

14 India : Location, Geological Structure And Physiography-II

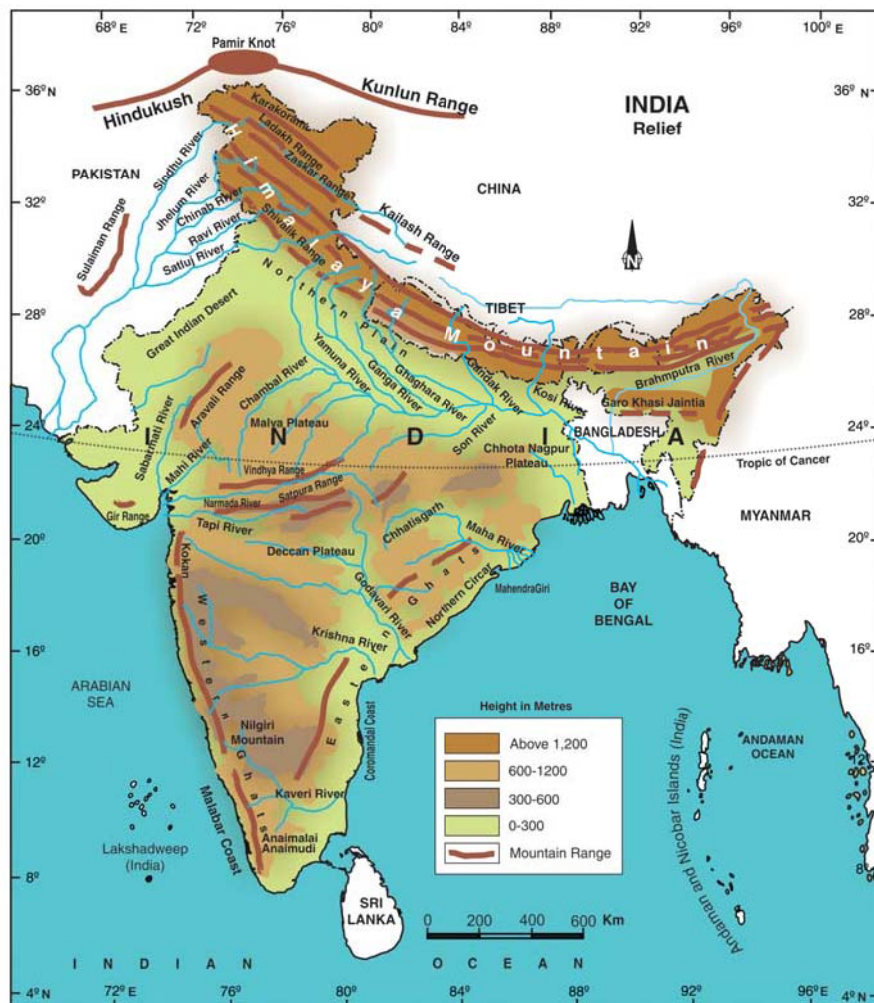
The landform which is irregular and has some undulation on the surface of the earth is called 'Physiography'. It includes mountains, plateaus, plains etc..



14.1 Forms of Relief Features

On the basis of physiography, India can be divided into the following physiographic regions :

- (1) Northern mountainous region
- (2) Great northern plains
- (3) Peninsular plateau
- (4) The Coastal plains
- (5) Archipelagos



14.2 India – Relief

1. Northern mountainous region

This is an important natural region of India. It is known as the Himalayan mountain system spread over 2400 km in west-east direction in the north. It has an arc shape. Its width ranges between 240 km to 320 kilometres. The Himalaya is not a single mountain, but is a complex of many mountain ranges. Going towards east from Afghanistan, it extends upto Myanmar via India, Nepal and Bhutan. It has more span in Tibet in the north. It is a part of the mountain system known as the Pamir knot.

Himalayas on the whole can be divided into two divisions :

(1) Northern Himalayan Region (2) Eastern Himalayas

(1) Northern Himalayan Region : There are three mountain ranges parallel to each other. The northern range is called the Greater Himalayas. This is the loftiest range among the Himalayas wherein there are more than 40 peaks which exceed height of 7000 metres. Most famous among them is Mt. Everest which is 8848 metres high. It is on Nepal – China border. It is known as Sagarmaththa in Tibet. Other famous peak is Godwin Austin or K² (8611 m) which is the highest peak of India. There are three distinct ranges in Himalayas which are almost parallel to each other. In the Greater Himalayas, there are some high mountain passes such as Jelep La, Nathu La, Shipki La etc. Mansarovar (China), which is considered to be a sacred holy place is located in this range.

Like to know

Mt. Everest	8848 metres
K ² (Mt. Godwin Austin)	8611 metres
Kanchenjunga	8598 metres
Makalu	8481 metres
Dhavalgiri	8198 metres
Annapurna	8070 metres

Second range, to the south of the Greater Himalayas is also spread in wider area. It is called Central Himalayas or the Lesser Himalayas. With a width ranging from 80 to 100 km, this range includes mountain ranges like Pir Panjal, Mahabharat, Nagtiba etc. Many hill stations have developed in this moderately high range. Some of these hill stations are Dalhousie, Dharamshala, Shimla, Mussoorie, Ranikhet, Almoda, Nainital, Darjeeling etc. Gangotri, Yamunotri, Badrinath, Kedarnath, Hemkund Sahib etc. are famous holy places. Kullu, Kangada and Kashmir are extremely beautiful natural valleys in this region.

Third range, situated in further south is known as Shivalik (Outer Himalayas) and most of it falls within India. It is about 10 to 15 km wide and has an average height of 1000 metres. Peculiar valley formations have taken place in this range which are covered by gravel, stones and thick sediments. Locally these are known as 'DUN', e.g. Dehra Dun, Patli Dun, Kothari Dun etc.

(2) Eastern Himalaya : Ranges situated in the eastern part of Himalayan ranges have lesser height. Some of them are more famous as Hills. These hills in eastern Himalayas are spread as smaller ranges. Among them, Patkai Hills are situated in Arunachal Pradesh, Naga Hills in Nagaland, and Lushai (Mizo) Hills in Mizoram. These hills are located near the eastern border and have their continuation in ArakanYoma range of Myanmar. Garo, Khasi and Jaintia Hills are in Meghalaya. Mountainous regions have more rainfall so dense forests have developed here. As this is a forested area, roads and railways have not developed much.

2. Great Northern Plain :

This northern plain is located between the northern mountainous region and the southern peninsula. This plain is formed due to the alluvial sediments brought by Himalayan rivers such as Satluj, Ganga and Brahmaputra. At some places, the layers of the sediments are about 50 metres thick. As these plains occupy very large area in North India, these are known as the great plains of Northern India.

The plain is about 2400 km long. It is considered as one of the largest river plains of the world. Its western part is narrower than the eastern part. The plain is almost a level land. None of its part is higher than 180 metres above sea level. The plain is very narrow near Delhi. The Satluj plain lies to the west of Delhi while the Ganga plain is in the east. This plain is considered to be the most prosperous region of India. Important cities such as Delhi, Kanpur, Lucknow, Allahabad, Varanasi, Patna, Kolkata etc. are situated in this plain.

Sindhu river and its tributaries Jhelum, Chenab, Ravi, Beas and Satluj originate in the Himalayas. Generally, a region between two rivers is called 'DOAB' (i.e. DO means two and AB means water). Thus the plain which is formed by five rivers is called 'Punjab' (Panj + Ab). Most of this plain is in Pakistan.

On the basis of physiography, the plain is divided into four parts: (1) Bhabar (2) Tarai (3) Bangar (4) Khadar. A small and narrow belt of gravels and stones lies parallel to the river from Sindhu up to Tista river in Shivalik foothills. This belt is almost 8 to 16 km wide. It is called Bhabar. The Terai region which is more humid and marshy comes next. Dense forests and diversified wild life are seen here. The old alluvium in the plains is called 'Bangar'. Due to consistent deposition, it develops a terrace shape which is at a higher level than flood plains. The new sediment of the flood is called 'Khadar'.

3. Peninsular Plateau

This is the oldest region of India. This region appears as an inverted triangle. Its average height is about 600 to 900 metres. Its northern part slopes towards north-east which is evident from the flow of Chambal, Son and Damodar rivers. The southern part slopes towards south-east. Most of its area is in south, hence it is also called Southern Plateau. As it is surrounded by sea on its three sides, it is called a Peninsular Plateau.

Peninsular Plateau can be divided into two parts (1) Malwa Plateau (2) Deccan Plateau.

(1) Malwa Plateau : Aravalli Range is situated to the north-west part of Malwa plateau. Aravalli is one of the oldest ranges in the world. It is a fold mountain. Mt. Abu is the famous hill station on this range. It is very beautiful and pleasant. Gurushikhar is its highest peak and it is 1722 metres high. To the south of this region, the rivers Chambal and Betwa, emerging from Vindhyachal, flow northwards and meet river Yamuna, while river Son flows northwards and meets river Ganga. It can be known from the direction of river flow that the region slopes northwards. The north-eastern part of this central upland is known as Bundelkhand. Besides this, rivers Luni and Banas also originate in the Aravalli range in north-east. These rivers vanish in the Rann of Kachchh while Sabarmati and Mahi rivers meet the Gulf of Khambhat. From the flow of these rivers, it can be ascertained that the western part of Malwa Plateau slopes towards south-west. Rajmahal Hills and Shillong plateau are a part of Chhota Nagpur plateau, which also includes Ranchi plateau.

(2) Deccan Plateau : The Deccan Plateau is situated to the south of Satpuda, Mahadev and Maikal ranges which are located to the south of the Malwa plateau. The north-western parts of the plateau are composed of lava deposits. On the western side, its border is demarcated by Western Ghats which runs north-south along the Arabian Sea coast. It has several local names. It is known as Sahyadri in Maharashtra and Karnataka, as Nilgiri in Tamil Nadu, as Annamalai and Cardamum ranges along the border of Kerala and Tamil Nadu. The southern portion of Western Ghats is more lofty.

Generally the average height of Deccan Plateau ranges between 900 to 1000 metres, but at a few places it exceeds that height. Few isolated hills having more than 900 metres of height form the eastern boundary of this plateau. This is called 'Eastern Ghats'. It has a general slope towards south-east which is evident from the direction of the flow of the rivers. Except rivers Narmada and Tapi which flow westwards, most of the rivers of Deccan Plateau flow eastwards and meet the Bay of Bengal.

4. Coastal Plains (Plains along the sea coast) :

Peninsular plateau is surrounded by a narrow belt of plains from Kachchh to Odisha. It is divided into western and eastern coastal plains. The west coast plain extends from Gujarat to Kerala. Except in Gujarat, the plain is mostly narrow. It is very much undulating and is known as Malabar Coast to the south of Goa. West coast rivers have developed creeks at their estuaries. Most of these creeks are submerged valleys under river water. These are formed due to the emergence of sea shore. It provides favourable conditions for fishery. There are many natural ports on the western coast, which include Mumbai and Marmagao. Backwaters have developed along the southern coast of Kerala, and these are known as **Kayal** in local language.

East coast plain is much broader than the west coast plain. There is substantial alluvial deposition in the deltas of Kaveri, Krishna, Godavari and Mahanadi. Its northern coast is known as North Sircar Coast and the Tamil Nadu coast is known as Coromandel coast.

(5) Archipelagos

There are few archipelagos in India. Andaman – Nicobar and Lakshadweep are major archipelagos among them. There are many smaller islands in Lakshadweep and these are located at some distance off Kerala coast. These islands have a horse-shoe shape. Such coral islands are called ‘Atolls’.

Andaman – Nicobar islands, are situated in the Bay of Bengal. Here, the number of islands is also more and these are situated very far from Indian coast. There are few mountain ranges, some of which are formed due to the volcanic activity. These islands are spread over 350 km and have a strategic importance.

Like to know

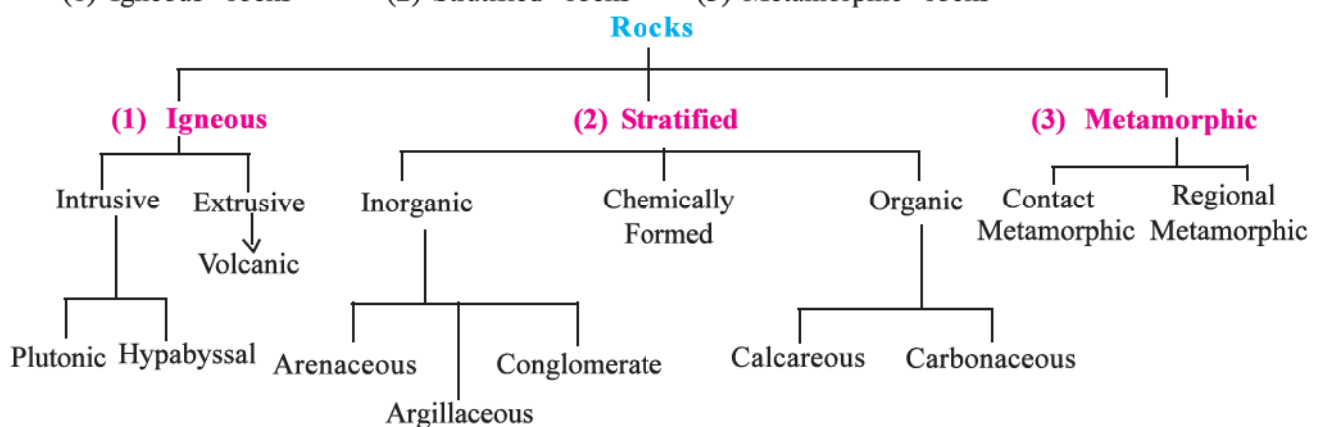
The only active volcano in India is in ‘Barren’ Island in Andaman – Nicobar archipelago. Narkondam, which is very near to it is a dormant volcano.

Thus there is a diversity in the physical features of India. Every region has its own distinct characteristics and yet all regions are inter connected. All of them have important contribution in the progress of the nation and are useful in the forest resources. Northern fertile plains are also called Storehouse of Grains. Southern plateau is rich in many mineral resources which has enhanced the national progress. Many rivers with large volume of water originate in the northern mountainous region which is also known for a variety of forest resources.

Rock :

A composite matter made up of one or more minerals is called a ‘Rock’. Rocks can be hard as well as soft. They can be porous or non-porous, and can be light or heavy in weight. Various types of rocks are formed due to different processes. Rocks can be divided into three categories on the basis of their formation. These are :

- (1) Igneous rocks (2) Stratified rocks (3) Metamorphic rocks



(1) Igneous Rocks : The intense heat in the interior of the earth is responsible for the formation of these rocks. The interior of the earth remains very hot due to this heat. So the matter here is in semi liquid state, which is called as 'Magma'. Eventually when this magma cools down, rocks are formed. These rocks are formed due to the effect of heat, hence these are called Igneous (Agneya) rocks. In the formation of the crust of the earth, these rocks were formed earliest, so these are also called primary rocks.

At many places in Rajasthan, Madhya Pradesh and southern peninsula in India, such rocks have formed. Igneous rocks are most solid of all rocks. Granite is a well known example of plutonic rock. Basalt is also this type of rock.

(2) Stratified Rocks : Igneous rocks disintegrate due to the collective effect of water and other forces. These are also known as Sedimentary rocks. The broken rock material is constantly deposited in water and they form layers. Thus, rock material is deposited into different layers. The upper layers exert pressure over the layers of underlying rocks, which were formed initially and are lying at the bottom, and eventually rocks are formed with different layers. These are called 'Stratified rocks'. Its examples are gypsum, limestone and coal. Coal and gypsum are obtained from Bihar and Jharkhand states.

(3) Metamorphic Rocks : In certain peculiar conditions, the form, composition and other characteristics of rocks are totally changed. Due to the combined effect of two factors high temperature and pressure of rock strata, the igneous and sedimentary rocks change into a totally new form. These newly formed rocks are known as Metamorphic rocks.

Marble and quartzite available in Rajasthan are their best examples.

Mineral

'Mineral' is that matter which is formed due to natural organic or inorganic process and has a specific chemical composition. Minerals are available from the interior of the earth in solid, liquid and gaseous forms. Minerals depend on the geological structure of the surface of the earth. Minerals such as iron, copper, nickel, gold, silver etc. are found in igneous rocks. Coal, mineral oil and natural gas etc. are available from stratified rocks, while slate, marble, diamond etc. are available from metamorphic rocks.

Classification of minerals : In our routine life, about 200 minerals are used directly or indirectly. A universally accepted classification of minerals is not possible. However, a general classification can be done as follows :

(1) Metallic minerals :

- Precious metallic minerals : Gold, silver, platinum etc.
- Light metallic minerals : Magnesium, bauxite, titanium etc.
- Minerals of general use : Iron, copper, lead, zinc, tin, nickel etc.
- Minerals used alloys : Chromium, manganese, tungsten, vanadium etc.

(2) Non – Metallic minerals : Limestone, chalk, asbestos, mica, fluorspar, gypsum, sulphur, diamond etc.

(3) Energy resources : Coal, mineral oil and natural gas, uranium, thorium etc.

Major minerals and their spatial distribution

Serial	Mineral	States
1.	Iron	Jharkhand, Chhattisgarh, Andhra Pradesh, Goa, Odisha, Tamil Nadu, Maharashtra, Rajasthan, Karnataka, Bihar, Madhya Pradesh
2.	Manganese	Karnataka, Odisha, Madhya Pradesh, Maharashtra, Goa,
3.	Copper	Gujarat, Karnataka, Andhra Pradesh, Uttar Pradesh, Rajasthan Sikkim, Meghalaya, Maharashtra, West Bengal M.P., Jharkhand
4.	Bauxite	Odisha, Andhra Pradesh, Chhattisgarh, Maharashtra, Jharkhand, Gujarat
5.	Lead	Rajasthan, Andhra Pradesh, Tamil Nadu, West Bengal, Madhya Pradesh, Uttar Pradesh, Odisha, Maharashtra, Meghalaya, Sikkim, Gujarat
6.	Mica	Andhra Pradesh, Rajasthan, Bihar, Jharkhand
7.	Limestone	Madhya Pradesh, Chhattisgarh, Andhra Pradesh, Rajasthan, Gujarat, Karnataka, Himachal Pradesh

Soil :

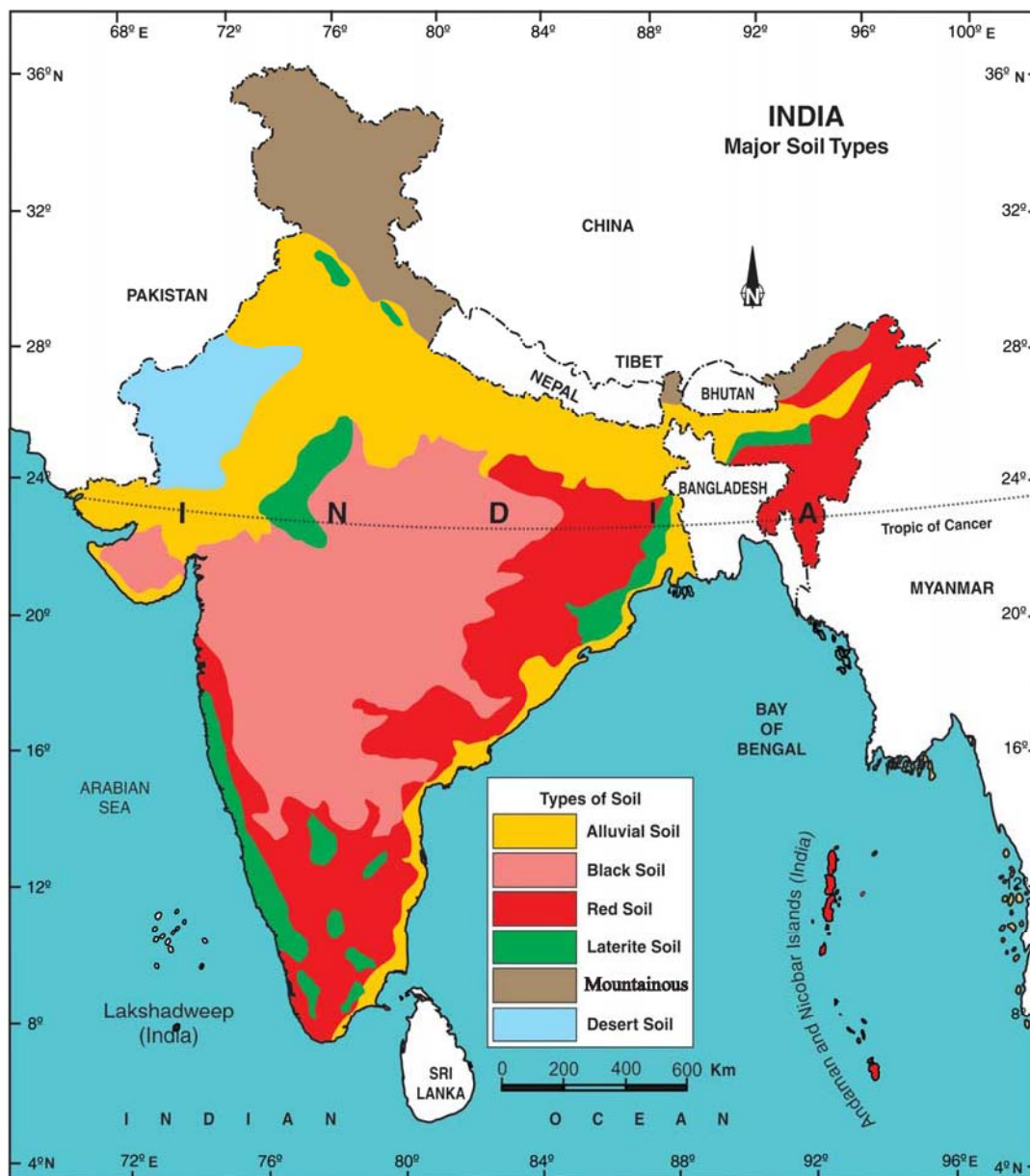
We know that soil is the basic resource for agriculture. Besides agriculture, soil is also very important.

Soil is a thin layer formed of the organic and inorganic matter on the surface of the earth. Soil is related to the surface of the earth in the same way as the apple with its skin. The thin layer on the crust of the earth is called soil.

Soil Formation : Soil is the result of denudation of rocks. The rock surface is eroded due to factors like temperature, rain, snow, air, vegetation and insects and it turns into powdery form. Thus it forms the land layer. In this layer, there are gravels, smaller stones, pebbles, soil particles etc. which are known as 'Regolith'. It contains only mineral contents. Then the biotic matter, air and water are mixed with it. Finally soil is formed out of this mixture. The process of soil formation is a long term process.

Soils in India : Soils in India are classified into six types :

- (1) Alluvial Soil (2) Black (or regur) soil (3) Red soil (4) Laterite soil (5) Mountainous soil
- (6) Desert soil.



14.3 Major Types of Soil

(1) Alluvial Soil : Alluvial soil can be divided into two types : (1) Khadar, and (2) Bangar. The soil formed due to the fresh alluvial deposit is known as Khadar soil. As this soil is formed due to the river floods, it is found mostly nearby the rivers. Generally such soil is sandy. Soil containing old alluvium in the upper valley region of a river is called Bangar soil. It is sticky and has dark colour. Alluvial soil is seen in many parts of the country. Their fertility is also different at different places. Generally, such soil is very fertile. It is found in Punjab, Uttar Pradesh, Bihar, West Bengal etc.

(2) Black Soil : This soil is found mostly in Maharashtra, western Madhya Pradesh, Gujarat, Karnataka, Andhra Pradesh, Telangana and Tamil Nadu. Black soil is the gift of peninsular plateau. This soil is very sticky and fertile. It can retain humidity for a prolonged time. It is formed from the igneous rocks and is very useful for cotton cultivation. That is why it has become famous as Black Cotton Soil. It is also known as regur soil.

(3) Red Soil : Such soil is found in regions of igneous and metamorphic rocks. Its red colour is due to its ferrous and other humus contents. The soil is porous and fertile. Such soil is seen in Goa, Tamil Nadu, Karnataka, Andhra Pradesh, Odisha and Jharkhand.

(4) Laterite Soil : Laterite soil develops as a result of excessive erosion by rain. Due to heavy rain, the humus contents from the top soil descend into the lower strata which is called leaching. As the soil contains less humus, it is less fertile. The red sandstones contain iron and aluminium. The erosion of these rocks results into its red colour. Such soil is found in mountainous region of Deccan, Karnataka, Kerala, Odisha and some parts of North-East.

(5) Mountainous Soil : Humus content is more due to the forests, although it differs from place to place. Such soil on Shivalik Range is less fertile and less developed. The soil is sandy and porous and does not contain humus. Such soil is found in the mountainous region of the country, such as in Meghalaya, Arunachal Pradesh, eastern hill ranges, Uttarakhand, Himachal Pradesh and Jammu-Kashmir and Laddakh (Union Territories).

(6) Desert Soil : Such soil is found in the arid and semi-arid regions of Gujarat, Rajasthan, Punjab and Haryana. The soil here is more alkaline and has less humus contents. Agriculture has been made possible in such soil only through irrigation.

Thus, a large diversity in soils of the nation is seen due to diversity in climate and relief features.

Self study

1. Write short answers for the following questions :

- (1) Which passes are located in the Himalayan system ?
- (2) What is regolith ?
- (3) Which are the major types of rocks ? State them.
- (4) State the soil formation process.

2. Explain the following terms :

- | | |
|----------------|----------|
| (1) Deposition | (4) Rock |
| (2) Bangar | (5) Soil |
| (3) Mineral | |

3. Write to-the-point answers of the following questions :

- (1) Archipelagos of India
- (2) State the types of soils of India and give a detailed information.
- (3) Classify the minerals.

4. Select the correct option of the following questions and complete the answer :

- (1) Patkai Hills : Arunachal Pradesh :: Lushai
- (A) Nagaland (B) Manipur (C) Mizoram (D) Meghalaya
- (2) Who from the following speaks the incorrect statement ? Find out.
- (A) Kashish : Gold, silver, platinum are precious minerals.
- (B) Kinni : Bauxite, titanium and magnesium are light metallic minerals.
- (C) Dhruvi : Tungsten, manganese, and chromium etc. are non-metallic minerals.
- (D) Nidhi : Lead, copper and iron etc. are minerals taken in common use.

- (3) Match the correct pairs :

A

A

- | | |
|----------------------|-------------------|
| (1) Stratified rock | (A) Granite |
| (2) Metamorphic rock | (B) Limestone |
| (3) Igneous rock | (C) Marble |
| (A) 1-B, 2-C, 3-A | (B) 1-A, 2-C, 3-B |
| (C) 1-C, 2-B, 3-A | (D) 1-B, 2-A, 3-C |

- (4) Which of the following statements is true ?
- (A) Western Ghats have more height in northern region.
- (B) Western Ghats are called Nilgiri in Karnataka.
- (C) Western Ghats are spread north-south in unbroken form along the Arabian Sea coast.
- (D) Western Ghats are called as Sahyadri on the border of Kerala and Tamil Nadu.
- (5) Which plateau is situated between Aravalli and Vindhya ?
- (A) Chhota Nagpur (B) Malwa
- (C) Deccan (D) Shillong

Activities

- Arrange a visit to the major archipelagos of India.
- With the help of an atlas, observe the map of relief features of India and study.
- Prepare an album containing the information about natural disasters like earthquake and volcano, and prepare their models also.