

Oilseeds

All the primary oilseeds like groundnut, linseed, sesame, mustard, rapeseed, castor, soybean, sunflower, etc. are grown in India. India has the largest area under production of oilseeds in the world. They are used as raw material for the manufacture of paints, varnishes, hydrogenated oils, soaps and many lubricants. Castor and linseed are two non-edible oilseeds.

1. Groundnut

It is the most important edible oilseed of India. It is both a kharif and rabi crop but is mostly grown as a kharif crop. Groundnut is also known as peanut. Its oil is used as a cooking medium and its oil cake is used as fodder for cattle. Groundnut plants are of two types:

(i) **The Bunch Type** They grow upto a height of 40 cm.

(ii) **The Runner Type** They grow horizontally unlike bunch type and spread over a large area. They are shorter in height.

Geographical Conditions

The geographical conditions suitable for the growth of groundnut are as follows:

Temperature It requires a temperature ranging from 20°C to 25°C. It is a tropical crop. Warm and dry weather is suitable for the ripening of the crop. Higher altitudes with cooler climates are not suitable for groundnut production.

Rainfall Rainfall of about 50 to 70 cm is required for groundnut crops. It is vulnerable to prolonged drought as well as continuous rain or stagnant water and frost.

Soil Groundnut grows well in drained light sandy loams, red and black soils.

Methods of Cultivation

The seeds of the plant are sown in the month of June or July generally by the process of broadcasting or drilling. Its pods grow underground and hence, they are called groundnuts. The plant bears flower on maturing. The flower stalk elongates after self-pollination and move downwards. The whole crop takes a time of about 4-5 months to be ready for harvesting. It is used as a rotation crop for millets and other crops as well.

Harvesting
It is harvested in the months from October to December. The whole plant is removed from the soil, including its roots. After that they are collected and dried in the Sun. They are shelled and seeds are collected. and then sent to mills after packaging.

Regions of Cultivation
India is the second largest producer of groundnut in the world after China. It is grown in Gujarat (largest producer), Rajasthan, Tamil Nadu, Andhra Pradesh, Karnataka and Uttar Pradesh.

2. Mustard (Sarson)
It is a tropical crop which is grown in rabi season (winter season). The seeds are pressed to obtain mustard oil. It is edible oil and one of the most important seeds produced in India.

Geographical Conditions
The geographical conditions **suitable** for the growth of mustard are as follows:

Temperature These are tropical crops which need a moderate, cool climate with temperature range of 10°C to 20°C.

Rainfall They need a rainfall of about 25 to 40 cm.

Soil It grows best in alluvial soils of Northern plains of Ganga and Sutlej. These plains are rich in alluvial deposits.

Methods of Cultivation
They are generally grown with other major crops like wheat, gram and barley and harvested before wheat when the crop turns yellow. They are sown by broadcasting and drilling method. Mustard and rapeseed take around 3 to 4 months to mature and as they turn yellow they are harvested.

Regions of Cultivation
Mustard is grown extensively in Rajasthan (largest producer), Uttar Pradesh, Madhya Pradesh, Punjab, Himachal Pradesh, Haryana, Chhattisgarh, Bihar, Assam and Jammu & Kashmir.

3. Soybean
It is a kharif crop of India. It is a rich source of protein and vitamins. It is in great demand due to its varied use like soybean oil, soya milk, cheese, etc and industrial products like paints, varnish, linoleum, etc. Soybean is a leguminous crop, thus it increases the nitrogen content in soil.

Geographical Conditions
The geographical conditions suitable for the growth of soybean are as follows:

Temperature The temperature should range between 15°C to 24°C . During the time of flowering, the temperature should be within 20°C to 25°C.

Rainfall The plant grows well in dry areas so it requires rainfall from 50 to 70 cm.

Soil The soil needed for the cultivation is the one that can retain moisture i.e. well drained fertile loamy soil.

Method of Cultivation
Soybean is sown in the summer months (June). It is sown by drill method in rows, 40 to 50 cm apart from each other. The depth of sowing is 5 to 10 cm. It is harvested in October before the arrival of winters. Thus, the crop gets ready within 3-4 months.

Regions of Cultivation
In India, soybean is generally grown in the states of Madhya Pradesh (largest producer), Maharashtra, Andhra Pradesh, Rajasthan, Chhattisgarh, Gujarat, parts of Punjab and Uttar Pradesh.

Sugarcane
It is one of the important cash/commercial crops of India. It is a tropical crop which belongs to the bamboo family and it is **indigenous**[1] to India. India has the largest area under sugarcane, but it has low per hectare productivity than Brazil. Sugarcane is the main source of sugar, gur and khandsari. It is also used as fodder for the cattle in rural areas. It is also eaten raw and its juice is widely popular in India, especially in summer season.

Geographical Conditions
The geographical conditions suitable for the growth of sugarcane are as follows:

Temperature Sugarcane requires hot and humid climate with temperature ranging from 20°C to 24°C. Both high and low temperature are very detrimental for the growth of sugarcane plant. Frost is also very harmful for the crop. Cool and moderate temperature favours the ripening process.

Rainfall It requires a rainfall of about 100 cm to 150 cm. It cannot withstand water stagnation.

Soil There are variety of soils which are good for sugarcane cultivation but it grows best in alluvial clayey loams of the Indo-Gangetic plains and the black soil of

1 Indigenous Anything which originates or occur naturally in a particular region is called indigenous.

Southern India. It is also grown on brown or reddish loams and laterite soils. The soil should be high in nitrogen, calcium and phosphorus contents.

Methods of Cultivation

Sugarcane can be cultivated by two methods which are as follows:

(i) **Sowing** Sugarcane is generally sown from January to April, in most part of the country. The field is prepared by ploughing and clearing all vegetation and also by **harrowing**[2].

Heavy amount of manure is applied before planting as the crops exhaust the fertility of the soil. **Sett method** is used for sugar plant in which commercial planting are done from healthy canes by cutting the cane into two to three joints and planted horizontially in well prepared furrows at regular intervals. Sugarcane takes about 8 to 12 months to mature.

(ii) **Ratooning** It is the method in which the sugarcane is cut leaving the root very much intact in the soil. The stalk which has been left behind grows out into new shoots or ratoons. The second or any other successive crop obtained from the roots of the first sugarcane plant is called ratoon. Ratooning has few important features like:

- The crops are not required to be planted again.
- The ratoons have comparatively low maturation period.
- It is cheaper as planting of crops is not needed.
- As the successive crop goes on, its productivity decreases, therefore only one or two ratoon crops are generally harvested.
- The risk of pests and diseases are higher, hence the sugarcane plant has to be protected from pests and insects like moth, termites, white flies and black bugs. The sugarcane is also vulnerable to fungal diseases like red rot, smut and ratoon stunting.

Processing

The sugarcane must be processed within 48 hours of cutting to preserve its sugar content. This is the reason why most of the sugar factories are located near the sugarcane fields in order to save the transportation time. In the mills, the sugarcane is trampled/crushed between rollers. It is boiled soon after the juice is extracted. Lime is added to it to remove the impurities.

The sugarcane juice crystallises and forms raw brown sugar. In South India, sugarcane grows well due to geographical conditions. The sucrose content is also higher than Northern India.

Regions of Cultivation

India is the second largest producer of sugarcane after Brazil. It is produced in:

- The Sutlej-Ganga plains of Uttar Pradesh, Punjab and Bihar in North India.
- The black soils region of Maharashtra and Tamil Nadu along the Eastern slopes of the Western Ghats.
- The coastal Andhra Pradesh and Krishna valley.

CHECK POINT 01

1 State two uses of oilseeds.
2 In which crop season Soybean is grown?
3 Name a crop that belongs to bamboo family?

Beverages

In India there are two beverage crops i.e. tea and coffee. These are cash crops also.

1. Tea

It is an important beverage crop of India. Planting of tea was first introduced by the Britishers in India in 1840's in Brahmaputra valley. Tea is grown best on hill slopes to avoid waterlogging. It can be grown in the valleys as well. Tea is grown on various elevations, ranging from 600 m to 1500 m above sea level. Tea cultivation is a fine example of plantation agriculture in India. There are mainly three varieties of tea:

(i) Black tea
(ii) Green tea
(iii) Oolong tea

Black tea is preferred in India and Europe, while Green and Oolong tea are more popular in China, Japan and Taiwan.

Geographical Conditions

The geographical conditions suitable for the growth of tea are as follows:

Temperature Tea plant requires a temperature ranging from 20°C to 30°C but ideal temperature would be 25°C. Alternate cool and warm breeze are very helpful for tea plants. Tea grows best in the shade and hence, shady trees are required in tea plantations along with tea plants.

2 Harrowing It is a type of method to till and break the soil to make it suitable for cultivation.

Rainfall Tea plant requires heavy rainfall of about 150 cm to 250 cm distributed well throughout the year. High amount of humidity, heavy dew and morning fog help the leaves to grow rapidly but prolonged dry spell is very detrimental for tea plants.

Soil Tea plant requires well drained, deep, friable, light loamy soils. The soil should be rich in humus and iron content. Tea is very soil exhausting crop and hence, regular use of fertilisers and manures is essential. Phosphorus and potash add special flavour to tea. Regular tilling of the soil to remove the weed is preferable.

Methods of Cultivation

Tea can be cultivated by following methods:

Transplantation Method First the seeds are sown in small germination beds or nursery and are allowed to grow for 9 to 12 months into proper seedlings. Good amount of fertilisers are applied in the meantime. The well developed seedlings are then transplanted to the tea estate.

Clonal Planting Under this method we use cutting from a good high yielding mother plant instead of seeds. This method is called clone planting because the new plant has the qualities of the mother plant. These small cuttings are then planted in the regular germination bed and again transplanted to the tea estate.

Processing

Processing of tea includes seven steps which are as follows:

(i) **Withering** This is performed to reduce the moisture from the tea leaves and to make them soft and flexible. This is done by spreading the leaves over shelves (racks) and hot air is blown over the leaves.

(ii) **Rolling** This is done to provide tea its special flavour. Under this process, the leaves are twisted which breaks the leaf cells and crushed between rollers to squeeze out the juice.

(iii) **Fermentation** Under this process, the tea leaves are spread out on trays and the tannin in tea is partly oxidised changing the colour of the leaves to copper red. This whole process is done under controlled temperature and humidity.

(iv) **Drying** (or Fixing) In this process, the tea leaves are put on a conveyor belt and are slowly passed through tiered dryers. Too much high temperature and too low temperature are harmful for tea. After this, the leaves become dry and turns to rich black colour.

(v) **Sorting** After drying the leaves, it is sorted out according to their size.

(vi) **Blending** In this method, tea planter prepares his own brand on the basis of its flavour, colour and texture.

(vii) **Packing** A lot of care is taken to pack the prepared tea to protect its flavour. They are packed in plywood cases with lining of aluminium foil paper to keep the tea fresh.

Regions of Cultivation

- India is the second largest producer of tea after China in the World.
- In the country, tea is mainly produced in North-East India and South India.
- In North-East India, mainly Assam (Surma Valley and Brahmaputra valley), West Bengal (hills of Darjeeling, Cooch Behar, Jalpaiguri), Uttarakhand (Almora, Garhwal), Himachal Pradesh (Kangra valley) are the main tea producing regions.
- In South India, Karnataka, Tamil Nadu and Kerala (Nilgiri hills, Cardamom hills, Annamalai hills) are the tea producing regions.

2. Coffee

It is taken out from the coffee fruit that grows in clusters. It is the second most important beverage of India after tea. Coffee is the oldest plantation crop of India. Coffee is very popular in urban areas especially among the young generation and in South India. It is a native plant of Ethiopia (Abyssinia plateau) from where it was brought to Arabia. The first plantation in India was set-up by the Britishers near Chikmagalur in Karnataka in 1830. There are three varieties of coffee which are grown in India:

(i) **Arabica** This is the most important type of coffee in the world. It is known for its fine flavour. In India, it is produced more than 70% of total cultivation. This is known for its superior quality and it is most expensive.

(ii) **Robusta** It is cheaper variety of coffee because the cost of production is less and the yield per acre is higher.

(iii) **Liberica** It is used in making instant coffee.

Geographical Conditions

The geographical conditions suitable for the growth of coffee are as follows:

Temperature Coffee is a tropical plant which requires high temperature, ranging from 15°C to 28°C throughout the year. Bright sunlight and warm weather are neccessary for harvesting and growth of the berries.

Therefore, coffee plant should be grown under shady trees like bananas, jackfruit, etc. The coffee plant cannot tolerate frost, snowfall and high temperature above 30°C.

Rainfall Coffee plant requires a rainfall of about 150 to 250 cm which should be well distributed all year round. Stagnant water is very detrimental for the plant, hence this crop is always grown on hill slopes at an elevation ranging from 600 to 1600 m above sea level.

Soils Coffee plant grows well in deep, porous soil having high humus content and minerals like iron and calcium. The soil must be properly manured to retain and replenish the fertility. Lava soils, red soils and laterite soils of Deccan plateau are very well suited for coffee plantation.

Methods of Cultivation

The coffee seeds are grown in nursery for 9 to 12 months, till it grows into a proper seedling. Good amount of fertilisers are also tll It grows applied. The well developed seedlings are then picked out and transferred to the coffee estate. In the early stage, it is grown under shady tree like silver oak, jackfruit.

Processing

There are two methods of processing the coffee berries which are as follows:

(i) **Wet Method** The coffee which is processed by the wet method is called plantation coffee. Under this method, pulping, fermenting, washing and drying is done. Machines are also used in this method.

(ii) **Dry Process** The coffee which is processed by dry process is called cherry or native method. Under this method, cherries are put under the Sun to dry. After drying, the covering is removed and the seeds are obtained. They are then sorted according to their size and quality. Then they are roasted which gives it a brown colour and pleasing aroma and taste. Freshly roasted beans are better and preferred more.

Regions of Cultivation

India contributes to around 2.5% of the world's total coffee production. Karnataka is the largest producer of coffee in India. Tamil Nadu, Kerala, Andhra Pradesh, Manipur, Nagaland and Mizoram are other producing states.

CHECK POINT 02

1. Name the country other than India where black tea is preferred the most.
2. Under which method farmers use cutting from a good high yielding mother plant instead of seeds?
3. After which process sorting of coffee is done?

Cash Crops of India

Crops	Temperature	Rainfall	Soil	Methods of Cultivation	Distribution (Areas)
Sugarcane	20° to 24°C	100 to 150 cm	Alluvial and black soils	Sett method, Ratooning	Uttar Pradesh, Andhra Pradesh, Tamil Nadu, Haryana, Maharashtra and Punjab
Oilseeds	10° to 25°C	25 to 70 cm (vary from crop to crop)	Alluvial, loams, black sandy soils	Broadcasting, drilling	Gujarat, Tamil Nadu, Andhra Pradesh, Karnataka and Punjab
Tea	20° to 30°C	150 to 250 cm	Light loam soils	Transplantation, clonal planting	Assam and West Bengal
Coffee	15° to 28°C	150 to 250 cm	Loamy soils	Transplantation	Karnataka, Tamil Nadu and Kerala

SUMMARY

- India has the largest area under production of oilseeds.
- Important oilseeds are groundnut, linseed, sesame, mustard, rapeseed, castor, soybean, sunflower, etc.
- Groundnut is the most important edible oilseed of India. It is both a kharif and rabi crop but is mostly grown as a kharif crop.
- Mustard is a tropical crop which is grown in rabi season (winter season).
- Soybean is a kharif crop of India. It is a rich source of proteins and vitamins.
- Sugarcane is an important commercial crop of India. It is a tropical crop. It belongs to the bamboo family of plants and is indigenous to India. It is used to make sugar, gur and khandsari.
- The sugarcane must be processed within 48 hours of cutting to preserve its sugar content.
- Tea is the most important beverage crop of India which is popular in both rural and urban areas. There are three varieties of tea i.e. Black Tea, Green Tea, Oolong Tea.
- Coffee is the second most important beverage crop of India after tea. It is more popular in urban areas than in rural and grown mainly in South India.

EXAM PRACTICE

a Short Questions [2 Mark each]

1. What are cash crops?

Ans. Cash crops are grown for commercial purpose i.e. to provide raw material to agro-based industries, e.g. oilseed, sugarcane and beverages.

2. Name two non-edible oilseed .

Ans. Two non-edible oilseeds are linseed and castor.

3. After oil extraction, what other uses can the oilseed be put to?

Ans. After oil extraction, the oilseed can be used as fodder for animals or manure in field.

4. State important characteristics of groundnut.

Ans. Important characteristics of groundnut are as follows:

(i) Groundnut is the most important edible oilseed of India.

(ii) It is both a kharif as well as rabi crop.

5. Define the method of cultivation of groundnuts.

Ans. The seeds of the plant are sown in the month of June or July and generally by the process of broadcasting or drilling.

6. Explain the following in terms of mustard crop.

(i) Its soil type

(ii) Its temperature condition

Ans. (i) **Soil** It grows best in alluvial soils of Northern Plains of Ganga and Sutlej. These plains are rich in alluvial deposits.

(ii) **Temperature** These are tropical crops which need moderate, cool climate with temperature range of 10°C to 20°C.

7. Explain the term oil cake?

Ans. Oil cake is the solid residue that is left after oil from oilseeds has been extracted. It is used as cattle fodder or fertiliser.

8. Discuss the geographical conditions of soybean

(i) Soil (ii) Temperature

Ans. (i) **Soil** The soil needed for the cultivation is the one that can retain moisture i.e. well drained fertile loamy soil.

(ii) **Temperature** The temperature should range between 15°C to 24°C. During the time of flowering the temperature should be within 20°C to 25°C.

9. What is the method used for the cultivation of soybean? Give any two regions suitable for its cultivation.

Ans. **Method of Cultivation** Soybean is sown in the summer months (June). It is sown by drill method in rows, 40 to 50 cm apart from each other. The depth of sowing is 5 to 10 cm. It is harvested in October before the arrival of winters. Thus, the crop gets ready within 3-4 months.

Regions of Cultivation Two regions suitable for its cultivation are Madhya Pradesh and Maharashtra.

10. State two reasons to explain why the cultivation of oilseeds is lagging behind in recent times.

Ans. Two major reasons are:

(i) The low productivity is recorded in oilseeds due to lack of high yielding varieties, irrigation facilities etc.

(ii) Low market value discourage farmers more towards commercial crops.

11. Give the geographical requirements for the cultivation of sugarcane. *[2017]*

Ans. It requires around 100-150 cm of rainfall throughout the year. It grows best in well drained rich alluvial soil with 20°C to 24°C temperature.

12. Define the following terms

(i) Molasses (ii) Bagasse

Ans. (i) **Molasses** It is one of the important by-product which is dark brown syrup like liquid formed after recrystalisation of sugar. It is used as organic fertilisers, fodder for the cattle, as fuel in mills and as a raw material in the manufacturing of paper industry.

(ii) **Bagasse** It is the crushed form of sugarcane after the juice has been extracted. It is used as a biofuel and in the manufacture of pulp and building materials.

13. What is press-mud? State any one use of it.

Ans. Press-mud is generally the residue of the filtration of sugarcane juice. The clarification process separates the juice into a clear juice that rises to the top and a mud that collects at the bottom is press-mud.

It is generally used as organic fertiliser, as a fodder and fuel for mills.

14. Name the regions where these varieties of tea are popular.
(i) Black tea
(ii) Green tea.

Ans. (i) **Black tea** It is more popular in India and Europe.
(ii) **Green tea** It is more popular in China, Japan and Taiwan.

15. Which temperature conditions are suitable for tea plantation?

Ans. Tea plant requires a temperature ranging from 20°C to 30°C but ideal temperature would be 25°C. Alternate cool and warm breeze are very helpful for tea plants. Tea grows best in the shade and hence, shady trees are grown along with tea plants.

16. Define the terms.
(i) Drying
(ii) Blending

Ans. (i) **Drying** In this process, the tea leaves are put on a conveyor belt and are slowly passed through tiered dryers. Too much high temperature and too low temperature are harmful for tea. After this, the leaves are dry and turns to rich black colour.
(ii) **Blending** In this method, tea planter prepares his own brand on the basis of its flavour, colour and texture.

17. Name the suitable soils for the following crops.
(i) Sugarcane (ii) Mustard
(iii) Coffee (iv) Tea

Ans. (i) **Sugarcane** Alluvial clayey loams, black soil, brown or reddish loams and laterite soils.
(ii) **Mustard** Alluvial soils.
(iii) **Coffee** Deep, porous soil, lava soils, red soils and laterite soils.
(iv) **Tea** Mountain soils.

b Long Questions [3 Marks each]

1. Why are oilseed crops important for Indian farming? State any three reasons.

Ans. Importance of oilseed crops are as follows:
(i) They can be grown in all kinds of soils.
(ii) These are valuable crops and a source of foreign exchange.
(iii) They provide raw material for many industries e.g. paints, varnishes, soaps, lubricating oils etc.

2. Answer the following questions.
(i) What are the geographical conditions necessary for the cultivation of groundnuts?
(ii) What climatic conditions adversely affect the groundnut crops?
(iii) Name two non-edible oilseeds grown.

Ans. (i) Groundnuts require tropical or sub-tropical climate with a temperature range of 20°C to 25°C and rainfall between 50 to 70 cm annually.
(ii) Continuous rain, stagnant water, frost or drought adversely affect groundnut crops.
(iii) Castor and linseed are two non-edible oilseeds grown.

3. (i) Why the yield of sugarcane is higher in the Deccan? Give two reasons for this.
(ii) Give one advantage and disadvantage of ratoon cropping.

Ans. (i) Two reasons for higher yield of sugarcane in the Deccan are as follows:
(a) Black lava soil with high fertility and water retention is favourable for this crop which is found in abundance there.
(b) Absence of loo during summer and frost during winter in the Deccan helps in better growth.
(ii) The advantage and disadvantage of ratoon cropping are as follows:
(a) **Advantage** It requires less labour and is time saving.
(b) **Disadvantage** It yields thinner canes with lower sucrose content.

4. Answer the following questions with reference to sugarcane. *[2010]*
(i) Mention two different ways in which it is propagated.
(ii) Why is a lot of labour required for its cultivation?
(iii) Why most of the sugar mills be near the sugar fields?

Ans. (i) The Sett method and ratooning are two different ways used to propagate sugarcane.
(ii) At the time of cultivation, furrows and cuttings are made and manuring is done two or three times. Thus, a lot of labour is required for sugarcane cultivation.
(iii) It is because, sugarcane contains sucrose and if it is not processed within 24 hours, the content of sucrose will start reducing, thus, reducing the sugar output.

5. What is withering? Why is it important? *[2011]*

Ans. Withering is a process which is used to remove excess water from the tea leaves and allows a very slight amount of oxidation. The tea leaves can be either put under the Sun or left in a cool breezy room to pull moisture out from the leaves. The leaves sometimes loose more than a quarter of their weight in water during withering.

Importance The process of withering is important in promoting the breakdown of leaf proteins into free amino acids and increases the availability of freed caffeine, both of which change the taste of the tea.

6. Give geographical reasons for the following. *[2017]*

(i) Regular pruning is essential for tea bushes.

(ii) Coffee beans are roasted.

Ans. (i) Pruning is the method in which the branches of tea bush are cut off. This method encourages the growth of new shoots with softer leaves and to keep the plant about 1.2 m high so that the leaves can be picked up easily. So, regular pruning is essential for tea bushes.

(ii) Coffee beans are roasted before grinding. This is done to add the specific brown color to the coffee beans, and for adding aroma and taste.

7. With reference to the cultivation of coffee in Southern India. *[2011]*

(i) Name the two varieties of coffee plants grown on commercial scale.

(ii) Why are coffee estates inter-planted with orange trees, cardamom and pepper vines?

(iii) Name one state where coffee is grown extensively.

Ans. (i) Arabica and Robusta are two main varieties of coffee.

(ii) They supplement the farmer's income and provide shade to the young coffee plants.

(iii) Coffee is grown extensively in Karnataka.

8. Answer the following questions.

(i) Give a brief description about following.

(a) Arabica (b) Robusta

(ii) Why are the following trees commonly grown in a coffee estate?

(a) Dalap and silver oak

(b) Orange and Plum

Ans. (i) (a) **Arabica** Arabica coffees have a delicate flavour and balanced aroma coupled with a sharp and sweet taste. These are harvested between November to January.

(b) **Robusta** It has a very strong taste and a grainy essence. These coffee plants are harvested from December to February.

(ii) (a) These are grown to provide shade to the young coffee plants.

(b) These are grown to provide extra income to the farmers.

9. (i) Name two states where coffee plantations are found. *[2013]*

(ii) What condition of soil and climate are favourable for the cultivation of coffee?

Ans. (i) (a) Karnataka is the largest producer of coffee in India. It contributes about more than 70% of the total production.

(b) Tamil Nadu is also an important coffee producing state. It contributes about more than 5% of the total production. Arabica coffee forms the major part of the total coffee produced in the state.

(ii) **Refer to chapter theory page no. 155 and 156.**

10. With reference to the cultivation of tea, answer the following. *[2018]*

(i) Why is tea grown on hill slopes?

(ii) Why tea bushes have to be pruned at regular intervals?

Ans. (i) Tea grows on hill slopes because tea plantation demands evenly distributed rainfall with no water-logging issues. The hill slopes provide an easy drainage of the rainwater. Moreover, the tea plants grow well in the loamy soil which is found mostly over the hill slopes.

(ii) Pruning is the method in which the branches of tea bush are cut off. This method encourages the growth of new shoots with softer leaves and to keep it about 1.2 m high, so that the leaves can be picked up easily.

11. State the two important methods of processing the coffee.

Ans. **Refer to chapter theory page no. 156.**

12. Give a geographical reason for each of the following. *[2014]*

(i) Clonal planting is the best method for tea propagation.

(ii) Oilseeds are an important commercial crop grown in India.

Ans. (i) It helps to produce superior quality, better yield and also contains special flavour of the mother plants.

(ii) Oilseeds provide raw material to various industries which extract the oil for different uses.

13. Answer the following questions. *[2012]*

(i) The propagation of rubber by the bud grafting method.

(ii) The propagation of sugarcane by ratooning.

Or

Explain the following methods of propagation and name the crop associated with each. *[2017]*

(i) Bud grafting

(ii) Ratooning

Ans. (i) Bud grafting is done by inserting a strip of bark containing a bud from a high yield plant under the bark of a young seedling and leaving it till they become united after three to four weeks. Then the old seedling stem is sawn off and the grafted bud grows to form a new plant.

(ii) Ratooning is a process where the cane plant is cut at the ground level, leaving the root intact. This is now well fertilised and it grows again, producing another plant.

14. Give the geographic term for each of the following. *[2015]*

(i) Cultivation of sugarcane from the root stock of the cane which has been cut.

(ii) The residue left behind after the crushing of oilseeds.

(iii) The process by which latex is converted into a thick spongy mass by adding acetic acid or formic acid.

Ans. (i) Ratooning

(ii) Oil cake

(iii) Coagulation

15. Give a geographical reason for each of the following.

(i) Tea is cultivated on hill slopes. *[2015]*

(ii) The yield per hectare of sugarcane is higher in Southern states.

Ans. (i) **Refer to Question No. 10 (i) Long Questions.**

(ii) Due to favourable climatic condition the sucrose content is higher so, yield per hectare is high in Southern India as compared to Northern India.

16. Give geographical reasons for the followings. *[2010]*

(i) Tea bushes are pruned at regular intervals.

(ii) Tapping of rubber trees is usually done in the morning hours.

(iii) Oil cake is a useful residue.

Ans. (i) Pruning of tea bushes help in growth of more new leaves and also the height of the plant does not increase, which helps in picking leaves easily.

(ii) It is done in the morning, as latex flows freely at this time.

(iii) Oil cake is used as manure and can be used as fodder for cattle.

C Picture Based Question

1. Study the picture given below and answer the questions that follow. *[2016]*

(i) Name one state where this crop grows well.

(ii) Why are mostly women employed to harvest it?

(iii) Mention two geographical conditions suitable for the cultivation of this crop.

Ans. (i) The crop is tea and it grows well in Assam, West Bengal, parts of Tamil Nadu and Kerala.

(ii) Women labour is mostly employed to pluck it as women hove nimble-fingers and take better care of the fragile and precious leaves as it requires fine plucking i.e. two leaves and a bud.

(iii) **Refer to chapter theory page no. 154 and 155.**

CHAPTER TEST

Short Questions

[2 Marks each]

1. Groundnut, linseed, mustard come under which type of crop?
2. Name two types of groundnut.
3. What is done in fermentation of tea crop?
4. Why coffee is grown on hill slopes?
5. Mention the geographical conditions suitable for the growth of groundnut.
6. Name some regions where cultivation of mustard takes place in India?
7. State the methods used for cultivation of sugarcane.
8. What is transplantation method?
9. What do you mean by fermentation?

Long Questions

[3 Marks each]

1. Explain the advantages of ratooning.
2. Explain how the cultivation of sugarcane of North India is different from South India?
3. Differentiate between wet method and dry method of coffee cultivation.

ARCHIVES*

Collection of Questions Asked in Previous Years' ICSE Class 10th Examinations

2018

1. With reference to the cultivation of tea, answer the following. ***(2)***

(i) Why is tea grown on hill slopes?

(ii) Why tea bushes have to be pruned at regular intervals?

2017

1. What is Mixed farming? Mention any one benefit of mixed farming. ***[2]***

2. Give the geographical requirements for the cultivation of Sugarcane. ***[2]***

3. Explain the following terms and name the crop with which each is associated. ***[2]***

(i) Retting (ii) Ratooning (iii) Ginning

4. Give geographical reasons for the following. ***[3]***

(i) Regular pruning is essential for tea bushes.

(ii) Coffee beans are roasted.

(iii) Millets are known as 'dry crops'.

2016

1. Mention any two reason for the importance of agriculture in India. ***[2]***

2. Study the picture given below and answer the questions that follow. ***[3]***

(i) Name one State where this crop grows well.

(ii) Why are mostly women employed to harvest it?

(iii) Mention two geographical conditions suitable for the cultivation of this crop.

2015

1. Differentiate between a rabi crop and a kharif crop. *[2]*

2. Give the geographic term for each of the following. *[3]*

(i) Cultivation of sugarcane from the root stock of the cane which has been cut.

(ii) The residue left behind after the crushing of oil seeds.

(iii) The process by which latex is converted into a thick, spongy mass by adding acetic acid or formic acid.

2014

1. How has poverty and fragmentation of land become problems of agricultural India? *[2]*

2. Mention any two features of plantation farming stating two examples. *[2]*

3. Give a geographical reason for each of the following. *[3]*

(i) Cotton grows widely in Maharashtra.

(ii) Clonal planting is the best method for tea propagation.

(iii) Oilseeds are an important commercial crop grown in India.

2013

1. Distinguish between intensive commercial farming and extensive commercial farming. *[2]*

2. (i) Name two states where coffee plantations are found. *[3]*

(ii) What conditions of soil and climate are favourable for the cultivation of coffee?

***** All these questions are covered and explained in chapter exercise 'Exam Practice'.

CHAPTER

12

Manufacturing Industries

India has made a transformation toward its progress in industrial development. The process of using the raw material from natural resources into a finished, ready to use product is called 'manufacturing'. India is one of the important industrialised countries in the world. India has diversified natural resources, large population which provide cheap labour and huge market to sell the manufactured goods.

Importance of Industries in India

Industries are very important as it fulfills human needs and provide employment to the people. Rapid industrialisation in India is needed for the following reasons:

- Rapid industrialisation helps to strengthen our agricultural system as industry provides tools and implements to be used in agriculture.
- Industrialisation is very important source to provide employment on a large-scale.
- Industries help to produce goods and equipments for the defence of the country.
- Industries help us to reduce dependence on foreign countries and make India self-reliant and become self-sufficient.
- Expansion of industries is required so as to fill the gap between developed and under-developed regions in India.
- Rapid industrialisation helps us to maintain a favourable balance of trade by producing goods of better quality that can be exported.

Classification of Industries

Based on the type of raw material, its size, location, type of the product manufactured, industries can be classified into the following groups:

On the Basis of Raw Material

Agro-Based Industries The raw material produced by the agricultural sector is the chief determinant in this type of industries, e.g. sugar, jute, cotton, vegetable oil, coffee, tea and other food processing industries.

Mineral Based Industries These industries use minerals as their raw material, e.g. iron and steel, aluminium, heavy engineering and machine tools, cement, fertilisers, chemicals and ship building industries.

Animal Based Industries These industries depend on animals for their supply of raw material, e.g. woollens, silk, dairy products, hides, skin and poultry, etc.

Forest Based Industries These industries receive their raw material from the forest and forest products, e.g. paper, cardboard, tanning of leather and timber industries. Some pharmaceutical industries also depend on forest produces and medicinal plants.

On the Basis of Nature of Products

Heavy Industries These industries produce capital goods and **consumer durables**[1]. These industries need huge capital, sophisticated machinery, skilled and unskilled labour, large quantity of raw material and scientific knowledge, e.g. iron and steel industry, locomotives and automobile industry.

Light Industries These industries produce goods of light weight like electronic goods, cycles, sewing machines, etc. They don't require huge capital like heavy industries and work with less number of workers, e.g. electronic goods, sewing machines, TV, fridge, fan, etc.

On the Basis of Size and Investment

Large-Scale Industries These industries need large amount of investment and large number of labour. The investment is above 10 crore. They produce machinery and goods on a large-scale like iron and steel industry, shipbuilding, automobile, etc. They use more capital so they are capital intensive.

Medium-Scale Industries These industries are neither very large nor very small. They require everything on a medium-scale. The investment is upto 10 crore, e.g. paper mills, radio, cycle manufacturing industry.

Small-Scale Industries These industries are very small and are managed by private individuals. They do not require large capital and only employ few workers. They use more labour instead of capital and also called 'labour intensive industries'. The investment is less than 1 crore, e.g. weaving industry, silk industry, etc.

On the Basis of Ownership and Management

Public Sector Industries These industries are owned and managed either by the Central Government or by the State Government. These industries comprise of railways, post and telegraph, oil refineries, irrigation projects, defence management, etc. The most important industries in this group are Bharat Heavy Electrical Limited (BHEL), Gas Authority of India Limited (GAIL), Indian Oil Corporation (IOC), etc.

Private Sector Industries These are owned and managed by an individual or some group of people. They can be large or small-scale industries, e.g. Reliance India Limited (RIL), Wipro, Infosys.

Joint Sector Industries These industries are owned, managed and controlled jointly by the private individuals or groups and the government, e.g. Automobile Corporation of Goa Ltd. and Ipitata Sponge Iron Ltd. have been established with TELCO and TISCO of the Tata House as private group respectively.

Cooperative Sector Industries These are owned and managed on cooperative basis by those who are producers of the raw materials required for the industry, e.g. sugar mills (run by the cultivators of sugarcane), dairy industry, (Amul) etc.

On the Basis of Location and Market

Rural Industries These industries get their basic requirements like raw material, skilled labour, etc from the rural area in which they are set-up, e.g. handloom, pottery making, food processing, pickles, khadi, etc.

Cottage Industries In these industries the business activity is performed at home and hence, they are also known as 'household industries'. These are organised by individuals who can invest their private resources and carry out their activity with households assistance. They employ local resources and labours, e.g. carpet weaving, handloom, handicraft industry, etc.

On the Basis of the Finished Product or Functions

Basic Industries These are the group of core industries on which other industries are dependent for their manufacturing, e.g. iron and steel industry, petroleum industry.

1 Consumer Durables Large goods that people buy for their own use like cars.

Secondary or Consumer Industry These industries process the basic raw materials and convert them into primary goods for direct utilisation by the consumers, e.g. bakeries, textiles, paper, sugar, etc.

Tertiary Industries These comprise of public utility based services like railways, roads, banking, post and telegraph, etc.

Ancillary Industries These industries prepare spare parts and components for big industries engaged in the manufacturing of buses, aircraft, heavy electrical industry, engines and locomotives.

CHECK POINT 01

1 How industries help in agriculture?
2 How do animal based industries get their raw materials?
3 What are cottage industries?

Agro-Based Industries

The industries which use agricultural products as raw material are known as agro-based industries. Some agro-based industies are discussed below:

Sugar Industry

India is known for producing sugar since decades. It is the second largest organised industry in India after cotton textiles. India is the second largest producer of sugarcane in the world after Brazil. It contributes around 8% of the total sugar production in the world. The sugar industry relies heavily on the supply of fresh cane hence, most of the industries are located in the vicinity of sugarcane producing fields generally in a radius of around 25 km.

Byproducts of Sugarcane

Molasses It is a thick, dark brown syrup. It is obtained in the process of sugar manufacture which involves the process of crystallisation and **centrifugation**[2]. It is used for the manufacture of fertiliser, DDT powder, alcohol, synthetic rubber, plastic, rum and cattle feed.

Bagasse It is the leftover cane after crushing. It is used as raw material for paper industry. It is used for making cardboard also.

Pressmud It is used for making wax, carbon paper, shoe polish, etc.

Distribution of Sugar Industry in India

Maharashtra It is the largest producer of sugar in India which contributes more than one-third of the total production of sugar in the country. It has ideal conditions for the cultivation of sugarcane. Manmad in the North to Kolhapur in the South is the narrow belt which is famous for sugar production. The crushing period is more than 140 days which is a very favourable factor.

North India Uttar Pradesh is the second largest producer of sugar in India. Sugar factories are located in the Ganga-Yamuna doab and the Terai belt. Saharanpur, Meerut, Baghpat, Muzaffarnagar, Bulandshahr and Ghaziabad are the main sugar producing centres in the Ganga-Yamuna doab while Basti, Gonda, Gorakhpur and Lakhimpur Kheri are the main centres in the Terai area. The other sugar producing states in North India are Bihar, Punjab, Haryana, Madhya Pradesh and Gujarat.

Peninsular India It emerged as the leading producer of sugar in the country. Many favourable conditions along with new machinery has led to higher output of sugar in South India. Major Sugar factories in Tamil Nadu are located in Coimbatore, Vellore, Tiruvanamalai and Tiruchirappalli. In Andhra Pradesh, it is located in Vijayawada, West and East Godavari, Kakinada, Chittoor, Srikakulam.

Sugar Industrial Centres

Uttar Pradesh	There are two belts, one in Western Uttar Pradesh and the other in Eastern Uttar-Pradesh. The Western belt includes Meerut, Bijnor, Saharanpur, Muzaffarnagar and Moradabad and the Eastern belt includes Gorakhpur, Deoria, Basti and Gonda.
Maharashtra	Nasik, Pune, Satara, Sangli, Kolhapur, Solapur are the centres well integrated in the cooperative sector in terms of cultivation and sugar factories.
Tamil Nadu	Nalikupuram, Pandyarajpuram, Coimbatore and Pugulur.
Andhra Pradesh	Vijayawada, West and East Godavari, Visakhapatnam, Srikakulam and Chittoor.
Karnataka	Munirabad, Shimoga and Mandya.
Bihar	This is an extension of the Eastern Uttar Pradesh belt, which includes Darbhanga, Saran, Champaran and Muzaffarpur.
Odisha	Bargarh and Rayagada
Madhya Pradesh	Sehore
Punjab	Centres exist mainly in the Eastern side in Phagwara, Dhuri.

2 Centrifugation It is a process which is used to separate two homogeneous substances.

Problems of the Sugar Industry

There are some problems faced by the sugar industry which are as follows:

- The quality of sugarcane produced in India is poor having low yield and sucrose content is also very low.
- Due to inefficient nature of production, the cost of production is high. Crushing season is short and the location of sugarcane cultivating fields are farther from the mills.
- Generally, entire stock of sugarcane is harvested at the same time, which creates pressure on factories to process the sugarcane hence, some amount of cane goes waste. This increases in the cost of production.
- The sugar mills do not run throughout the year thus creating problem of regular income for the workers.
- The by-products produced by the sugar industry such as molasses and bagasse are not utilised properly. Hence, they can't be converted into different useful products to further reduce the cost of production.
- The machines in the factories especially in Northern India are old and obsolete. This hampers the production of sugar.

Textile Industries

When we refer the word textile it includes all the five fibres i.e. cotton, jute, wool, silk and synthetic fibre. In India, textile industry is the first manufacturing industry which occupies very important place in India as it generate huge employment opportunity.

Cotton Textile Industry

Cotton textile manufacturing is the largest organised modern industry in the country. India is the third largest cotton textile manufacturing country in the world after USA and UK and also the third largest exporter of cotton textiles after Japan and USA.

Cotton textiles employs huge number of people thereby supporting the economy of the country. Maximum number of cotton mills are located in Maharashtra, Gujarat and Tamil Nadu. The other centres are West Bengal, Uttar Pradesh, Madhya Pradesh, Rajasthan, Andhra Pradesh, Karnataka. Cotton textile industry is more concentrated in the cotton growing region.

Distribution of Cotton Textile Industry in India

Maharashtra It is often called as **cottonopolis**[3] of India. It produces about 40% of the mill cloth in India. It is also known as Lancashire (England country) of India.

Gujarat It is renowned as the second largest producer of cotton textile in India. It contributes to about 23% of the total mill cloth production in India. Ahmedabad is the second largest cotton manufacturing city of India and is popularly known as 'Manchester (England city) of India'.

Tamil Nadu It produces about 6% of the total mill cloth of India and it leads in yarn production. It is an important cotton textile producer which is also called 'The Manchester of South India'. Coimbatore, Madurai, Salem, Tuticorin, Tiruchirappalli, Tirunelveli and Ramanathapuram are the chief centres.

West Bengal Kolkata is the most popular textile centre of West Bengal, which has various advantages as it is a port city. It receives its coal from Raniganj. It has huge supply of cheap labour and has high demand of cotton clothes due to humid climate. It receives water for the production of cotton from Hooghly river. It is also facilitated with good network of roads and railways.

Uttar Pradesh In Uttar Pradesh, majority of Cotton Textile Industry has emerged along its Western part. The largest centre in Uttar Pradesh is Kanpur. Lucknow, Moradabad, Modinagar, Etawah, Agra and Saharanpur are other important centres.

Cotton Textile Industry in India

Maharashtra	Mumbai, Pune, Aurangabad, Kolhapur and Solapur.
Gujarat	Ahmedabad, Surat, Jamnagar and Bhavnagar
West Bengal	Kolkata
Tamil Nadu	Chennai, Salem, Coimbatore, Tuticorin and Madurai.
Madhya Pradesh	Gwalior, Indore and Bhopal
Rajasthan	Kota, Bhilwara and Jaipur
Uttar Pradesh	Modinagar, Kanpur, Varanasi, Moradabad and Lucknow
Andhra Pradesh	Anantpur and Vijayawada
Kerala	Kollam and Thiruvananthapuram

3 Cottonopolis A major catton trading centre.

Problems of Cotton Textile Industry

Shortage of Raw Material After the partition, India had to bear a huge loss of long-staple cotton as most of the centres went to Pakistan. India, in order to fulfil its requirement, import cotton from Pakistan, Kenya, Uganda, Sudan, Egypt, USA and Peru.

Old and Obsolete Machinery Many mills in India are very old and are very inefficient. They have **obsolete**[4] machineries as compared to some other developed countries. This proves to be an obstruction in higher production.

Shortage of Power Supply There is serious problem of power shortage for cotton textile mills. The industries suffer a lot due to load shedding and frequent power cut. This causes loss in production to huge extent.

Low Labour Productivity As compared to other developed countries, the labour productivity of India is low and it is a drawback for the cotton industry.

Stiff Competition Indian cotton textiles have to face stiff competition from synthetic fibres which are cheaper and needs less maintenance.

Foreign Market Indian cotton textile industry is facing a tough competition in foreign markets of Taiwan, Japan, South Korea and China whose proudcts are both cheaper and better in quality.

Sick Units/Mills Due to various reasons as mentioned above many mills in India are going in loss and are declared as sick mills. These sick units are in the need of huge financial investments to replace it with modern technology and machineries. The government has setup National Textile Corporation to solve the problems of the sick mills and many of the sick and unproductive mills have been taken over by the government.

Silk Textile Industry

India is the second largest producer of silk in the world after China as per International Sericultural Commission, 2016. It has also the distinction to produce all the four varieties of silk *viz* mulberry, eri, tassar and muga. India holds a world monopoly in golden-yellow muga silk which is produced in Assam.

The rearing of silkworms for the production of silk is called 'sericulture'. The raw material is obtained by silkworm reared on mulberry bushes. It is considered as a small-scale industry in India.

Very little investment is required in it but it requires more labour. Sericulture engages women in rearing of silkworms while men work in the plantations.

In India, mulberry silk accounts for about 90% of total natural silk produced. Mulberry silk is produced in Karnataka, Andhra Pradesh, Tamil Nadu, West Bengal, Kashmir and Himachal Pradesh.

Distribution of Silk Textile Industry in India

Karnataka is the leading silk producing state in India. Andhra Pradesh accounts for almost 17.83% of India's total silk production. West Bengal accounts for almost 8.3% of India's total production. Assam, Jharkhand, Bihar, Odisha and Meghalaya produces muga and tussar varieties of silk.

Silk Industry in India

Karnataka	Bengaluru, Hubli, Dharwar, Mysore and Belgaum, Kollegal, Melkote
West Bengal	Murshidabad, Bankura and Bishnpur, Birbhum
Uttar Pradesh	Varanasi, Mirzapur and Shahjahanpur.
Tamil Nadu	Salem, Tirunelveli, Nilgiris, Kanchipuram, Thanjavur
J & K	Srinagar
Bihar	Bhagalpur
Assam	Goalpara in Kamrup and Nagaon, Sualkuchi
Punjab	Amritsar, Jalandhar and Ludhiana
Gujarat	Ahmedabad, Surat, Cambay
Telangana	Warangal, Mahbubnagar, Karimnagar, Adilabad
Andhra Pradesh	Anantpur, Chittoor, Visakhapatnam and Kurnool, Pochampally

Problems of Silk Industry

- It is facing tough competition from artificial silk which is cheaper and needs less maintenance.
- The import of cheaper and better quality silk from China is proving to be very harmful for the Indian silk industry.
- The fluctuation in the prices of raw silk has an adverse effect on the silk industry.
- As compared to advanced countries like Japan, China, we do not have systematic testing and grading of silk.
- Latest and modern technology is required for increasing the production.

4 **Obsolete** Outdated when new technology is invented.

Artificial Silk (Synthetic Fibre)

These are man-made or synthetic fibre which are in huge demand due to their variety, durability, cheaper price and strength.This sillk is also called art silk. **Cellulose**[5] (rayon and **acetate**[6]) and non-cellulose (nylon and polyester) are two type of man-made fibres.

Caustic soda, sodium sulphate and sulphuric acid are chief raw material required to produce these fibres. Alcohol and cotton are the chief or primary raw material needed for acetate yarn and staple fibre. The popular areas of production of these yarns are Kerala, Andhra Pradesh, Gujarat, Kota, Mumbai and Modinagar.

CHECK POINT 02

1 Name any one byproduct of sugarcane.
2 Name any two sugar producing centres of Uttar Pradesh.
3 Mention any one problem of cotton textile industry.
4 What is art silk?

Mineral Based Industry

The industries that require minerals as their raw material are called mineral based industry. For example, iron and steel industry is a mineral based industry as it is based on iron ore and other minerals.

Iron and Steel Industry

Iron and steel is a central element in the heavy industrial structure and forms the backbone of industrial development. This industry converts iron ore into iron and then to steel which becomes the major input for other industries like automobile, locomotives, railways, shipbuilding, machine, tools, dams and manufacture of defence equipment, etc.

The production and consumption of iron and steel reflects the level and reach of industrialisation and development of a country. The history of making steel in India dates back to AD 350 which is evident from the iron pillar in Delhi.

The first unit to produce pig iron was started in 1874 at **Kulti** which was named as **Bengal Iron Work Company**. Later the setting up of **Tata Iron and Steel Company** at Jamshedpur by **Jamshedji Tata** in 1907 was a turning point in the development of iron and steel production in India. India has become the fifth largest crude steel producing country in the world and tenth largest in steel production.

Large Integrated Iron and Steel Plants of India

Integrated steel plants are very large plants where all the processes are carried at one place from making of steel to its rolling, shaping and drawing it into sheets.

The important iron and steel plants in India can be listed as follows:

Tata Iron and Steel Company (TISCO)

This is one of the oldest manufacturing plant in India. It is a private sector iron and steel plant established in 1907 by Jamshedji Tata at Sakchi in Jamshedpur in Jharkhand. The place is named after the founder of the Iron and Steel Company i.e Jamshedpur, Tata Nagar, steel city.

The production started in 1911. This plant is responsible for producing many types like iron sheets, rail sleepers for railway wheels, etc.

The given factors were responsible for the establishment of this plant in Jamshedpur:

- High quality of iron-ore available from Noamundi of Singhbhum region (Jharkhand) and Mayurbhanj (Odisha).
- Availability of coal from Jharia coal mines of Jharkhand.
- Availability of manganese from Joda in Keonjher district of Odisha.
- Dolomite, limestone and fire clay are available from Sundargarh district of Odisha.
- Water for cooling purpose is provided from the river Subarnarekha and also from the Kharkai dam.
- Raw materials as well as finished goods can be transported from Jamshedpur to Kolkata, Mumbai, Chennai as it is well connected by roads and railways.
- Availability of cheap labour from Jharkhand and nearby Odisha region.

Bhilai Iron and Steel Plant

It was setup in 1953 in collaboration with the erstwhile USSR in Durg district of Chhattisgarh. This was the first plant under the public sector and was established to bring prosperity and development in Durg region. The steel plant started its production in 1959.

The important factors which were favourable for this plant are as follows:

- Availability of iron ore from Dalli-Rajhara range which is just 80 km South of Bhilai.
- Coal is available from Korba and Kargati fields of Chhattisgarh. High quality coals are further brought from Jharia and Bokaro.

5 **Cellulose** Plant material used in making of natural fibres.
6 **Acetate** Smooth artificial cloth made from chemicals and acetic acid.

- Limestone is obtained from Nandani which is few kilometres away.
- Manganese is available from Balaghat of Madhya Pradesh.
- Dolomite is available from Bilaspur and energy supply is available from Korba thermal power plant in Chhattisgarh.
- Important water supply is available from Tendula canal.
- Cheap labour is easily available.
- The region is well connected with Kolkata-Nagpur railway line. There was a construction of another railway line to transport iron ore from Dalli to Bhilai steel works. This plant produces rails, railway sleepers, beems, billets, angles, etc.

Rourkela Steel Plant

This plant was set-up in the Sundergarh district of Odisha with the technical help of German firm, Krupps and Demag in 1959 during the Second Five Year Plan. This plant has produced specialised steel for the vehicles related to Indian Space Satellite Programme. It also supports various fertiliser plants which utilises the by-products released by it.

Some of the favourable factors for this plant are as follows:

- Availability of iron ore from Sundergarh and Keonjhar district which is very close to its location.
- Coal is available from Jharia, Talcher and Korba coal fields.
- Power is supplied from Hirakud Dam.
- Manganese is obtained from Barajamda. Dolomite is obtained from Baradwar and Hirni mines of Madhya Pradesh while limestone from Birmitrapur.
- Water supply is available from the nearby Brahmani river.
- Abundance of cheap labour from the nearby areas.
- There is good connectivity from the plant to Kolkata through roads and railways. Kolkata provides good port facilities for both the raw materials and finished goods.

Visakhapatnam Steel Plant

Visakhapatnam plant is the most modern steel plant and is the latest integrated iron and steel plant. It is also the first seashore based steel plant which started its production in 1992. It is managed by Rashtriya Ispat Nigam. It is also the second largest producer of iron and steel in the country. This plant contributes heavily to the shipbuilding industry and uses the advantage of being a large sea port of India.

Some of the favourable factors contributing to this plant are as follows:

- Iron ore is available from Bailadila mines of Chhattisgarh.
- Cooking coal is obtained from Pookie and Bhalore coal mines of Jharkhand.
- Limestone is obtained from Jaggayyapeta of Andhra Pradesh and dolomite is brought from Birmitrapur in Odisha and Khammam in Andhra Pradesh. It produces liquid steel and saleable steel.

Problems of Iron and Steel Industry

Huge Investment This is a large-scale industry that requires huge capital for its set up. It is difficult for a developing country like India to invest huge capital required in this type of industry.

Outdated and Low Technical Development Outdated machinery has increased the cost of production of iron and steel. This has also reduced the profit margin of the iron and steel plants.

Inefficiency in Production The production units do not utilise the full potential of employees. Labour productivity is low as compared to other countries which increases the cost of production.

Rise in Import India has to import iron and steel from foreign countries as it is not able to fulfil its demand for steel. The rise in import leads to greater spending of foreign exchange.

Proper Availability of Resources There should be proper availability of all the natural resources at one place such as iron-ore mines, energy sources and water resources. If even one of the natural resources is not available, then the development of the industry becomes very difficult.

Mini Steel Plant Mini steel plants are small steel plants that do not do all the processing at one place. These plants use scrap iron or sponze iron which they set from large steel plants. These plants recycle the scrap iron and make products according to local needs. They require less investment.

CHECK POINT 03

1. Name any two large integrated iron and steel plants of India.
2. Mention any one favourable factor for the set-up of Rourkela steel plant in Sundergarh.
3. Give any one problem of iron and steel industry.

Electronics

The electronics sector in India covers a wide range of products which includes television, transistors, telephone exchange, cellular telecom, pagers, computers and various equipments for post and telegraph, defence, railway and **meteorological**[7] phenomena. It developed from 1950s and has improved the lifestyle of the people.

Electronic Goods Industries

The India Telephone Industries (ITI) It was the first public sector undertaking to be set-up after independence, near Bengaluru in 1950. Bengaluru is known as 'Electronic city' or 'Electronic capital of India' as it is the largest centre of electronics goods production. ITI produces equipments for fulfilling the requirement of post and telegraph departments, railways, defence, overseas communication services and electricity boards. It also manufactures automatic telephone switching systems, long distance transmission systems and teleprinter exchanges.

The Bharat Electronics Ltd. (BEL) It was set-up in 1956 in Bengaluru as a public sector undertaking so as to fulfil the requirement of defence services, All India Radio and the meteorological department.

Electronics Corporation of India Ltd. (ECIL) It was set-up in 1970 in Hyderabad. It is an indigenous unit which manufactures modular systems for nuclear application and for the use in medical, agricultural and industrial fields. Various other products like metal oxide resistors, analog computers and online digital process control computers are also manufactured.

Software Industry

Software has developed as a major industry. India has vast reservoir of technically sound manpower which is the main reason for the rapid development of software industry. From the 90's (between 1991 and 1996), software sector of India made a major progress. India has well developed software industry which provides cost effective, high quality, high reliability, speedy deliveries and the use of state of the art technologies in the software industry. India has attained a capacity of designing and building super computers. The leading centres for software industries in India are Bengaluru and Hyderabad.

Space Technology

The space technology in India is supported by the electronics industry. India has successfully launched many indigenously built satellites like the Aryabhatta and the INSAT series. The Indian Space Research Organisation (ISRO) at Bengaluru, the Satellite Launching Station at Sriharikota and the National Remote Sensing Agency at Hyderabad are the major centres of developments in the field of space technology.

India has the capability to launch satellites into **Geosynchronous**[8] Transfer Orbit (GTO) and is among the six countries to do so. ISRO has developed two types of rockets, Polar Satellite Launch Vehicle (PSLV) to put the satellite into polar orbits and the Geosynchronous Satellite Launch Vehicle (GSLV) to put the satellite into **geostationary**[9] orbits. Space industry is the top most marketing agency for subsystem and components for satellites and provide launch facilities and trekking and training services. The recent development in space programme of India has earned it many appreciations around the world. In 2008, Chandrayaan-I was launched as India's first Scientific Mission to moon.

Petrochemical Industry

It is an important organic chemical industry which derive its chemicals from petroleum resources and products like LPG and Coal. Petrochemicals are used for manufacturing various goods like synthetic rubber, synthetic fibre, ferrous, non-ferrous metals, plastics, dyestuffs, drugs, insecticides and many pharmaceuticals. This industry also produces resins, adhesives, plastic sheets, paints and furniture covering for household items.

Raw material for this industry includes petroleum, LPG, coal, etc. This industry is situated near oil refineries to obtain the raw materials Ethylene and Benzene. Various petrochemicals products are Synthetic fibre, Polythene, Vinyl, PVC of plastic group, nylon, dacron, tetron, terylene, acrilon of synthetic fibre group and synthetic fibre. Many copper and steel utensils are being replaced by plastic containers.

Some petrochemical industries are as follows:

Union Carbide India Ltd. The first petrochemical complex to be set-up in 1966 at Trombey. It produces **polypropylene**[10], ethyl ecetate, butyl spirit, etc and is controlled and Managed by multinational Brand Union Carbide.

7 Meteorological It is a phenomena dealing with atmosphere and weather.
8 Geosynchronous Being or having an orbit around the Earth with a period equal to one sidereal day.
9 Geostationary Artificial satellite of the Earth moving in a circular geosynchromous orbit in the plane of the equator.
10 Polypropylene It is a thermoplastic polymer used in a wide variety of application.

The Udex Plant This plant was set up in 1969. It is located in Gujarat near Koyali Refinery to produce benzene and toluene.

Indian Petrochemical Corporation Ltd. It is located at Jawaharnagar near Vadodara. It was set-up in 1969 and manufactures and distributes various petrochemicals like polymers, synthetic organic chemicals and fibres.

Petrofils Cooperative Limited (PCL) It was set-up as a joint venture of the Government of India and Weaver's Cooperative Societies. It is set-up at Vadodara and Naldheri in Gujarat. It produces yarn which is used for making swim suits, undergarments, polyester filament yarn and nylon chips.

The Bongaigaon Petrochemicals Ltd. It is located at Bongaigaon in the State of Assam and it gets its raw material from the Bongaigaon and Noonmati refineries and produces polyester fibre and orthorycline.

National Organic Chemical Industries Ltd. It is the biggest unit in India which is managed by Mafatlals at Thane (near Mumbai). It is based on the latest technology and enjoys the title of being the first integrated plant in India. It produces ethylene, benzene, PVC, etc.

Haldia Petrochemicals Ltd. It is located at Haldia in West Bengal which is based on naphtha. It produces polyolefins and chemicals like benzene, butadiene, cyclo-pentane, etc.

The India Oil Corporation It has built three petrochemical complex.

(i) Linear Alkyl Benzene (LAB) Plant in Gujarat.

(ii) Paraxylene Purified Terephthalic Acid (Px/PTA) at Panipat.

(iii) Naphtha Cracker Plant at Panipat.

Advantages of Petrochemical Products

- They are cheaper as compared to other products as they are generally manufactured on a large-scale.
- They are cost effective and economically stable as they have a definite market.
- The raw material is easily available for these products.
- They do not depend on agricultural raw material as with the case of jute, cotton, etc.

CHECK POINT 04

1 Which city is called the 'Electronic capital of India'?

2 Mention some products of petrochemical industry.

3 Mention any one advantage of petrochemical products.

Summary

- India has made a huge transformation toward industrial development.
- The process of using the raw material from natural resources into a finished good is called 'manufacturing'.
- Industries can be classified into various types based on the raw material, size, location, type of the product manufactured by it and its location is also dependent on both geographical and commercial factors.
- Agro-based industry are the one which are dependent on agricultural product for their raw material.
- Sugar industry is the second largest organised industry in India.
- India is the second largest producer of sugarcane in the world after Brazil. It is more advantageous to produce in South India due to the presence of favourable factors.
- India is the third largest cotton textile manufacturing country in the world after USA and UK.
- Cotton textiles employ huge number of people. Maximum number of mills are located in Maharashtra, Gujarat and Tamil Nadu.
- Silk industry is very popular in India as it is the second largest producer of silk in the world.
- India produces all the four varieties of silk *viz* mulberry, eri, tassar and muga.
- Iron and steel is a pivotal element in the heavy industry structure and forms the backbone of industrial development. It gives imput for other industries as well.
- Integrated steel plant is the one where all the three important processes are carried out, i.e. from melting of iron, to steel making followed by shaping of the metal by rolling.
- Mini steel plant are the secondary unit. These have electric furnaces and do not posses all the facilities at one place and require separate units for manufacturing steel.
- Electronic sector in India covers a wide range of products which includes television, transistors, telephone exchange, cellular telecom, pagers, computer and various other equipment for post and telegraph. Hyderabad and Bengaluru are two important centres.
- Petrochemical industry produces products derived from petroleum resources, LPG, coal, etc.
- These type of chemicals are used for manufacturing various goods like synthetic rubber, synthetic fibre, plastic, etc.

EXAM PRACTICE

a Short Questions [2 Marks each]

1. How has industrialisation helped India?

Ans. Industrialisation has helped India by transforming it towards industrial development.

2. What is the need of rapid industrialisation in India?

Ans. Rapid industrilisation strengthens the economy by providing employment to a large number of population.

3. Mention two reasons, why industrial development is important for India?

Ans. Two reasons why industrial development is important for India are:

(i) It provides employment to a large number of people.

(ii) It supports agriculture by providing farm machinery, fertilisers etc.

4. How would you classify the industries?

Ans. The industries are classified on the basis of raw materials, size, location, type of product manufactured etc.

5. How would you classify the industries on the basis of ownership in India?

Ans. Classify the industries on the basis of ownership in India are public sector, private sector, joint sector, co-operative sector.

6. Differentiate between agro-based and mineral based industry giving one example for each. ***[2017]***

Ans. The industries that depend on agricultural products for raw materials are agro-based industry example, cotton and textile industry. The industries that depend on minerals for raw materials are mineral based industry example, iron and steel industry.

7. What is the difference between a public sector industry and one which is in the private sector? Give an example of industry in each of the two sectors. ***[2010]***

Ans. Difference between public sector and private sector industries are as follows:

	Public Sector	Private Sector
1.	Owned and controlled by the Government (State or Central)	Owned and controlled by private group of people or individual
2.	Example–Oil India, Railways, GAIL, BHEL.	Example–TISCO, Reliance, Wipro, Birla Mills.

8. What do you understand by ancillary industries?

Ans. These are the type which prepares spare parts and components for big industries engaged in the manufacturing of buses, aircraft, heavy electrical industry, engines and locomotives.

9. Distinguish between the industries that require huge capital and the industries that use more labour.

Ans. The industries that require huge capital are large scale industries and are also called 'capital intensive' industries. The industries that require more labour are small scale industries and are also called 'labour intensive' industries.

10. (i) Mention two reasons why the sugar industry has developed in Maharashtra.

(ii) Give two reasons for the importance of the silk industry in India.

Ans. (i) (a) Due to large production of sugarcane.

(b) Crushing period is more.

(ii) (a) India earns foreign exchange by exporting it.

(b) It provides employment to a large number of people.

11. Mention two problems faced by the sugar industry in India.

Ans. The two problems faced by the sugar industry are as follows:

(i) The quality of sugarcane produced in India is poor having low yield and sucrose content is also very low.

(ii) The sugar mills do not run throughout the year thus creating problem of regular income for the workers.

12. "Though Uttar Pradesh has the largest number of sugar mills yet Maharashtra is the largest producer of sugar." Give any two reasons to justify the statement. ***[2017]***

Ans. The two reasons are as follows:

(i) Maharashtra has maritime climate therefore, it does not face extreme weather conditions like frost and loo as in Uttar Pradesh.

(ii) The black soil available in Maharashtra is more suitable for cultivation of sugarcane than Alluvial soil. Also the state has better transport facilities.

13. Why is the cotton textile industry called an 'agro-based industry'?

Ans. It is because cotton textile industry is dependent heavily on its raw material i.e. cotton which is an agricultural product.

14. Mention two problems of the cotton textile industry in India. *[2018, 2016]*

Ans. The two problems faced by the cotton textile industries are as follows:

(i) Textile industry depends on cotton and its cultivation depends on seasons which creates a problem of availability.

(ii) Indian textile industry is facing the problem of outdated mechinery.

15. Give two reasons for the importance of the jute industry in the Ganga-Brahmaputra delta region. *[2016]*

Ans. The reasons for the importance of the jute industry in the Ganga-Brahmaputra delta region are as follows:

(i) The Ganga-Brahmaputra basin supplies the raw material, it constitutes about 90% of the jute production.

(ii) The region is well-connected with network of transport and also water transport in easily available.

16. Answer the following questions.

(i) Name any two textile industries using any animal fibres. Name an important state where these industries are located.

(ii) Give two reasons for each of the following.

(a) Kolkata is an important cotton manufacturing centre even though West Bengal is not a leading producer of cotton.

(b) The wool industry is not as well developed as compared to the cotton industry in India.

Ans. (i) Wool industry in Punjab and Silk industry in Karnataka.

(ii) (a) The soil and climatic conditions in West Bengal are not suited for cotton cultivation. However, Kolkata is well connected, has a port, banking facilities, cheap labour and power supply, so lots of cotton manufacturing units are set-up there. Due to humid weather conditions, there is high demand for cotton.

(b) Wool industry is restricted to Northern India as winters are very cold over there. Rest of the country have tropical type of climate and does not need woollens. So, the demand for cotton is throughout the country while demand for wool in restricted to North India only.

17. (i) Why is the silk industry considered as a small scale industry? Name the two types of silk produced in India.

(ii) Name two important silk-weaving centres in Karnataka.

Ans. (i) Silk industry is considered as a small scale industry as it requires little investment and more labour. So it is a labour intensive industry. Two types of silk produced in India is tassar silk and muga silk.

(ii) Two important silk weaving centres in Karnataka are Mysore and Bengaluru.

18. What is sericulture? Name any two types of silk. *[2010]*

Ans. The rearing of silkworms for the production of silk is called 'sericulture'. The two types of silk are–Tussar and Muga silk.

19. State two factors which favour the silk industry in Karnataka. *[2012]*

Ans. Factors favouring the silk industry in Karnataka are as follows:

(a) Karnataka has ideal climate conditions for the rearing of silkworms.

(b) Mulberry trees which are suited for rearing silkworms grow well in Karnataka.

20. Answer the following questions.

(i) Name and define two important by-products of the sugar industry.

(ii) Give two reasons why the state of Punjab is the largest producer of woollen textiles. *[2011]*

Ans. (i) The two important by-products of sugar industry are as follows:

(a) **Molasses** It is thick, dark brown syrup. It is obtained in the process of sugar manufacture which involves the process of crystallisation and centrifugation.

(b) **Bagasse** It is the left over cane after crushing. It is used as raw material for paper industry.

(ii) The two reasons why the state of punjab is a leading producer of woollens are:

(a) Raw material i.e., wool is available from Jammu and Kashmir.

(b) Due to cold winters, demand of woollens is high there.

21. Identify the type of indsutry for the following products.
(i) Carpet weaving (ii) Post and telegraph
(iii) Silk industry

Ans. (i) Cottage industry (ii) Electronic industry
(iii) Small scale/Animal based industry

22. State two problems of steel industry?

Ans. Problems of steel industry are as follows:
(i) **Huge Investment** It needs huge capital for its set-up.
(ii) **Inefficiency in Production** This increases cost of production as labour is not utilised properly.

23. Name one integrated iron and steel plant in the private sector. Where does it obtain its iron and coal from? ***[2018, 2014]***

Ans. Tata iron and steel plant.
Iron Singhbhum in Jharkhand
Coal Jharia in Jharkhand

24. "The Iron and steel industry constitutes the backbone of modern industrial economy." Give two reasons to justify the statement. ***[2017]***

Ans. Iron and steel industry is a key or basic industry as it lays the foundation of other industries due to the following reasons:
- Most of the other industries such as automobiles, locomotives, rail tracks, shipbuilding; machine building, bridges, dams and many other industries and commercial activities depend upon iron and steel industry for raw material.
- It also provides employment to a large number of people.

25. Answer the following questions.
(i) Define a mini steel plant.
(ii) With which large scale industry would you identify the following manufacturing centres?
(a) Kanpur (b) Rourkela
(c) Pune (d) Mangalore

Ans. (i) **Mini Steel Plant** They produce alloy steel, mild steel and stainless steel. Mini steel plants utilise scrap or sponge iron from large steel plants as raw materials. So, they help in recycling of iron.
(ii) (a) Cotton textile (b) Iron and Steel Industry
(c) Automobile (d) Chemical and fertiliser

26. Mention two advantages that a mini-steel plant has over an integrated iron and steel plant. ***[2016]***

Ans. The two advantages of mini steel plant over an integrated iron and steel plant are as follows:
(i) This industry uses an electric arc furnace which conserves coal.
(ii) It requires small capital investment as compared to large steel plants.

27. (i) Name an iron and steel plant which was established with British collaboration. ***[2018, 2016]***
(ii) From where does it get its supply of
(a) Iron ore (b) Manganese
(c) Coal

Ans. (i) Durgapur steel plant is a plant which was established with British collaboration.
(ii) It gets its supply of
(a) iron-ore from Singhbhum and Keonjhar
(b) manganese from Sundergarh
(c) coal from Jhansi, Raniganj

28. (i) Name an iron and steel Industry set-up in Odisha with the help of a famous German firm.
(ii) From where does the industry (i) get its iron ore and manganese? ***[2017]***

Ans. (i) The Rourkela steel plant was set-up in Odisha with collaboration of the West German firm Krupps and Demag during the Second Five Year Plan. It started its production in 1959.
(ii) This iron and steel industry gets its iron ore from Sundergarh and Keonjhar district of Odisha and Manganese from Barajmda of Jharkhand.

29. Give two geographical reasons for the growth of IT industries in Bengaluru. ***[2011]***

Ans. The two geographical reasons for growth of IT industries in Bengaluru are:
(i) Presence of already existing electronic industry made it easier.
(ii) Availabitity of highly skilled labour.

30. (i) State the importance of electronics in defence.
(ii) Mention one important requirement of the electronics industry.

Ans. (i) The industry provides the modern means of communication used in defence.
(ii) It requires huge investment and research facilities.

31. Mention two reasons for the development of the petrochemical industry in India. ***[2010]***

Ans. (i) Petrochemical industries do not depend on agriculture hence, are not seasonal.
(ii) The raw materials used in the petrochemical industry are easily available.

32. What are petrochemicals? Name any two products made from petrochemicals. *[2012]*

Ans. The petrochemicals are mainly chemicals derived from petroleum resources like coal, gas and petroleum. Plastics and acrylic fibres are two products made from petrochemicals.

33. Name two raw materials used in the petrochemical industry and state two advantages of petrochemical products. *[2014]*

Ans. Two raw materials used in petrochemical industry are ethylene and benzene. Reasons for the development of petrochemical industry are as follows:

(i) The raw material are easily available since they are not agro-based.

(ii) The products produced under this industry are durable.

34. (i) Mention two reasons for the importance of the electronic industry in India's development.

(ii) What is a petrochemical industry? Mention two reasons why petrochemical products are replacing traditional raw materials.

Ans. (i) Two reasons are as follows:

(a) Electronic industry provides telecommunication equipments.

(b) Electronic industry provides tools and implements needed in other industries.

(ii) Petrochemical industry is an industry where organic chemicals are derived from petroleum and then they are processed into various synthetic products.

Petrochemical products are replacing traditional raw materials because they are cheaper, easily available and needs less maintenance.

b Long Questions [3 Marks each]

1. Differentiate between the following.

(i) Public sector and private sector.

(ii) Large scale and small scale industries.

(iii) Agro-based and mineral based industry.

Ans. (i), (ii), (iii) **Refer to chapter theory page no. 164 and 165.**

2. Answer the following questions

(i) Explain why sugarcane must be crushed within 24 hours of harvesting.

(ii) Name four sugar mill centres in the Northern plains.

Ans. (i) Sugarcane must be crushed within 24 hours of harvesting as the sucrose content present in it, that is used to make sugar, keeps on decreasing in the sugarcane.

(ii) Four sugar mill centres in Northern Plains are Saharanpur, Meerut, Gonda and Gorakhpur.

3. Mention three factors that have helped the sugar industry flourish in the peninsular region rather than in the Northern regions of India.

Ans. Three factors favouring sugar industry in peninsular region than Northern India are as follows:

(i) The peninsular India has tropical climate throughout the year that favours the growth of sugarcane.

(ii) The sucrose content in sugarcane is higher and crushing season is longer in peninsular India.

(iii) States like Maharashtra, Tamil Nadu in Peninsular India have better transportation facilities and modern sugar mills.

4. Mention three factors, that favour the concentration of the cotton textile mills in Mumbai.

Ans. The factors that favour the concentration of cotton textile mills in Mumbai are as follows:

(i) Mumbai has proper network of roads and railways that facilitates easy transportation from mills.

(ii) It has proper network of banks that provides credit for setting up of cotton mills.

(iii) It is a very important port that provides opportunity for import and export of cotton goods.

5. Give three factors that favour the cotton industry in Kolkata.

Ans. Three factors that favour the cotton textile industry in Kolkata are as follows:

(i) It has proper supply of coal from Raniganj to run the industries.

(ii) It has huge supply of cheap labour and also has high demand of cotton due to humid climate.

(iii) It is facilitated with good network of roads and railways.

6. (i) Mention two reasons for the importance of the cotton textile industry.

(ii) Mention two reasons responsible for its poor performance.

Ans. (i) The two reasons for importance of the cotton textile industry are:

(a) It provides employment to huge section of population.

(b) It brings lot of foreign exchange.

(ii) **Refer to chapter theory page no. 168.**

7. State three main problems faced by the cotton textile industry in India.

Ans. **Refer to chapter theory page no. 168.**

8. How is cotton facing stiff competition from other goods?

Ans. Cotton is facing stiff competition from synthetic fibres or artificial fibres that are made from petrochemicals like nylon, terylene etc. These are cheaper and needs less maintenance. These synthetic fibres are more durable than natural fibre like cotton and readily pick-up different dyes. Compared to natural fibres, many synthetic fibres are more water resistant and stain resistant. Natural fibres like cotton are much more sensitive than synthetic fibres.

9. With reference to cotton textile industry, answer the following question. ***[2017]***

(i) Give two reasons why Mumbai is an important cotton textile industry.

(ii) Mention two more important centres of cotton textile industry in India.

Ans. (i) The two reasons why Mumbai is an important cotton textile industry are as follows:

(a) Black cotton soil and humid climate in Mumbai are ideal for cotton.

(b) Mumbai's location as an international port and cheap Hydroelectric power easily available from Tata hydroelectric grid from Western Ghats are important reasons for the development of cotton textile industry.

(ii) Two important centres are Ahmedabad and Madurai.

10. State the contribution of Maharashtra in sugar and cotton industries.

Ans. Maharashtra is the largest producer of sugar in India. It contributes to more than 1/3rd of the total production of sugar in the country. Maharashtra is also the largest producer of cotton in India. It produces about 46 per cent of the total production and is also called 'Lancashire' of India.

11. Give a geographical reason for each of the following. ***[2018]***

(i) Silk industry is doing particularly well in Karnataka.

(ii) Petrochemical products are gaining popularity in modern times.

(iii) The electronics industry is proving to be an asset for our country in the field of education.

Ans. (i) Silk industry is doing particularly well in Karnataka because of the temperature as it ranges from 16°C to 31°C and other favourable climatic conditions prevailing in Karnataka.

(ii) Petrochemical products are gaining popularity in modern times because products made from petrochemicals have greater variety and are cheaper. These products are more durable and require less maintenance.

(iii) The electronics industry which means consumer electronics are products intended for everyday use, most often in entertainment, communications and office productivity. It is proved to be an asset for India in the field of education because it makes revolution to encourage the education related electronic items like personal computers, calculators, GPS automotive, digital cameras, etc.

12. Give geographical reasons for the following.

(i) Kolkata has many cotton mills though cotton is not grown in West Bengal.

(ii) Karnataka is an important centre for silk.

(iii) India produces very little sugar though it is one of the largest producers of sugarcane in the world.

Ans. (i) **Refer to Q. no. 16 (ii) (a) (Short Questions).**

(ii) Karnataka, where the temperature ranges from 16° to 31°C, enjoys favourable climatic conditions for rearing silkworms. It is the hub of skilled workers which are required for the production of silk.

(iii) Though India is the largest producer of sugarcane yet it produces very little sugar because the sugar mills have old and obsolete machinery which hampers sugar production. Also the location of sugar mills are far from sugarcane fields.

13. How is artificial silk developing in India?

Ans. **Refer to chapter theory page no. 168.**

14. With reference to the silk industry, answer the following.

(i) Why is Karnataka the largest producer of mulberry silk?

(ii) Mention two varieties of non-mulberry silk produced in India.

(iii) Name one silk weaving centre each in UP and in Tamil Nadu. ***[2016]***

Ans. (i) The most important factors responsible for making Karnataka the largest producer in mulberry silk are availability of favourable climate for rearing silkworm, availability of Bombyx mori silkworm and recent introduction of new technology of handling Bombyx mori silkworm.

(ii) Non-mulberry silk produced in India are–Tussar and Muga.

(iii) UP-Varanasi and Tamil Nadu-Kanchipuram.

15. Give the geographic term for each of the following.

(i) Non-mulberry silk produced in Madhya Pradesh.

(ii) Rejected cane after crushing.

(iii) The rearing of silkworms to obtain silk. ***[2017]***

Ans. (i) Non-mulberry silk produced in Madhya Pradesh-Tussar silk.

(ii) Rejected cane after crushing-Bagasse.

(iii) The rearing of silkworms to obtain silk-sericulture.

16. Differentiate the industries on the basis of the finished goods or end product they provide.

Ans. On the basis of finished goods or end product the industries are classified as heavy and light industry. Heavy industries produce capital goods and consumer durables that are bulky e.g. cars, engineering goods, machines. Light industries produce goods of light weight like electronics, cycles, computers. Heavy industries require huge capital, scientific knowledge, large labour force and huge amount of raw materials. Light industries require less capital and labour in comparison to heavy industries.

17. State any three advantages of mini steel plants.

Ans. The advantages of mini steel plants are as follows:

(i) Mini steel plants do not require huge capital investment like integrated steel plant.

(ii) Mini steel plants use scrap or sponge iron as raw materials, that is easily available and also helps in recycling of iron.

(iii) These plants are set-up at local areas so they suit local needs and cater to local demands.

18. With reference to the iron and steel plant located at Jamshedpur answer the following.

(i) The company that is located here.

(ii) The places from where the plant gets its iron ore and coal.

(iii) Water sources near the steel plant.

Ans. (i) The company that is located here is TISCO (Tata Iron and Steel Company).

(ii) It gets iron ore from Singhbhum (Jharkhand) and Mayurbhanj (Odisha). Coal from Jharia coal mines of Jharkhand.

(iii) Water sources near the steel plant are Subarnarekha river and Kharkai dam.

19. With reference to the steel plants in India answer the following questions.

(i) What are integrated steel plants?

(ii) Name one integrated steel plant in the public sector. From where does this plant get its requirement of iron ore and coal? ***[2010]***

Ans. (i) Integrated steel plants are the plants where all the processes of making steel such as melting of iron ore, processing of steel and shaping of metals are carried out at one place.

(ii) One integrated steel plant in the public sector is Rourkela steel plant. This plant gets iron ore from Sundargarh and Keonjhar district and coal from Jharia, Talcher and Korba fields.

20. Write three favourable factors that led to the development of Bhilai steel plant.

Ans. The factors that led to the development of Bhilai steel plant are as follows:

(i) Availability of iron ore, coal, limestone, manganese from the nearby mines lying within a range of 30-80 kms.

(ii) Availability of cheap labour and regular water supply from the nearby areas.

(iii) The steel plant located in the Kolkata-Nagpur railway line for easy transportation of goods.

21. Name the following.

(i) A city on the East coast of India which has a shipbuilding yard.

(ii) The iron and steel plant set-up with German collaboration.

(iii) A city which has a plant manufacturing Maruti cars.

Ans. (i) Visakhapatnam has a shipyard named Hindustan Shipyard Ltd. It was set-up by M/S Scindia Steaus Navigation Company in 1941 and the first ship was launched in on 14th March, 1948. It was taken over by the Government in 1952.

(ii) Rourkela plant was set-up in the Sundergarh district of Odisha with the technical help of German firm Krupps and Demag in 1959 during the Second Five Year Plan.

(iii) Gurugram in Haryana.

22. Give one important centre of production of each of the following.

(i) Integral Coach Factory (ICF)

(ii) Bharat Heavy Electrical Limited (BHEL)

(iii) Hindustan Machine Tools (HMT)

Ans. (i) Integral Coach Factory (ICF) is a manufacturer of rail coaches located in Chennai, Tamil Nadu. It was established in 1952, is owned and operated by the Indian Railways.

(ii) Bharat Heavy Electricals Limited (BHEL) Owned and founded by the Government of India, is an engineering and manufacturing company based in New Delhi. It was established in 1964. It is India's largest power generation equipment manufacturer.

(iii) Hindustan Machine Tools Limited (HMT) is a state-owned manufacturing company. Its 6 manufacturing units situated at Bengaluru (Mother unit), Kochi, Hyderabad (2 units), Pinjore and Ajmer.

23. Give a reason for each of the following.

(i) The largest mineral based industry in India.

(ii) Mini steel plants causes less pollution than integrated steel plants.

(iii) The electronic industries has made an impact on both entertainment and education.

Ans. (i) Iron and steel is a pivotal element in the heavy industrial-structure and forms the backbone of industrial development. It gives the raw material for other industries such as automobile, locomotives, railways, shipbuilding, machine and tools, dams, manufacture of defence equipment etc.

(ii) Mini steel plants causes less pollution because they uses electric and induction furnace for processing.

(iii) Electronic industry give us various products like television, computers, laptops, tabs, radio, DTH etc. All these electronic products have become the major source of entertainments as well as education. With the help of these products information is readily available and can be shared through the use of internet.

24. Name a manufacturing centre for each of the following industries. ***[2014]***

(i) Engines for MIG aircraft.

(ii) Diesel locomotives

(iii) Software

Ans. (i) Koraput has the engine division of Hindustan Aeronautics Limited (HAL), which is a defence enterprise of the Government of India. This factory manufactures aircraft engines for MIG and Sukhoi fighter aircraft.

(ii) The Diesel Locomotives are manufactured by the Diesel Locomotive works in Varanasi.

(iii) Software-Bengaluru and Pune.

25. With reference to Rourkela steel plant answer the following.

(i) Name the state in which it is located.

(ii) Name the three products of the plant.

(iii) From where it gets

(a) Iron ore (b) Coal (c) Limestone

Ans. (i) It is situated in the Sundergarh district of Odisha.

(ii) It produces heavy steel plants, boilers, automobiles and shipbuilding.

(iii) (a) **Iron ore** Iron ore comes from Bonaigarh, Mayurbanj and Keonjhar districts.

(b) **Coal** It gets coal from Raniganj, Jharia and Talcher.

(c) **Limestone** Birmitrapur and Hirri.

26. Answer the following questions.

(i) What is the significance of the electronics industry in recent times?

(ii) Name two cities that have leading software companies.

Ans. (i) The significance is as follows:

(a) The electronics industry has revolutionised the lifestyle of the people today. It covers a wide range of products including transistor sets, televisions, telephone exchanges, telecommunication, computers and various equipments for posts and telegraph, defence, railway and meteorological departments.

(b) It generates employment to a large number of people.

(ii) (a) **Bengaluru** It is the IT capital of India and a global information technology hub in the country. The city is known as the 'Silicon Valley' of India with large number of software companies in India and many top Indian firms like, Infosys, Wipro, Mindtree are headquartered in Bengaluru.

(b) **Hyderabad** It is also known as 'Cyberabad' and 'HITEC City'. It is the second largest IT exporter in India and the first destination in India for the microsoft development centre.

27. Name the following. ***[2018]***

(i) A city most famous for electronics and hence Called 'The Electronics Capital of India'.

(ii) The location of an iron and steel industry set-up with German collaboration.

(iii) A by-product of sugar industry which is used in the manufacture of wax and shoe polish.

Ans. (i) Bangalore also known as Bengaluru is the electronic capital of India because the presence of software industries, aerospace, telecommunications and heavy industries.

(ii) Rourkela Steel Plant in Odisha is set-up by German collaboration in 1960s. It is operated by Steel Authority of India Limited (SAIL).

(iii) Sugarcane is a by-product of sugar industry which is used in the manufacture of wax and shoe polish. This by-product is also known as sugarcane filter cake mud.

28. Name two products for each of the following industries. *[2017]*

(i) Petrochemical industry

(ii) Heavy engineering industry

(iii) Electronic industry

Ans. (i) Two product of petrochemical industry-polythene and PVC.

(ii) Two product of heavy engineering industry-ships and aircrafts.

(iii) Two product of electronic industries-computers and television.

29. Give a reason for each of the following. *[2016]*

(i) Products made from petrochemicals are growing in popularity.

(ii) A heavy engineering industry requires huge capital investment.

(iii) The electronics industry contributes to the development of the country.

Ans. (i) Products made from petrochemicals have greater variety and are cheaper. They are more durable and needs less maintenance so they are growing in popularity.

(ii) A heavy engineering industry requires huge capital investment because it requires heavy machinery, large scale labours, heavy infrastructure etc.

(iii) The electronics industry contributes to the development of the country because it covers diverse areas such as space exploration, defence equipments.

30. (i) State two reasons for the concentration of the sugar industry in Uttar Pradesh.

(ii) Mention any two ways in which the agro-based industries have affected the economy of India.

Ans. (i) The two reasons are as follows:

(a) Sugarcane grows well in the fertile plains of Uttar Pradesh.

(b) Cheap and easy availability of labour to work in the sugar mills.

(ii) The two ways in which agro-based industries have affected the economy are:

(a) Agro-based industries increase the demand and efficiency of the agricultural products.

(b) Provides employment to a large section of the society.

C Picture Based Question

1. Study the picture given below and answer the following questions.

TISCO

(i) What is the full form of the plant shown in the picture?

(ii) To which sector does this plant belong?

(iii) Where it is located?

Ans. (i) The full form of TISCO is Tata Iron and Steel Company.

(ii) The plant belongs to private sector.

(iii) It is located in Jamshedpur in Jharkhand.

2. Study the picture given below and answer the following questions.

(i) Name the industry shown in the picture.

(ii) Give a brief description of this industry.

Ans. (i) Petrochemical industry

(ii) It is an important organic chemical industry which derive its chemicals from petroleum resources and product likes LPG and Coal. Petrochemicals are used for manufacturing various goods like synthetic rubber, synthetic fibre, ferrous, non-ferrous metals, plastics, dyestuffs, drugs, insecticides and many pharmaceuticals. This industry also produces resins, adhesives, plastic sheets, paints and furniture covering for household items.

CHAPTER TEST

Short Questions

[2 Marks each]

1. What is the importance of iron and steel plant in India?
2. What is the importance of heavy industries in India?
3. State three examples of heavy engineering industries.
4. Explain the development of aircraft industry.
5. What do you understand by medium-scale industry?
6. (i) Why is the iron and steel industry called a 'basic industry'?
   (ii) Define a mini steel plant.
7. With which industry would you identify the following manufacturing centres?
   (i) Kanpur (ii) Rourkela (iii) Pune (iv) Mangalore
8. Why is the cotton textile industry called an 'agro-based industry'?
9. Name the state that produces the most cotton and silk products respectively.

Long Questions

[3 Marks each]

1. Write in details about the advantage of petrochemical products.
2. Write in details about the different production units of petrochemical industries.
3. Explain in details about the distribution of sugar industry in India.
4. Explain few problems faced by the cotton industries as well as jute industries.
5. Write about the features of mulberry silk.
6. (i) State two reasons for the growing importance in the status of petrochemical industries.
   (ii) Name two products of the petroleum industry.
7. State two conditions necessary for the setting up of a heavy engineering industry.
8. (i) State two major problems faced by the sugar industry.
   (ii) Name two by-products of the sugar industry. Also mention their uses.
9. (i) State one of the main problems of the silk industry.
   (ii) Why are synthetic fibres popular?

ARCHIVES*

Collection of Questions Asked in Previous Years' ICSE Class 10th Examinations

2018

1. Give a geographical reason for each of the following. *[3]*

(i) Silk industry is doing particularly well in Karnataka.

(ii) Petrochemical products are gaining popularity in modern times.

(iii) The electronics industry is proving to be an asset for our country in the field of education.

2. Name the following. *[3]*

(i) A city most famous for electronics and hence Called 'The Electronics Capital of India'.

(ii) The location of an iron and steel industry set-up with German collaboration.

(iii) A by-product of sugar industry which is used in the manufacture of wax and shoe polish.

2017

1. Differentiate between mineral based and agro-based industry giving one example for each. *[2]*

2. "Though Uttar Pradesh has the largest number of sugar mills yet Maharashtra is the largest producer of sugar." Give any two reasons to justify the statement. *[2]*

3. Give the geographic term for each of the following. *[3]*

(i) Non-mulberry silk produced in Madhya Pradesh.

(ii) Rejected cane after crushing.

(iii) The rearing of silkworms to obtain silk.

4. With reference to cotton textile industry, answer the following question. *[3]*

(i) Give two reasons why Mumbai is an important cotton textile industry.

(ii) Mention two more important centres of cotton textile industry in India.

5. 'The Iron and Steel industry constitutes the backbone of modern industrial economy'. Give two reasons to justify the statement. *[2]*

6. (i) Name an Iron and Steel Industry set-up in Odisha with the help of a famous German firm.

(ii) From where does the industry named in (i) get its iron-ore and manganese?

7. Name a manufacturing centre for each of the following industries.

(i) Aircraft (ii) HMT (iii) Railway coaches

8. Name two products for each of the following industries. *[3]*

(i) Petrochemical industry (ii) Electronic industry (iii) Heavy engineering industry

2016

1. Give two reasons for the importance of the jute industry in the Ganga-Brahmaputra delta region. *[2]*

2. Mention two problems of the Cotton Textile industry in India. *[2]*

3. (i) Give two reasons why the woollen industry is not a flouirishing industry in India. *[3]*

(ii) Name two centres for this industry.

4. With reference to the silk industry, answer the following *[3]*

(i) Why is Karnataka the largest producer of mulberry silk?

(ii) Mention two varieties of non-mulberry silk produced in India.

(iii) Name one silk weaving centre each in UP and in Tamil Nadu.

5. Mention two advantages that a mini steel plant has over an integrated iron and steel plant. *[3]*

6. (i) Name an iron and steel plant which was established with British collaboration. *[2]*

(ii) From where does it get its supply of

(a) iron ore (b) manganese (c) coal

7. Give a reason for each of the following. *[3]*

(i) Products made from petrochemicals are growing in popularity.

(ii) A heavy engineering industry requires huge capital investment.

(iii) The electronics industry contributes to the development of the country.

8. Name the industrial product for which following centres are well known: *[3]*

(i) Bhilai (ii) Chittaranjan (iii) Koraput.

2015

1. (i) Why is the cotton textile industry called an agro-based industry?

(ii) Give an important reason for it being more widespread than the jute industry. *[2]*

2. (i) State one important point of similarity between the woollen industry and the silk industry.

(ii) Name the state that produces the most woollen and silk products respectively. *[2]*

3. (i) State two major problems faced by the sugar industry.

(ii) Name two by-products of the sugar industry. *[3]*

4. (i) State one of the main problems of the silk industry.

(ii) Name two products of the jute industry, other than rope and gunny bags.

(iii) Why are synthetic fibres popular? *[3]*

5. (i) Why is the iron and steel industry called a 'basic industry'?

(ii) Define a mini steel plant. *[2]*

6. With which large scale industry would you indentify the following manufacturing centres?

(i) Kanpur (ii) Rourkela (iii) Pune (iv) Mangalore *[2]*

7. (i) State two reasons for the growing importance in the status of petrochemical industries.

(ii) Name two products of the petroleum industry. *[3]*

8. (i) State two conditions necessary for the setting up of a heavy engineering industry.

(ii) Name a shipbuilding yard on the East Coast and a centre for making electric locomotives. *[3]*

2014

1. Name two textile industries using any animal fibres. Name an important state where these industries are located. *[2]*

2. Give two reasons for each of the following.

(i) Kolkata is an important cotton manufacturing centre even though West Bengal is not a leading producer of cotton.

(ii) The wool industry is not as well developed as compared to the cotton industry in India. *[2]*

3. Mention three problems of the jute textile industry in India. *[3]*

4. Mention three factors that have helped the sugar industry to flourish in the peninsular region rather than in the Northern regions of India. *[3]*

5. Name one integrated iron and steel plant in the private sector. Where does it obtain its iron and coal from? *[2]*

6. Name two raw meterials used in the petrochemical industry and state two advantages of petrochemical products. *[2]*

7. Give a reason for each of the following.

(i) Visakhapatnam is a leading centre for shipbuilding.

(ii) Mini steel plants cause less pollution than integrated steel plants.

(iii) The electronic industry has made an impact on both entertainment and education. *[3]*

8. Name a manufacturing centre for each of the following industries.

(i) Engines for MIG aircraft (ii) Diesel locomotives (iii) Software *[3]*

2013

1. Name any two large sugar producing states, one each in North and South India. *[2]*

2. Name an agro-based Industry based in the following industrial centres. *[3]*

(i) Ahmedabad (ii) Mysore *[2]*

3. State three favourable conditions responsible for the growth of the jute industry in West Bengal. *[3]*

4. Give geographical reasons for the following. *[3]*

(i) The woollen industry is a localised industry in India.

(ii) It is necessary to crush sugarcane within 24 hours of harvesting.

(iii) Sericulture flourished in Karnataka.

5. (i) What is the significance of the Electronics Industry in recent times? *[2]*

(ii) Name two cities that have leading Software Companies.

6. Name of the steel plants that were set-up with Russian collaboration. *[2]*

7. Explain three reasons as to why there is a large concentration of iron and steel plants in the Chotanagpur region. *[3]*

8. What industrial product are the following centres noted for? *[3]*

(i) Gurugram (ii) Perambur (iii) Chittaranjan

* All these questions are covered and explained in chapter exercise 'Exam Practice'.

CHAPTER

13

Transport

The system through which people and goods move from one place to another is called transport system. Good transport network helps in the development of industrialisation and urbanisation. A developing country like India needs an efficient and wide transport system. There are several means of transport like roadways, railways, airways, waterways, etc.

Importance of Transportation

- It helps in strengthening the feeling of unity and brotherhood among the citizen.
- It links the backward areas to the urban cities and reduces regional industrial disparity.
- It helps in utilisation of natural resources lying in hills and forest.
- It protects the people during war, natural calamities and crisis.
- It helps in transportation of raw material to industries.

Modes of Transport

Different modes of transport are discussed below:

Roadways

It is very important for the development of a region or country as, it is capable of connecting each and every area of a region with another. India has one of the largest road networks in the world with about 33 lakh kilometre (approx) of roads. This makes it the second largest road network in the world.

Road networks are classified into various types, which are as follows:

National Highways These are the roads constructed and maintained by Central Government. These are well constructed long metalled roads which are stretched through length and breadth of the country. The National Highway Authority of India (NHAI) is an autonomous body of the Government of India is responsible for the development, maintenance and management of National Highways in India. The longest highway in India is NH-7, which is from Varanasi to Kanyakumari.

State Highways The roads linking to the state capital with its district headquarters are called state highways. These are constructed and maintained by State Public Works Department.

District Roads The roads that connects district headquarters with other places of district are called district roads. These are maintained by Zila Parishad of the district.

Rural Roads Roads that conect villages to disteicts are called rural roads. These are very important means of communication in road network. These roads cover about 80 per cent of the total road length in the country. These roads play a vital role in moving the agricultural products from the field to the manufacturing centres.

Border Roads The Border Roads Organisation (BRO) constructs and maintains roads in the border areas of the country. It was established in 1960.

Golden Quadrilateral

It is 5846 Km long 4/6 lane and high density traffic corridor. It connects India's four big metro cities of Delhi-Mumbai-Chennai-Kolkata. Its construction helps in reducing the time, distance and cost of movements among mega cities.

Advantages of Roadways

Good road network are the **precursor**[1] of economic development of a country.These are very complimentary for other transport systems. The major advantages of having good road transport are as follows:

- It helps to connect the remotest villages and hilly areas to towns, cities and plain areas.
- It comparatively costs less to construct road networks than railway lines.
- Roads can be constructed even in irregular land and hilly regions where other transport system is difficult to develop.
- Roads provide the facility of door to door service which is very favourable and minimise the cost of loading and unloading of products and goods.
- Farmers are also benefitted as their perishable goods can be transported to the nearby market within the time limit.
- The movement of products is safer in road transport as it has less chance of pilferage or theft.
- Road transport is complimentary to the other means of transport as it offers a connection between railway stations and ports.
- It is very efficient as the farmers or producers can start the movement on their own rather than depend on railways for transportation of their goods.

Disadvantages of Roadways

Road transport system has some disadvantages also. Some of them are as follows:

- Most of the roads are irregular, hence they are not suitable for regular vehicular traffic.
- Roads in India are not properly maintained, hence when the road surface are poor it causes heavy wear and tear of vehicles.
- The presence of number of check posts, toll tax and **octroi**[2] duties collection posts causes vehicles to reduce their speed more than often, waste a lot of precious time and causes irritation to the passengers.
- Roads in India are not strongly built. Most of it have weak pavement, unbridged level crossings and lack of wayside amenities and safety measures.
- Most of the Indian roads are heavily infested with traffic especially in cities. Same road is utilised by all type of vehicles with varied speeds. Road accidents frequently takes place and thus, it is not safe.

CHECK POINT 01

1 How does transport help during natural disaster?
2 Which is the longest highway in India?
3 Mention anyone advantage of roadways.

Railways

It is the important means of transportation which plays a central role in the economy of the country. It constitutes a principle means of transportation for freight and passengers. It provides the basic facilities to the people. The railways in India started in 1853 from Mumbai to Thane which covered a distance of about 34 km. After this, another railway line was opened from Kolkata and Raniganj in 1859. After Independence, huge development was made in railways.

In the year 1951, the railway system was nationalised as one unit and became one of the largest networks in the world. India has the fourth largest and busiest rail network in the world. It helps to transport over 18 million passengers and over 2 million tonnes of freight daily. The rail network in India stretches over the length and breadth of the country constituting 683 stations covering more than 64,460 kms.

1 Precursor It is something which comes before something else and that often leads to or influences its development.
2 Octroi A kind of tax.

There are also suburban rail networks constructed in many big cities to cater a large number of commuters. Mumbai, Chennai, Delhi, Kolkata, Hyderabad, Pune and Lucknow are the cities which currently have their own suburban networks. New Delhi, Kolkata, Chennai, Mumbai and Bengaluru are also facilitated with their own metro networks. The overall railway system is managed by the Railway Board.

There are total 17 **railway zones** in which the railway network has been divided. These zones are further divided into divisions. The Konkan railway is established as a separate and a corporate railway. It is supervised by the Railway Ministry and Railway Board.

Railway gauges

There are three types of railway gauge, which were constructed during the colonial period to cater to the movement of varied volume of traffic and goods in different parts of the country. These are:

(i) **Broad Gauge** It has the width of about 1.676 metres and is installed in most part of the country. It was built to link the important cities in order to export the raw materials to Britain.

(ii) **Metre Gauge** It is one metre in width and is mostly used in Northern Uttar Pradesh, Bihar, Assam, Western Rajasthan, Gujarat, Maharashtra, Karnataka and Tamil Nadu.

(iii) **Narrow Gauge** It is about 0.762 m in width and covers about 2463 km accounting for 3.8 per cent of the total route length. It is used mainly in mountainous regions such as Kalka, Shimla, Siliguri, Darjeeling and Otacamund.

Advantages of Railways

Railways are the principal mode of transport for both passengers as well as freight. It has following advantages:

- Railways are the chief means of transportation which help in smooth movement of heavy goods as well as perishable commodities to distant areas.
- It helps to move the raw material to the production point and manufactured goods to the markets.
- It helps in minimising the sufferings during natural disasters and helps to send the required food products and aid to the effected area.
- It has helped to bring the rural areas very close to the urban centres and reduced the travel time effectively.
- It has helped with its huge network stretched throughout the country to integrate and knit the whole country into a whole.
- It provides smooth movement of police forces, armed forces and defence equipments during the time of crisis.
- It is very comfortable form of journey as it allows the passenger to stretch and walk along the corridors.
- Modern berths are installed to allow the passengers to sleep comfortably during long distance travelling.

Disadvantages of Railways

Rail transport has few disadvantages as well which are as follows:

- Rail tracks are very difficult to lay on irregular land such as hilly and forested areas.
- Train journey sometimes are very long and tiring, especially if we compare it with air journey.
- Majority of the train in India still runs on coal and thus, produces lot of air and noise pollution.
- Trains cannot cross seas and oceans. It cannot be laid on the landscape which has loose soil base.
- Due to the electrification of trains there is an increase in the consumption of electricity and train fares.
- Lack of cleanliness and other basic facilities adds to the disadvantage of the railways.
- Rail transportation cannot provide door to door service.
- The tracks, equipments and machineries have become obsolete and need to be replaced urgently. These are the cause of major rail accidents in the country.
- High cost is involved in construction of railway tracks.

CHECK POINT 02

1 Name the first railway route of India.
2 Name the different gauges present in Indian railways.
3 Which railway gauge covers the longest area in India?

Airways

Air transport is the fastest and most confortable mode of transport. The Airports Authority of India (AAI) set-up on 1st April, 1995 (by merging the International Airports Authority of India and the National Airports Authority) is responsible to enhance the expansion and modernisation of the operational, terminal and cargo facilities at the airports in the country. It is the nodal agency which provides safe and efficient air traffic services and **aeronautical**[3] communication services in the country.

3 Aeronautical A science that deals with airplanes and flying.

Earlier, the air transport in India was managed by Air India and Indian Airlines, but these two corporations were merged into a single entity in 2007 and is combinely called 'Air India'. Air India has emerged as the 16th largest airline in Asia. There are a number of private airlines dealing with air transport other than Air India such as Jet Airways (India) Ltd. Jet Lite Airlines, Spicejet Ltd., Go Airlines (India) Pvt. Ltd. and Inter Globe Aviation Ltd. which is popularly known as 'Indigo'. These private airlines provide extensive range of flights and transportation to the different parts of India as well as outside the country.

Four important airports of India are as follows:

(i) Indira Gandhi International Airport, Delhi

(ii) Chhatrapati Shivaji International Airport, Mumbai

(iii) Netaji Subhash Chandra Bose International Airport, Kolkata

(iv) Chennai International Airport, Chennai

Pawan Hans

Pawan Hans Helicopters Ltd. (PHHL) was formed in 1985, which was set-up to provide helicopter support services to the petroleum sector and Oil India Ltd. in offshore exploration and operate in the mountainous regions that are inaccessible. It also provides services to some State Government and and also to North-Eastern states. It also makes flights for promotion of tourism in India.

Advantages of Airways

In a vast country, like India, air transport plays a significant part in transportation, covering long distances between major cities. The various advantages of the airways are listed as follows:

- It is the fastest means of transportation which acts as a link between major cities located far away from each other.
- It helps us to move swiftly and allow us to cross any mountain barriers, deserts, seas and oceans and all other inaccessible areas unlike rail and road networks.
- Air transport provide unparallel service during the time of natural calamities. It provides air-lift facilities to the people in affected areas and also could drop food, medicines, etc. in the affected areas.

Disadvantages of Airways

Apart from various benefits, there are some disadvantages of airways which are as follows:

- Air transport provides comfortable, but costly services.
- It depends mainly on prevalent weather conditions and when the weather is not favourable, it is often delayed.
- It runs on fuel based on petroleum which is a non-renewable source of energy.
- The airlines in India are facing a tough competition from many foreign airlines which are very efficient and provide better facilities and services.
- Its maintenance cost is too high.
- The rate of freight charges are very high in air transport.

CHECK POINT 03

1 Name one agency that provides safe and efficient air traffic services?

2 State any one service provided by Pawan Hans Helicopters Ltd.

3 State any one advantage of air transport.

Waterways

It is considered as the cheapest mode of transport. India has a huge cover of waterways such as rivers, lakes, canals, backwaters and has a long coastline of about 7517 km. It is a very favourable transport system for carrying heavy and bulky goods from one place to another. It offers only about 1 per cent of the total transport of the country which is very low as compared to other developed countries. Water transport can be broadly categorised into two groups which are as follows:

(i) **Inland Waterways** The water bodies like rivers, canals, lakes, **backwaters**[4] and creeks which are deep enough to provide the safe navigation of boats and ships are included in inland waterways. Inland Waterways Authority of India (IWAI) is the statutory authority which was constituted on 27th October, 1986 to look after the development and regulation of inland waterways for shipping and navigation.

(ii) **Oceanic Waterways** India is endowed with a long coastline of about 7517 kms which is one of the longest in the world. Indian economy is greatly supported by the oceanic waterways. The ocean channels in India supports about 95 per cent of foreign trade by volume and about 70 per cent by value. They are also utilised for transportation between the islands and the other parts of the country.

Ports Majority of the Cargo traffic is handled by the major ports. The ports are grouped as major, minor and intermediate ports which has its own administrative significance.

4 Backwater It is a part of a river where the water moves slowly because it is away from the main part of the river.

Major ports in India is administered by the Central Shipping Ministry and the minor and intermediate ports are administered by the ministries in the nine coastal states such as Odisha, West Bengal, Andhra Pradesh, Tamil Nadu, Kerala, Karnataka, Goa, Maharashtra and Gujarat. Major Ports of India are Kolkata, Haldia, Paradip, Visakhapatnam, Chennai, Tuticorin, kandla, Mumbai, Jawaharlal Nehru Port, Marmagao, New Mangalore, Kochi and Ennore Port.

Advantages of Waterways

The advantages of using water transport are as follows:

- It is popular as the cheapest mode of transport.
- It provides favourable means to carry heavy and bulky material.
- It consumes less fuel and is very safe in terms of conservation of environment.
- Ships and cruise provides very comfortable form of travelling as it offers lot of space and other facilities such as that of catering, entertainment, sports, medical facilities, communication, etc.
- The traffic in waterways are very less as compared to other modes of transport like roadways and railways.
- It provides employment to thousands of people.
- It is one of the best means to promote tourism.

It requires less capital investment as there is no cost of construction like in roadways and railways.

Disadvantages of Waterways

There are some disadvantages of water transport. These are as follows:

- Many ports are not well linked with their hinterland which obstructs the smooth movement of goods.
- It is dependent on the weather conditions which obstructs its potential.
- It demands long travelling hours which tends to make people ill.
- Many ports in India are not well planned and lack basic facilities.
- It is restricted to the areas having navigable rivers and oceanic modes.
- The shipping companies incur huge losses due to slow handling of the cargo at port and undue delays as well.

CHECK POINT 04

1 What are inland waterways?
2 Who administer the major, intermediate and minor ports in India.
3 Mention any one disadvantage of waterways.

SUMMARY

- Transport helps in the better utilisation of the resources of the backward areas by connecting them with other developed areas. It helps in the movement of raw material, fuel, machinery, etc, from one point of production to the other point.
- Roadways are capable of connecting each and every area of a region with another. India has one of the largest road networks in the world with about 33 lakh km, which makes it the second largest road network in the world.
- National Highways are the roads constructed by the Central Government. It passes through various states and cities which stretches over 96,261 km.
- The National Highway Authority of India is an autonomous body of the Government of India which was constituted in 1988. It is responsible for the development, maintenance and management of National Highways in India.
- Railways constitute a principle mean of transportation for freight and passengers.
- The railway system in India started in 1853 from Mumbai to Thane, which covered a distance of about 34 km. After this, another railway line was opened from Kolkata and Raniganj in 1859.
- Airways was started in India with a 10 km air mail operation from Allahabad to Naini in 1911. The air transport was nationalised in the year 1953.
- The Airports Authority of India (AAI) was set-up on 1st April, 1995 by merging the International Airports Authority of India and the National Airports Authority.
- Pawan Hans Helicopters Ltd. (PHHL) was formed in 1985, which was set-up to provide helicopter support services to the petroleum sector, offshore exploration and mountainous regions.
- Waterway is considered the cheapest mode of transport. India has huge cover of waterways such as rivers, lakes, canals, backwaters and has a long coastline of about 7500 km.
- The water bodies like rivers, canals, lakes, backwaters and creeks which are deep enough to provide the safe navigation of boats and ships are included in Inland waterways.
- Ports are divided into major, minor and intermediate ports.

EXAM PRACTICE

a Short Questions [2 Marks each]

1. What do you understand by transport system?

Ans. The system through which people and goods move from one place to another is called transport system. Better transport helps in the better ultilisation of the resources of the backward areas by connecting them with other developed areas.

2. Give two reasons for the 'means of transport' being called the lifelines of a nation's economy. ***[2018]***

Ans. The two reasons for the means of transport being called the lifelines of a nations's economy are:

1. It helps in the production and movement of goods and services.
2. It helps us in interacting with other in all parts of the world which has brought the world closer.

3. Why is road transport preferred in Northern Plains of India?

Ans. The road transport preferred in the Northern Plains of India due to its fertile soil and high density of population. The necessary material for constructing roads is also available from the nearby hilly areas.

4. What do you understand by National Highway?

Ans. The National Highway Authority of India is an autonomous body of the Government of India which was constituted in 1988. It is responsible for the development, maintenance and management of National Highways in India.

5. What do you understand by 'Expressway'?

Ans. These highways are six to eight lane type which controlled access, are well cemented and designed to offer smooth and highspeed movement of vehicles with hindrance free facility.

6. Name two government agencies that work for the construction and maintenance of roads in India.

Ans. (i) **The National Highway Authority** (NHAI) It is an autonomous body of the Government of India which was constituted in 1988. It is responsible for maintenance and management of National Highways in India.

(ii) **State Public Works Department** (PWDs) It is also responsible for the development, construction and maintenance and management of National Highways.

7. Distinguish between national highway and expressway.

Ans. Difference between national highway and expressway are as follows:

	National Highway	Expressway
(i)	These are maintained by the Central Government.	These may or may not be constructed by the Central Government.
(ii)	These connect two remote places.	These are built to reduce congestion and travel time.

8. Distinguish between national highway and state highway.

Ans. Difference between national highway and state highway are as follows:

	National Highway	State Highway
(i)	These are maintained by the Central Government.	These are maintained by the State Government.
(ii)	These highways run over two or more state.	These highways run within the same state.

9. Why is road transport in India considered more useful than rail transport? State two reasons in support of your answer. ***[2014]***

Ans. Road transport is more popular than rail transport because of following reasons:

(i) It provides door to door service.

(ii) Perishable products can be transported easily.

10. Roadways are always considered more important than any other means of transportation. Give two reasons in support of the statement. ***[2016]***

Ans. Roadways are always considered more important than any other means of transport because:

(i) It is more suitable for short distance travel.

(ii) Saves on cost of transportation from one station to another station.

11. Give two ways in which rail transport is useful for the people of India. ***[2018]***

Ans. The two ways in which rail transport is useful for the people of India are:

1. It helps us in conducting various activities like business, sight seeing, pilgrimage.
2. It helps people to connect their family from far away and transport the goods over long distance.

12. (i) Why is the railways an important means of transport as compared to airways? ***[2015]***

(ii) State one economic benefit of the Golden Quadrilateral Project.

Ans. (i) (a) Railways is a cheap mode of transport which are easily reachable for the poor people.

(b) Railway can carry loads at cheaper rate to every corner of the country.

(ii) The economic benefit for the country by Golden Quadrilateral is that it transports the goods at cheaper rate to the market where the demand is more.

13. Mention two reasons why more people use railways rather than airways. ***[2017]***

Ans. Railways have been serving more people than airways because:

(i) Railways carry more tonnage and passengers than airways.

(ii) Railways is a cheaper mode of transport as compared to airways.

14. Distinguish between Broad Gauge and Metre Gauge.

Ans. Difference between Broad Gauge and Metre Gauge are as follows:

	Broad Gauge	Metre Gauge
(i)	The distance between the railway track lines is 1.676 m.	The distance between the railway track lines is 1 m.
(ii)	Total route length of broad gauge line is 55,188 km.	It covers, 7180 km of route length.

15. Distinguish between Metre Gauge and Narrow Gauge.

Ans. Difference between metre Gauge and Narrow Gauge are as follows:

	Metre Gauge	Narrow Gauge
(i)	The distance between railway track lines is 1m.	The distance between railways is 0.762 m and 0.610 m.
(ii)	It covers 7180 km of route length.	It covers 2463 km of route length.

16. What is AAI and when was it formed?

Ans. The Airports Authority of India (AAI) was set-up on 1st April, 1995 by merging the International Airports Authority of India and the National Airports Authority.

17. What is 'Pawan Hans'? Why was it set-up?

Ans. Pawan Hans Helicopters Ltd. (PHHL) was formed in 1985. It was set-up to provide helicopter support services to the petroleum sector and Oil India Ltd. in offshore exploration and operate in the mountainous region where the area are inaccessible.

18. Name two airports of India that cater to international flights.

Ans. Two airports of India that caters to international flights are as follows:

(i) Indira Gandhi International Airport, Delhi.

(ii) Chhatrapati Shivaji International Airport, Mumbai.

19. Name two areas where helicopter services may be used. ***[2012]***

Ans. Helicopter services can be used mainly in following areas:

(i) Areas of mountains.

(ii) Areas affected with natural calamities like flood, earthquake, etc.

20. Mention one advantage and one disadvantage of air transport. ***[2011]***

Ans. **Advantage** Air transport provide unparallel service during the time of natural calamities. It provides air-lift facilities to the people in affected areas and also could drop food, medicines etc. in the affected areas.

Disadvantage Air transport provides comfortable, but costly services.

21. Give one advantage of air transport. Why is it still a popular means of transportation in India? ***[2013]***

Ans. Air transport is the fastest mode of transport. It is indispensable for the business people, for defence and for making communication in hilly regions and border areas. So, it is a popular means of transportation in India.

22. Mention one advantage and one disadvantage each of the inland waterways. ***[2014]***

Ans. **Advantage** It is the most suitable for carrying heavy and bulky goods.

Disadvantage It depends on the weather conditions which obstructs its potential.

23. Why is inland waterways declining in its importance? Give two reasons for your answer. ***[2017]***

Or Why has the importance of inland waterways declined? Give any two reasons. ***[2012]***

Ans. Inland waterways declining in its importance due to following reason:

(i) Areas of water transport is restricted. It provide access to limited areas.

(ii) It demands long travelling hours which tends to make people ill.

24. What do you mean by inland waterways? Name the authority which handle the waterways in India.

Ans. The water bodies like rivers, canals, lakes, backwaters and creeks which are deep enough to provide the safe navigation of boats and ships are included in inland waterways. Inland Waterways Authority of India (IWAI) is the statutory authority which was constituted on 27th October, 1986.

25. Give the meaning of Port.

Ans. Port is the harbour where goods are loaded and unloaded from the ship is called a 'port'.

26. Name the following.

(i) Cheapest mode of transport.

(ii) Fastest mode of transport.

Ans. (i) **Waterways** It is the cheapest mode of transport which provides favourable means to carry heavy and bulky goods.

(ii) **Airways** Airways are the fastest mode of transport. It saves our travelling time.

b Long Questions [3 Marks each]

1. State any three features of the Border Roads?

Ans. The main features of the border roads are as follows:

(i) These Border Roads are the life line of Border areas of Northern and North-Eastern part of India.

(ii) These roads have increased the accessibility in the difficult terrain areas of India.

(iii) These roads are constructed and maintained by Border Roads Organisation.

2. Write any three problems faced by the roadways in India.

Ans. **Refer to chapter theory page no. 186.**

3. In accordance to the railway transport, answer the following questions.

(i) Why railways is suitable for long distance travel?

(ii) Why it requires high cost construction and maintenance?

(iii) First railway line in India connected which two places.

Ans. (i) Railways reduce the cost of long distance travelling as compared to other modes of transport. As compared to airways, travelling through railways is easy and comfortable as one more during his/her travelling time and does not stuck in his/her seat for endless amount of time.

(ii) Rail tracks are very difficult to lay on irregular terrain thus, high cost is involved in construction and maintenance of railway tracks.

(iii) The first railway line was started in 1853 from Mumbai to Thane.

4. (i) State one advantage of inland waterways. ***[2018]***

(ii) State one advantage of roadways.

(iii) State one disadvantage of water transport.

Ans. (i) The inland waterways is the cheapest means of transport and is most suitable for carrying heavy and bulky material.

(ii) Roads can go through dissected and undulating land areas and through steep mountains. It also provide door-to-door services.

(iii) The one disadvantage of water transport is that it is a slow means of transport and unsuitable for small business.

5. (i) Give reasons to explain the lack of rail transport in Northern India.

(ii) Why is road transport favoured in the Northern Plains of India?

Ans. (i) Northern India has a hilly region and it is difficult to lay the railway tracks in this hilly terrain with uneven areas.

(ii) (a) Northern Plains are the fertile and levelled region which has a high density of population.

(b) Here, roadways help in easy transportation of crops, perishable food items and raw materials within short distances quickly.

6. Mention any three problems being faced by the Indian railways. ***[2012]***

Ans. **Refer to chapter theory page no. 187.**

7. Which mode of transport is considered as fastest mode of transportation and why?

Ans. Airways is considered as fastest mode of transportation. It acts as a link between major cities located far away from each other. It also help us to move swiftly and allow as to cross any mountain barrier, desert and other inaccessible area within very less time.

8. (i) State one important difference between an expressway and a highway. ***[2015]***

(ii) Name the first expressway constructed in the country.

(iii) State a reason why the Northern rivers are more suitable for navigation than the Deccan rivers.

Ans. (i) (a) **Expressways** These have controlled access, where a vehicle can enter it only through a limited place and no other road merges/crosses the expressway anywhere, thereby avoiding possible accidents.

(b) **Highways** While in the case of highways, there are multiple roads which merge with/across the highways at many places.

(ii) Ahmedabad-Vadodara expressway was the first expressway to be constructed in the country.

(iii) (a) Deccan rivers are not Perennial as compared to Northern rivers.

(b) Deccan rivers are seasonal in nature and only fed by rainfall.

(c) They have lots of waterfalls and rapids.

9. Mention two advantages and one disadvantage of waterways. ***[2016]***

Ans. **Advantage**

(a) It is popular as the cheapest mode of transport.

(b) It provides favourable means to carry heavy and bulky material.

Disadvantage Many ports are not well linked with their hinterland which obstructs the smooth movement of goods.

10. Give three reasons as to why airways are becoming a popular means of transport in modern India.

Ans. The three reasons due to which airways are becoming a popular means of transport in modern India are:

1. It is the fastest means of movement from one place to the other for a vast country like India.
2. It has reduced the distance by minimising the travel time.
3. It helps to reach the large and the terrain place where the climate conditions are diverse in India.

C Picture Based Question

1. Study the diagram below and answer the questions that follow.

(i) In which part of India is this means of transport is most popular?

(ii) Name the first commercial train journey in India.

Ans. (i) This means of transport is most popular in the Northern plains.

(ii) The first commercial train journey was started in 1853 from Mumbai to Thane.

CHAPTER TEST

Short Questions

[2 Marks each**]**

1. How does transport plays an important role in human life?
2. How have National Highways helped the country's economy?
3. Explain in detail about the National Highway Authority of India.
4. How are rural roads important?
5. Mention any two advantages of roadways.
6. Give any two disadvantages of railways.
7. Name some important airports of India.
8. Give a brief description about inland waterways.
9. Mention any one advantage and disadvantage of waterways.

Long Questions

[3 Marks each**]**

1. Explain in brief about Airport Authority of India.
2. Explain in details about the National Waterway.
3. Explain in details about the major ports of India.

ARCHIVES*

Collection of Questions Asked in Previous Years' ICSE Class 10th Examinations

2018

1. Give two reasons for the 'means of transport' being called the lifelines of a nation's economy. **(2)**
2. Give two ways in which rail transport is useful for the people of India. **(2)**
3. (i) State one advantage of inland waterways. **(3)**
   (ii) State one advantage of roadways.
   (iii) State one disadvantage of water transport.
4. Give three reasons as to why airways are becoming a popular means of transport in modern India. **(3)**

2017

1. Mention two reasons why more people use railways rather than airways. **[2]**
2. Why is inland waterways declining in its importance? Give two reasons for your answer. **[2]**

2016

1. Roadways are always considered more important than any other means of transportation. Give two reasons in support of the statement. **[2]**
2. Mention two advantages and one disadvantage of waterways. **[3]**

2015

1. Why is the railways an important means of transport as compared to airways? **[2]**

2014

1. Why is road transport in India considered more useful than rail transport? State two reasons in support of your answer. **[2]**
2. Mention one advantage and one disadvantage each of inland waterways. **[2]**

2013

1. Give one disadvantage of air transport. Why is it still a popular means of transportation in India? **[2]**

* All these questions are covered and explained in chapter exercise 'Exam Practice'.

CHAPTER

14

Waste Management

Waste Material

The products that has been used in any activity and now is rejected for further usage. The wastes generated by the natural vegetation, animal, insects and humans are called wastes or waste material, which are recycled and go back in the atmosphere in many forms.

The Environment Protection Act, 1990, has defined waste material as follows:

- Waste materials are the substance, which constitute a discarded material or an effluent or any other unwanted residue, which has come out from any activity.
- Any substance or article, which requires to be disposed of as being broken, worn out, contaminate or otherwise spoiled.

Classification of Waste

Wastes are classified into biodegradable (can be broken down by microbes), non-biodegradable and toxic wastes (poisonous).

- **Biodegradable Waste** These are vegetable peels, wood, paper, dead animals, plants etc. They can be decomposed by bacteria.
- **Non-biodegradable Waste** These cannot be broken down or degraded by bacteria. They are harmful for the environment, e.g. glass, plastics, polythene bags, etc.
- **Toxic Waste** These are poisonous wastes and also known as 'hazardous waste' or 'radioactive wastes', e.g. industrial wastes and effluents, pesticides, fluoride wastes, medical wastes like blood samples, unused drugs, etc.

Sources of Waste

The sources of waste or the ways by which waste are generated are industries, agriculture, domestic waste, biomedical waste, nuclear waste, etc.

- **Industrial Waste** It includes chemical gases, liquid and solid waste.
- **Agriculture Waste** It includes plant, animal waste and crop residue.
- **Domestic Waste** It refers to vegetable peels, plastics, paper, food wastes.
- **Biomedical Waste** It includes bandages, expired medicines, plasters, syringes.
- **Nuclear Waste** It includes toxic wastes from nuclear plants, radioactive elements.

Impact of Waste Accumulation

There is huge generation of wastes in the urban cities which is turning out to be a major concern. Major cities are facing the problems of garbage accumulation due to lack of space and increasing population. Dumping of wastes indiscriminately not only gives an undesirable, ugly look and foul smell but also causes serious health hazards. Many **pathogenic**[1] bacteria, virus and fungi grow in these wastes. This causes air and water pollution. Some impacts of waste accumulation are as follows:

Spoilage of Landscape

This refers to the accumulation of garbage, rubbish and trash in an open area which is left untreated. Dumping of garbage in an open area ruin the natural beauty of the place and serves as a potential disease breeding ground. All sorts of insects, flies, mosquitoes, rodents, etc breed on these garbage dumped to decompose. The poisonous substance may seep into the groundwater or rivers and streams and contaminate it. The soil may be contaminated and thus, these pollutants may even enter the food chain through water and soil pollution.

Pollution

The undesirable and unfavourable addition of certain things in the environment entirely or partly due to direct or indirect actions of human being is called pollution. The substances, that causes pollution are called pollutants. Pollution is caused by man, by addition of waste and toxic chemicals in the atmosphere.

Pollution can be categorised into three categories which are as follows:

(i) Air Pollution

When any chemical particulate matter, toxic waste material or biological material are added into the atmosphere by direct or indirect actions of human beings that causes the degradation or damage to the quality of the ecosystem, is termed as air pollution.

The pollutants that causes air pollution are of many forms such as solid particles, liquid matter or gases. These are of two types, which are as follows:

(a) **Primary Pollutants** The pollutants which are emitted directly in the air are referred as primary pollutants, e.g. ash from household, volcanic eruption, carbon monoxide from motor vehicles exhausts, sulphur dioxide from power plants, nitrogen oxide and Suspended Particulate Matter (SPM).

(b) **Secondary Pollutants** The pollutants which generates from the reaction taking place among various primary pollutants are known as secondary pollutants.

(ii) Water Pollution

Any addition of chemicals and waste material in the water bodies, which reduces the quality of the water by changing its colour, odour and composition is termed as water pollution. Harmful waste from the surrounding area reaches the water bodies like ponds, lakes, rivers and groundwater and contaminates it.

The sewage waste coming from factories and industries reaches the water bodies and causes many water related diseases like diarrhoea and typhoid. These sewage must be properly treated before releasing them into the environment.

(iii) Soil Pollution

The degradation and **deterioration**[2] of soil quality due to addition of certain solid and semi solid wastes from agricultural practices, industrial processes, household, etc is termed as soil pollution. There are many different ways by which soil can become polluted, such as sewage from a landfill, discharge of industrial waste into the soil, flowing of contaminated water into the soil, breakage of underground storage tanks, excess application of pesticides, herbicides or fertilisers and solid waste sewage. The most common chemicals involved in causing soil pollution are petroleum hydrocarbons, heavy metals, pesticides, solvents etc.

CHECK POINT 01

1 Name any two sources of domestic waste.
2 What do you mean by spoilage of landscape?
3 Mention any one impact of water pollution.

1 Pathogenic Something that causes disease such as bacteria or a virus.
2 Deteriorate To become worse as time passes.

Effects of Waste on Human Health

- Indiscriminate dumping of toxic and non-toxic matter causes serious health problems. The accumulations of these harmful waste can cause the outbreak of serious epidemics.
- Carbon monoxide present in air lowers the amount of oxygen that enters our blood, slows our reflexes and makes us confused and sleepy.
- Carbon dioxide (CO_2) is the principle greenhouse gas emitted as a result of human activity. It increases global warming.
- Chlorofluorocarbons (CFC) rise to the stratosphere, where they come in contact with few other gases, which lead to a reduction of the ozone layer that protects the Earth from the harmful ultraviolet rays of the Sun.
- Lead is present in petrol, diesel, lead batteries, paints, hair dye products, etc and affects mainly children. It can cause nervous system damage and digestive problems and in some cases, cause cancer.
- The dumping grounds are open pits and thus become the breeding ground for mosquitoes, flies, insects which cause malaria and dengue.
- Sulphur dioxide (SO_2) produced from burning coal, mainly in thermal power plants is a major contributor to **smog** and **acid rain** and can lead to lung disease.
- The unhygienic disposal of plastic may generate toxic substances that is harmful for human health.
- Recycling of toxic matter may also cause great risks for workers as they may experience toxic exposure. Some chemicals like cyanides, polychlorinated biphenyls and mercury are highly toxic and exposure to them lead to disease or death.

Impact of Waste Accumulation on Terrestrial Life

Hazardous wastes may pollute soil, air, surface water and underground water. The oil pollutants may affect human being, plants and animals. These toxic substances are transferred to different organisms through the food chain and cause a number of complications in living organisms.

Some of these impacts are as follows:

- Many toxic chemicals, pesticides, other agricultural wastes released into the environment are taken up by the plants from air, water and soil. Plants growing under such conditions are severely affected by these toxic chemicals.
- Exposure to high concentration of pollutants may cause acute injuries like chlorosis, discoloration and even the death of plants.
- Sulphur dioxide is the most toxic pollutant which damages the crops.
- In recent years, the losses to agriculture and animal life due to fluoride content have greatly increased.
- Besides morphological changes, biochemical and physiological changes have also been observed in many mammals including human being.
- Several domestic animals like cow, buffalo, goat, etc, often eat polythene and plastic bags along with food material which ultimately reach to their alimentary canal causing many disorders and even death.

Impact of Waste Accumulation on Aquatic Life

Large amount of wastes of human society are disposed of in the rivers, lakes, ponds and other aquatic bodies. These make the water polluted which is not fit for drinking and other domestic purposes.

The impacts of waste dumping on aquatic life are as follows:

- Due to heavy accumulation of toxic wastes and sewage drained from cities into the water bodies like canals, lakes and rivers, oxygen concentration is reduced considerably. Thus, affecting the life of fishes and other aquatic population. In extreme deficiency of oxygen most of the fishes die.
- Sewage from municipalities and **tanneries**[3] discharged into the rivers, canals and lakes, etc carry many species of bacterias and other microbes which cause diseases in humans and animals.
- Some pollutants, for example heavy metals, cyanides and several other organic and inorganic compounds are harmful to aquatic organisms. Many of them especially non-biodegradable ones accumulate in the body of organisms and cause long-term effects.
- The DDT and other pesticides present in very low concentrations in water may accumulate to higher concentration within algae, insects and fishes. The bird, animals or humans that eat these fishes are then exposed to very high levels of hazardous substances. In birds, these substances can affect the egg production and bone formation.

3 Tanneries It is a place where animal skin is converted into leather.

Impact of Waste Accumulation on Marine Life

One of the least known but most significant uses of the sea is as an enormous dumpsite. In the past, the oceans were able to assimilate the wastes of the civilisation without noticeable adverse effects. But now, piles of human wastes ranging from the raw sewage of urban centres to junked appliances and automobiles are heavily polluting the sea shores.

The impacts of waste dumping on marine life are as follows:

- The growth of marine algae is affected.
- Massive oil spills not only spoil innumerable beaches and estuaries but also cause widespread damage to marine life.
- Herbicides and pesticides (especially the organ chlorides) reach the oceans *via* the wind and rivers and contaminate marine water.
- It is a matter of great concern that mangrove forests are being damaged at an alarming rate due to disposal of wastes along sea shores.
- Thermal and radioactive pollution have disturbed the life of fishes in estuaries and coastal ecosystems. Their breeding is also affected adversely.

CHECK POINT 02

1 How lead effects the health of human beings?
2 Mention any one impact of waste generation on terrestrial life.
3 Give an impact of waste accumulation on marine life.

Need for Waste Management

Accumulation of wastes have led to serious environmental consequences. It also possess a great health risk. The following points show the need for waste management:

- High degree of growth in population and industrialisation has made pollution of environment a serious problem in many urban areas.
- The rapid increase in the number of vehicles on the road especially in metropolitan cities has degraded the quality of air severely. It leads to acid rain which adversely affects forests, freshwater, soil, killing insects as acid rain increases acidity in the soil, affects buildings, monuments, human health, plant growth, aquatic, species, etc.
- The land gets littered by plastic bag, garbage and becomes ugly and unhygienic. Burning of plastics, especially PVC releases dioxin which is highly **carcinogenic**[4] and toxic.
- The conventional plastics right from their manufacture to their disposal is a major problem to the environment. Plastic bags can also contaminate food stuffs due to leaching of toxic dyes and transfer of pathogens.
- Careless disposal of plastic bags chokes drains, blocks the porosity of the soil and causes problems for groundwater recharge. The waste must be recycled to conserve our resources and protect our environment.

Thus, designing eco-friendly, biodegradable plastics are the need of the hour. With rising urbanisation and change in lifestyle and food habits, the amount of municipal solid waste has been increasing rapidly.

The need for waste management also depends on the country's level of development. The need of the hour in our country is to implement the following steps in controlling pollution:

- To control the growth of population.
- Suitable and necessary infrastructure should be prepared.
- Waste material should be disposed properly in closed vans.
- **Stringent**[5] laws should be made and implemented against polluting the ecosystem.
- Farmers must be taught about the harmful impact of pesticides on human life and soil.
- Supply of improved auto fuel.
- Most of the e-waste is not hazardous if it is stocked in safe storage or recycled by scientific methods. Safe transportation from one place to the other in parts or in totality is also impotant. Hence, e-waste must be recycled with care.
- Tightening of vehicles and industrial emission norms.
- Promotion of cleaner technologies.
- Awareness programmes should be conducted.
- Preparation and implementation of action plans for major cities and critically polluted areas.

4 Carcinogenic A substance that causes cancer.
5 Stringent Very strict or severe.

Safe Disposal of Waste

Depending upon the type of waste i.e. solid, liquid or gases, organic or inorganic wastes, toxic or non-toxic wastes, they should be disposed accordingly. There are several ways of disposing the wastes which are as follows:

Segregation of Waste

Garbage segregation is a method of dividing garbage into 'reduce', 'reuse' and 'recycle' materials. Biomedical waste and industrial waste must not be mixed with other municipal solid waste which is biodegradable garbage. Segregation is important because if the waste is not separated properly, it all gets mixed up in landfills. The danger of this is that they all leak after a period of time, resulting in contamination of groundwater. The toxic or non-biodegradable chemicals and e-waste must be treated separately. The waste must be collected in closed vans and vehicles of municipality.

Open Dump (Dumping)

It refers to uncovered areas that are used to dump solid waste of all kinds. The waste is untreated, uncovered and not segregated. It is the breeding ground for flies, rats and other insects that spread diseases. The rainwater runoff from these dumps contaminate nearby land, water and air thereby spreading disease. Treatment of open dumps needs to be phased out by landfills. These landfills are generally located in urban areas. It is a pit that is dug in the ground. The garbage is dumped and the pit is covered with soil everyday thus, preventing the breeding of flies and rats. After the landfill is full, the area is covered with a thick layer of mud and the site can thereafter be developed as a parking lot or a park.

But landfills have some limitations. Water seeps through landfills and contaminate the groundwater. Methane gas is also produced in the landfills that is not good for the plants growing there as it is poisonous.

Composting

It is a biological process in which micro-organisms, mainly fungi and bacteria, decompose biodegradable or organic waste in the presence of oxygen. Various wastes like leaves, twigs, grass, fruit peels and vegetable peels, etc. are dumped into a pit and then covered. The recyling produces compost and biogas or gobar gas. Compost is a rich source of organic matter. It plays an important role in sustaining soil fertility.

Soil composting may be divided into two categories by the nature of the decomposition process. They are anaerobic and aerobic. In **anaerobic composting**, decomposition occurs where oxygen is absent or in limited supply. **Aerobic composting** takes place in the presence of ample oxygen. Both manual as well as mechanical methods of composting are used in India.

Benefits of Composting

Following are the benefits of composting:

- The soil becomes more resistant to stresses such as drought, diseases and toxicity.
- It helps the crop in better absorption of nutrients from the soil.
- It increases the quality of poor soils by adding humus.
- It reduces soil erosion.
- It is cost effective for farming as composting does not require excess water, fertilisers and pesticides.

CHECK POINT 03

1. Mention any two steps to control pollution.
2. Garbage segregation method divides garbage into which materials?
3. Give any two benefits of composting.

Need for Reducing, Reusing and Recycling Waste

In developing countries, waste management is turning out to be a major problem. The government and local bodies are looking for sustainable ways to dispose these wastes and reduce the harmful effects it has on the environment. The waste material could be managed in three ways:

(i) Reducing Waste

Since, the waste is generated by human activities, it can be controlled by people.

The generation of unnecessary waste should be reduced in the following ways:

- The harmful commodities like polythene bags should not be used as it is non-biodegradable. We can carry our own shopping bags such as cloth bags and paper bags.
- Using solar heaters and other solar products which are not harmful for the environment will help in reducing the waste generation at the source point.
- Vegetable peels, papers, wrappers, leftover food, etc. are the household wastes which can be reduced by making compost.

- After using various disposables such as plastic plates, plastic food containers, etc, they should be kept and not thrown away immediately as they can be put to many uses even after its first chief purpose is served.
- Avoiding purchase of new items immediately after a slight fault in the old product as it would save money and reduce unnecessary deposition of garbage.
- It is a wiser choice to use washable table napkins instead of paper.

(ii) Reusing

The products which we use at home, offices, schools etc can be put to many uses before discarding it. Just by changing its appearance it can be made workable for other purposes.

Various methods of reusing materials are as follows:

- Allowing customers to return used packaging such as boxes, bubble wrap, so that they can be used again.
- Furnishing an office with reclaimed materials instead of purchasing new chairs, tables, etc.
- Personal computers, printers, fax machines, television, video cassette recorders can be reused in business, personal and non-profit environments.
- Appliances, clothes, furnitures, dishes, vehicles, paint and virtually anything else for the home can be found by shopping reused products instead of brand new and in most cases, at a significantly lower price.
- Fly ash is one such residue which is produced whenever combustion of solid material takes place. Cement can be replaced by fly ash upto 35% thus, reducing the cost of construction of roads. Bricks are also made from it.

(iii) Recycling

It is processing of used waste materials into new, useful products. This is done to reduce the use of raw materials that would have been used. Recycling also uses less energy and it is a great way of controlling air, water and land pollution.

Recycling is possible only if the waste is segregated at source and then soiled, cleaned and reprocessed into new useful products.

Recycling is beneficial in following ways:

- It helps to protect the precious environment because if we burn the recyclable waste materials, these would pollute our air, land, water and soil.
- Recycling conserves natural resources. Recycling more waste means that we do not depend too much on raw resources, which are already massively depleted.
- It saves energy. It takes more energy to produce items with raw materials than from recycled materials.
- It creates jobs where people are employed to collect, sort and work in recycling companies.

Method of Waste Recycle

Several organisation and recycling centres have been established to collect recyclable waste. In this process waste is treated and made into something valuable.

The methods of waste recycling are as follows:

Paper Recycling In the process of paper recycling, the waste paper which are produced from households, offices, schools, etc are used to make new fresh paper. Pieces of wood from furniture industry, used and discarded cloth are also recycled.

Plastic Recycling It is the process of recovering scrap or waste plastics from the cities and reprocessing the material into useful products, sometimes completely different in form, from their original product, e.g. soft drink bottles casted into plastic chairs and tables.

Car Recycling In this process a car is **trampled**[6] and **dismantled**[7] to take out its spare parts. The automobiles which reaches the end to their use can still have a purpose by giving back metal that is contained in them.

CHECK POINT 04

1 Give two examples of reusing materials.
2 How recycling is beneficial? Mention any one point.
3 Define any one method of waste recycling.

6 Trampled To cause damage by walking or stepping heavily on something.
7 Dismantled To destroy something in an orderly way.

Summary

- Waste material is the normal term used to describe the products that has been used in any activity and now is rejected for further usage. It is generated by the natural vegetation, animals, insects and humans.
- Wastes are classified into various types such as biodegradable wastes, non-biodegradable wastes, toxic wastes, non-toxic wastes.
- The sources of waste are from domestic, agriculture, industries, medical, nuclear, etc.
- The impact of waste accumulation can be seen by many ways, e.g. spoilage of landscape, causes pollution, bad impact on health and causes many diseases.
- Global warming and greenhouse effect is caused when some greenhouse gases such as carbon dioxide, methane, nitrous oxide, chlorofluorocarbons (CFCs) are released in the environment.
- Ozone present in the upper portion of the atmosphere it prevents the harmful ultraviolet rays coming from the Sun. But this layes is deplated due to air pollution.
- Methyl mercury is a toxic chemical which is very harmful and cause a crippling disease of Minamata.
- Open dumps are the uncovered areas that are used to dump solid waste of all kinds. It is usually the breeding ground for flies, rats and insects.
- Landfills are the pit that is dug in the ground and garbage is dumped before covering it with soil, preventing the breeding of flies and insects.
- Composting is a biological process in which micro-organisms, mainly fungi and bacteria decompose degradable organic waste into humus like substance in the presence of oxygen.
- To reduce waste we should focus on three R's i.e. reduce, reuse and recycle. These ways help to cut down on the amount of waste and manage the waste in a constructive way.

EXAM PRACTICE

a Short Questions [2 Marks each]

1. What do you understand by waste?

Ans. Waste is the usual term used to describe the products that has been used in any activity and now is rejected for further usage.

2. How many types of waste are there?

Ans. Wastes are of three types biodegradable, non-biodegradable and toxic waste.

3. What is non-biodegradable waste?

Ans. The waste that cannot be decomposed by microbes is called non-biodegradable waste.

4. What do you understand by toxic wastes?

Ans. Toxic wastes are the wastes that are poisonous such as radio active wastes, industrial wastes, effluents, medical wastes etc.

5. What do you understand by non-toxic waste?

Ans. Non-toxic wastes are non-poisonous wastes, which are less harmful than toxic wastes. E.g. paper, plastic bags, containers, pieces of rope etc.

6. Give two reasons as to why there is a need for safe waste disposal. ***[2018]***

Ans. There is a need for safe waste disposal because of the following reasons:

1. It helps to prevent additional pollution which can improve public health.
2. Waste that is properly disposed off has a lesser chance of getting into the water supply and causing illness.

7. What do you understand by industrial waste?

Ans. Industrial waste is the waste produced by industrial activity which includes any material that is rendered useless during a manufacturing process.

8. What do you mean by domestic waste?

Ans. Domestic waste refers to waste generated in household like vegetable peels, paper, plastic etc.

9. What is biomedical waste?

Ans. Biomedical waste consist of used bandages, syringes, empty medicine bottles, expired medicines etc.

10. What are nuclear wastes? State some examples.

Ans. When electricity is produced using a nuclear power plant, this generates nuclear waste. For example, toxic by products of nuclear fuel processing plants , nuclear medicine and nuclear weapons industries.

11. What is hazardous waste? How is it generated?

Ans. Hazardous waste is waste material, often in chemical form that comes from agriculture, radioactive sources and industries. This can pose a long term risk to health and environment.

12. Define gaseous waste.

Ans. It includes fuel exhausts containing carbon dioxide, nitrogen oxides, carbon monoxide etc. and smog. Smog is a mixture of smoke and fog in the air.

13. How can waste be reused? Explain with help of an example. ***[2018]***

Ans. The best option to reduce solid waste altogether is to reuse as many items as possible. Reuse can mean purchasing non-disposable items or it can mean passing an item along to another person for confined use.

For example, using paper towels to clean the house, one can use a washable rag and instead of throwing out the clothes or toys pass them to a neighbour, charity, etc.

14. What do you understand by the word 'Pollution'?

Ans. Pollution refers to the addition of undesirable and unfavorable particles in the environment entirely or partly due to direct or indirect human actions.

15. What is air pollution?

Ans. Chemicals suspended, particulated matter, toxic wastes, biological wastes suspended into the atmosphere by direct or indirect human action, degrading the quality of air is known as air pollution.

16. (i) Mention two sources of waste.
(ii) What are biodegradable wastes? ***[2016]***

Ans. (i) Agriculture waste and industrial waste are two sources of waste.
(ii) Biodegradable wastes are the object which decompose through the action of bacteria, fungi and other living organisms.

17. (i) What is understood by biodegradable waste? ***[2015]***
(ii) State one source of gaseous waste.

Ans. (i) Biodegradable waste includes that material which can be breakdown or decomposed in the soil by microbes e.g. fruits and vegetables.
(ii) Factories and vehicles.

18. What harmful effects do radiations from toxic waste have on human health?

Ans. Toxic wastes often contain carcinogens and exposure to these by some route such as leakage or evaporation from the storage, causes cancer to appear at increased frequency in exposed individuals. It also leads to serious birth defects, lung diseases etc.

19. What is the waste material produced from mining?

Ans. Waste materials produced from mining are various suspended solid particles, chlorides, sulphuric acid, ferric hydroxide, heavy metals etc.

20. Give examples of industrial waste.

Ans. Examples of Industrial wastes are chemical solvents, pigments, sludge, metals, ash, paints, sandpaper, paper products, industrial by-products, metals and radioactive wastes and effluents etc.

21. How does fresh water get polluted?

Ans. Sewage from municipalities and tanneries discharged into the rivers, canals and lakes etc. carry many species of bacteria and other microbes which cause diseases in human and animals.

22. Name any three source of marine pollution.

Ans. Three sources of marine pollution are:

(i) Massive oil spills.

(ii) Growth of marine algae.

(iii) Discharge of harmful pesticides.

23. Why is waste management important?

Ans. Because dumping of solid waste indiscriminately not only gives an undesirable and ugly look and foul smell but also cause serious health hazards.

24. (i) State the main objective of the treatment of gaseous waste. ***[2013]***

(ii) Name two common diseases caused as a result of gaseous pollution.

Ans. (i) To minimise the generation of gaseous waste and to reduce the diseases caused due to air pollution.

(ii) Asthma and bronchitis are two common diseases caused as a result of gaseous pollution.

25. What is segregation of waste?

Ans. Segregation is the initial stage of waste disposal. The waste can be segregated according to their features like sharp edged waste like blades, knives, plastic, glass, bottles, etc.

26. Mention any three form of safe disposal of waste.

Ans. The three form of safe disposal of waste are segregation, open dump and composting.

27. What are the main objectives of the treatment of gaseous waste?

Ans. The objectives of the treatment of gaseous waste is to drain the harmful particles and allow clean air to escape through chimneys. For this purpose, we can use scrubber and electrostatic precipitators in factories.

b *Long Questions* [3 Marks each]

1. How does waste accumulation affect the environment? ***[2014]***

Ans. Waste accumulation affect the environment such as:

(i) When the waste is dumped in an improper way, the landscape of the area gives unpleasant look.

(ii) The uncontrolled dumping of urban waste damages the environment by causing air, water and land pollution.

2. With reference to waste accumulation, answer the following.

(i) Different types of primary pollutants.

(ii) Different types of secondary pollutants.

(iii) Formation of smog.

Ans. (i) Different types of primary pollutants are ashes from household, volcanic eruption, carbon monoxide from motor vehicle etc.

(ii) Different types of secondary pollution are burning of coal, vehicles on road and acid rain.

(iii) Smog is the mixture of smoke and fog in the air. It is also harmful for human health.

3. What is acid rain? Mention two of its effects. ***[2014]***

Ans. Acid rain is a corrosive type of air pollution which occurs when oxides of sulphur and nitrogen combine with the moisture of atmosphere.

Effects

(a) Acid rain severely damages the various ecosystems in many parts of the world. Many forests and lakes have been damaged by it.

(b) When acid rain pours on soil, it destroys the nutrients of the soil and reduces its fertility.

4. What was the cause of the following. ***[2013]***

(i) The Bhopal Tragedy.

(ii) The Minamata Disease.

(iii) The Chernobyl Disaster.

Ans. (i) Leakage of Methyl Isocyanate gas was the main cause for the Bhopal Gas Tragedy, 1984.

(ii) Methyl mercury, a toxic chemical, contaminated the water of Minamata (Japan) which caused serious health problems like Minamata disease.

(iii) The chernobyl disaster took place because of a combination of basic engineering deficiencies in the nuclear reactor and faulty actions of the operators.

5. What is water pollution?

Ans. **Refer to chapter theory page no. 197.**

6. What are the harmful effects caused by the following?

(i) Sulphur dioxide

(ii) Chlorofluorocarbons

(iii) Lead

Ans. (i) **Refer to chapter theory page no. 198.**

(ii) **Refer to chapter theory page no. 198.**

(iii) **Refer to chapter theory page no. 198.**

7. 'Methane is an air pollutant that causes greenhouse effect'. Name three source of this gas. ***[2017]***

Ans. The three sources of methane gas are:

(i) **Fossil Fuel** The largest source of methane emission is from the production, distribution and combustion of fossil fuels.

(ii) **Landfills and Waste** Methane gets generated by the decomposition of solid waste in landfills.

(iii) **Wetlands** Wetlands are the largest natural sources of methane.

8. What is the impact on terrestrial life due to accumulation of wastes?

Ans. **Refer to chapter theory page no. 198.**

9. (i) What are open dumps?

(ii) How do they cause environmental degradation?

(iii) What can be done to stop it?

Ans. (i) **Refer to chapter theory page no. 200.**

(ii) The waste in open dump is left untreated, uncovered and not segregated. It becomes the breeding ground for flies, rats and other insects that spread diseases and causes environmental degradation.

(iii) Open dumps can be covered which are known as landfills. After dumping the garbage, the area can be sealed and used as a park or a parking lot.

10. What do you understand by landfill?

Ans. Landfill is a way of disposing waste materials in a pit that is dug in the ground without creating hazards to public health or safety. The waste is packed and dumped at the site and is covered with the soil daily to prevent insects or rodents from entering into the landfill.

11. Mention one way in which waste accumulation has an effect on the following. ***(3) [2018]***

(i) Aquatic life (ii) Terrestrial life

(iii) Landscape

Ans. (i) The life form in the aquatic ecosystem is adversely affected by accumulation of waste. This can decrease process of reproduction, which can eventually lead to extinction of animals.

(ii) Pesticides and weedicides are widely used in agricultural practices which are responsible for killing several types of soil organisms, worms, etc.

(iii) The waste accumulation not only ruins the natural beauty of the land but also provide a home to rats and other disease carrying organisms.

12. What do you mean by the following terms? ***(3)***

(i) Segregation (ii) Composting

(iii) Dumping

Ans. (i) It is setting apart or separation of people or things from others or from the main body or a group.

(ii) It is an aerobic method, which means that it requires the presence of air for decomposing organic solid wastes.

(iii) It is a site where the disposal of waste material is done by burial. It is also called as tip, landfill site, garbage dump and rubbish dump.

13. Give reason for the following.

(i) In the primary stage of treatment water is unfit for drinking.

(ii) In the secondary stage, water is allowed to settle.

(iii) Raw sludge is kept in airtight tanks.

Ans. (i) In this stage water is not clean. It contains sewage, toxic substances and chemicals.

(ii) Settling allows the micro-organisms to decompose the organic materials present in the water.

(iii) Anaerobic bacteria breaks down the raw sludge to form carbon dioxide, methane and water.

14. Explain briefly the meaning of the following terms. ***[2016]***

(i) Composting (ii) Incineration (iii) Segregation

Ans. (i) Composting is a biological process of decomposing solid wastes by micro-organisms.

(ii) Incineration is a method of burning the waste to reduce its weight and volume so that it can be disposed easily.

(iii) Segregation refers to separation of waste into different categories of waste. Classification of biodegradable and non-biodegradable wastes are two most popular segregation of wastes.

15. What do you mean by the following *[2017]*
(i) Sewage (ii) Eutrophication (iii) Recycling

Ans. (i) Sewage is waste water which is either domestic or industrial produced by human actions.
(ii) Eutrophication is the process of depletion or reduction of oxygen content from water bodies due to direct or indirect activities of human works.
(iii) Recycling is the process of changing the waste and non-usable materials into potentially useful materials.

16. What type of products can be used again? Mention three methods of reusing a product.

Ans. **Refer to chapter theory page no. 201.**

17. (i) What do you mean by recycling?
(ii) What is the need for recycling?
(iii) Give two examples of things than can be recycled.

Ans. (i) **Refer to chapter theory page no. 201.**
(ii) **Refer to chapter theory page no. 201.**
(iii) Paper and plastics are the things that can be recycled. In paper recycling waste paper from household, school, offices, etc are recycled to make fresh paper. In plastic recycling, waste plastics from cities e.g. soft drink bottles casted into plastic chairs and tables.

18. (i) "Waste segregation is important." Give a reason to support your answer. *[2015]*
(ii) Why is nuclear waste harmful?
(iii) Explain briefly how as a student, you can help in the reduction of waste generation.

Ans. (i) Waste segregation is important because under this waste is segregated into different categories like biodegradable and non-biodegradable and toxic wastes. It increases recycling process.
(ii) Harmful radiations from nuclear plants like uranium and radium when absorbed by the human body causes serious health problems.
(iii) We as a student should follow steps to reduce the waste generation. These are:
- We should prefer the use of natural energy resources such as solar cooker and minimise the use of cooking gas.
- Stop using plastic bags and carry paper bags or jute bags.
- We should learn to repair rather than discard.
- We should stop using disposable plates.
- We should make minimum use of auto vehicles and maximum use of the public transport vehicles.

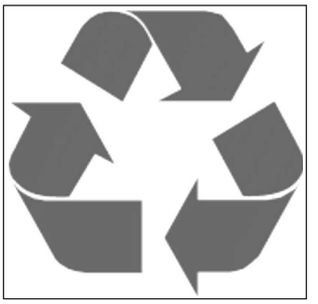
C Picture Based Questions

1. Study the diagram given below and answer the questions that follows.

(i) Name the activity shown in the above diagram.
(ii) Give two advantages of this activity.

Ans. (i) Recycling of paper.
(ii) Two advantages of paper recycling are as follows:
(a) The waste paper which are produced from housholds, offices and schools are reused to make fresh paper.
(b) It creates jobs where people are employed to collect, sort and work in paper recycling process.

2. Study the diagram given below and answer the following questions.



(i) Identify the logo given.
(ii) Give any two methods of waste recycling.

Ans. (i) The given logo is of three R's i.e. Reduce, Reuse and Recycle.
(ii) The methods of waste recycling are as follows:

Paper Recycling In the process of paper recycling, the waste paper which are produced from households, offices, schools, etc are used to make new fresh paper. Pieces of wood from furniture industry, used and discarded cloth are also recycled.

Plastic Recycling It is the process of recovering scrap or waste plastics from the cities and reprocessing the material into useful products, sometimes completely different in form, from their original product, e.g. soft drink bottles casted into plastic chairs and tables.

CHAPTER TEST

Short Questions

[**2 Marks** each]

1. Differentiate between biodegradable and non-biodegradable waste.
2. How does oil refineries contribute in water pollution?
3. How do textile industries contribute in pollution?
4. What is e-waste? Define.
5. How is carbon monoxide harmful to human life?

Long Questions

[**3 Marks** each]

1. What is the effect of wastes on aquatic life?
2. What is the need of waste management to protect the environment and human life?
3. What is waste collection and its safe disposal?

ARCHIVES*

Collection of Questions Asked in Previous Years' ICSE Class 10th Examinations

2018

1. Give two reasons as to why there is a need for safe waste disposal. ***(2)***

2. How can waste be reused? Explain with help of an example. ***(2)***

3. Mention one way in which waste accumulation has an effect on the following. ***(3)***
(i) Aquatic life (ii) Terrestrial life (iii) Landscape

4. What do you mean by the following terms? ***(3)***
(i) Segregation (ii) Composting (iii) Dumping

2017

1. What do you mean by the following. ***[3]***
(i) Sewage (ii) Eutrophication. (iii) Recycling.

2. Methane is an air pollutant that causes greenhouse effect. Name three sources of this gas. ***[3]***

2016

1. (i) Mention any two sources of waste. ***[2]***
(ii) What are Biodegradable waste?

2. Explain briefly the meaning of the following terms. ***[3]***
(i) Composting (ii) Incineration (iii) Segregation

2015

1. (i) What is understood by biodegradable waste? ***[2]***
(ii) State one source of gaseous waste.

2. (i) ''Waste segregation is important''. Give a reason to support your answer. ***[3]***
(ii) Why is nuclear waste harmful?
(iii) Explain briefly how as a student, you can help in the reduction of waste generation.

2014

1. How does waste accumulation affect the environment? ***[3]***

2. What is acid rain? Mention two of its effects. ***[3]***

2013

1. (i) State the main objective of the treatment of gaseous waste. ***[2]***
(ii) Name two common diseases caused as a result of gaseous pollution.

2. What was the cause of the following? ***[3]***
(i) The Bhopal Tragedy (ii) The Minamata Disease (iii) The Chernobyl Disasterk

* All these questions are covered and explained in chapter exercise 'Exam Practice'.