

## Chapter 4 – Climate

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### EXERCISES

1. Choose the right answer from the four alternatives given below.

**Question 1(i).**

What causes rainfall on the coastal areas of Tamil Nadu in the beginning of winters?

- (a) South-West monsoon
- (b) Temperate cyclones
- (c) North-Eastern monsoon
- (d) Local air circulation

**Answer:**

- (c) North-Eastern monsoon

**Question 1(ii).**

What is the proportion of area of India which receives annual rainfall less than 75 cm?

- (a) Half
- (b) One-third
- (c) Two-third
- (d) Three-fourth

**Answer:**

- (d) Three-fourth

**Question 1(iii).**

Which one of the following is not a fact regarding South India?

- (a) Diurnal range of temperature is less here.
- (b) Annual range of temperature is less here.
- (c) Temperatures here are high throughout the year.
- (d) Extreme climatic conditions are found here.

**Answer:**

- (d) Extreme climatic conditions are found here.

**Question 1(iv).**

Which one of the following phenomenon happens when the sun shines vertically over the Tropic of Capricorn in the southern hemisphere?

- (a) High pressure develops over North-western India due to low temperatures.



- (b) Low pressure develops over North-western India due to high temperatures.
- (c) No changes in temperature and pressure occur in north-western India.
- (d) 'Loo' blows in the North-western India.

**Answer:**

(a) High pressure develops over North-western India due to low temperatures.

**Question 1(v).**

In which of the following states in India do we find 'As' type of climate as per Koeppen's classification?

- (a) In Kerala and coastal Karnataka
- (b) In Andaman and Nicobar Islands
- (c) On Coromandel Coast
- (d) In Assam and Arunachal Pradesh

**Answer:**

(c) On Coromandel Coast

**2. Answer the following questions in about 30 words.**

**Question 2(i).**

What are the three important factors which influence the mechanism of Indian weather?

**Answer:**

The three important factors which influence the mechanism of Indian weather are:

- Distribution of air pressure and winds on the surface of the earth.
- Upper air circulation caused by factors controlling global weather and the inflow of different air masses and jet streams.
- Inflow of western cyclones generally known as disturbances during the winter season and tropical depressions during the south-west monsoon period in India, creating weather conditions favourable for rainfall.

**Question 2(ii).**

What is the Inter-Tropical Convergence Zone?

**Answer:**

The Inter Tropical Convergence Zone (ITCZ) is a low pressure zone located at the equator where trade winds converge, and so, it is a zone where air tends to ascend.



In July, the ITCZ is located around 20°N-25°N latitudes (over the Gangetic plain). These are sometimes called the monsoon trough. This monsoon trough encourages the development of thermal low over north and northwest India. Due to the shift of ITCZ, the trade winds of the southern hemisphere cross the equator between 40° and 60°E longitudes and start blowing from southwest to northeast due to the Coriolis force. It becomes southwest monsoon. In winter, the ITCZ moves southward, and so the reversal of winds from northeast to south and southwest, takes place. They are called northeast monsoons.

**Question 2(iii).**

What is meant by 'bursting of monsoon'? Name the place of India which gets the highest rainfall.

**Answer:**

High velocity winds with extreme thundering and lightening cause sudden rainfall. It is called bursting of the monsoon. The easterly jet stream sets in along 15°N latitude only after the western jet stream has withdrawn itself from the region. This easterly jet stream is held responsible for the burst of the monsoon in India.

The highest rainfall occurs along the west coast, on the Western Ghats, as well as in the sub-Himalayan areas is the northeast and the hills of Meghalaya. Here the rainfall exceeds 200 cm. In some parts of Khasi and Jaintia hills, the rainfall exceeds 1,000 cm. In the Brahmaputra valley and the adjoining hills, the rainfall is less than 200 cm.

**Question 2(iv).**

Define 'climatic region'? What are the bases of Koeppen's classification?

**Answer:**

A climatic region has a homogeneous climatic condition which is the result of a combination of factors. Temperature and rainfall are two important elements which are considered to be decisive in all the schemes of climatic classification. Koeppen identified a close relationship between the distribution of vegetation and climate. He selected certain values of temperature and precipitation and related them to the distribution of vegetation and used these values for classifying the climates. Koeppen introduced the use of capital and small letters to designate climatic groups and types. Koeppen recognised five major climatic groups, four of them are based on temperature and one on precipitation.

- Tropical climates,

- Dry climates,
- Warm temperate climates,
- Cool temperate climates,
- Ice climates

**Question 2(v).**

Which type(s) of cyclones cause rainfall in north-western India during winter?  
Where do they originate?

**Answer:**

Western cyclonic disturbance cause rainfall in north western India during winter. The western cyclonic disturbances which enter the Indian subcontinent from the west and the north-west during the winter months originate over the Mediterranean Sea and are brought into India by the westerly jet stream. An increase in the prevailing night temperature generally indicates an advance in the arrival of these cyclones disturbances.

**3. Answer the following questions in not more than 125 words.**

**Question 3(i).**

Notwithstanding the broad climatic unity, the climate of India has many regional variations. Elaborate this statement giving suitable examples.

**Answer:**

The monsoon regime emphasises the unity of India with the rest of south-east Asian region. This view of broad unity of the monsoon type of climate should not, however, lead one to ignore its regional variations which differentiate the weather and climate of different regions of India. The climate of Kerala and Tamil Nadu in the south is so different from that of Uttar Pradesh and Bihar in the north, and yet all of these have a monsoon type of climate.

1. While in the summer the mercury occasionally touches 55°C in the western Rajasthan, it drops down to as low as minus 45°C in winter around Leh. Churu in Rajasthan may record a temperature of 50°C or more on a June day while the mercury hardly touches 19°C in Tawang (Arunachal Pradesh) on the same day.

2. On a December night, temperature in Drass (Jammu and Kashmir) may drop down to minus 45°C while Thiruvananthapuram or Chennai on the same night records 20°C or 22°C.



3. In Kerala and in the Andaman Islands, the difference between day and night temperatures may be hardly seven or eight degree Celsius. But in the Thar desert, if the day temperature is around 50°C, at night, it may drop down considerably upto 15°-20°C.

4. While snowfall occurs in the Himalayas, it only rains over the rest of the country. Similarly, variations are noticeable not only in the type of precipitation but also in its amount. While Cherrapunji and Mawsynram in the Khasi Hills of Meghalaya receive rainfall over 1,080 cm in a year, Jaisalmer in Rajasthan rarely gets more than 9 cm of rainfall during the same period.

5. Tura situated in the Garo Hills of Meghalaya may receive an amount of rainfall in a single day which is equal to 10 years of rainfall at Jaisalmer. While the annual precipitation is less than 10 cm in the north-west Himalayas and the western deserts, it exceeds 400 cm in Meghalaya.

6. The Ganga delta and the coastal plains of Orissa are hit by strong rain-bearing storms almost every third or fifth day in July and August while the Coromandal coast, a thousand km to the south, goes generally dry during these months. Most parts of the country get rainfall during June-September, but on the coastal areas of Tamil Nadu, it rains in the beginning of the winter season.

These examples confirm that there are seasonal variations in temperature from place to place and from region to region in India. In spite of these differences and variations, the climate of India is monsoonal in rhythm and character.

### **Question 3(ii).**

How many distinct seasons are found in India as per the Indian Meteorological Department? Discuss the weather conditions associated with any one season in detail.

### **Answer:**

In India as per the Indian Meteorological Department, there are four distinct seasons:

- Winter Season (from December to February)
- Summer Season (from March to May)
- South west monsoon season (from June to September)
- Retreating Monsoon (from October to November)



Summer Season: April, May and June are the months of summer in north India. In most parts of India, temperatures recorded are between 30°-32°C. In March, the highest day temperature of about 38°C occurs in the Deccan Plateau while in April, temperature ranging between 38°C and 43°C are found in Gujarat and Madhya Pradesh. In May, the heat belt moves further north, and in the north-western part of India, temperatures around 48°C are not uncommon.

The hot weather season in south India is mild and not too intense as found in north India. The Peninsular situation of south India with moderating effect of the oceans keeps the temperatures lower than that prevailing in north India. Therefore, temperatures remain between 26°C and 32°C. Due to altitude, the temperatures in the hills of Western Ghats remain below 25°C. In the coastal regions, temperature does not decrease from north to south rather it increases from the coast to the interior. The mean daily minimum temperature during the summer months also remains quite high and rarely goes below 26°C. ”

### **Project/Activity**

**On the outline map of India, show the following:**

1. Areas of winter rain
2. Wind direction during the summer season
3. Areas having variability of rainfall over 50 per cent
4. Areas having less than 15°C temperature in January
5. Isohyte of 100 cm.

**Answer:**



