AEP STUDY CIRCLE
ACCENTS EDUCATIONAL PROMOTERS
SINCE 2001...
IIT-NEET-CBSE

GEOGRAPHY

23 YEAR OF LEGACY

OFFLINE ONLINE LEARNING ACADEMY

CBSE

GEOGRAPHY

CLIMATE

SOCIAL STUDIES
GEOGRAPHY

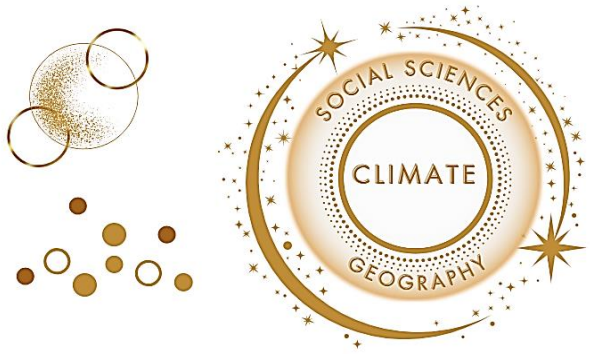
STUDY MODULE

www.aepstudycircle.com

NEET IIT-JEE CBSE
The Success Destination

+91-9939586130
+91-7739650505

2ND FLOOR, SATKOUDI COMPLEX, THANA CHOWK,
RAMGARH - 829122-JH



WEATHER AND CLIMATE

Weather keeps changing from hour to hour and from day to day. **Weather** can be defined as the atmospheric conditions at a given place and at a given time. The climate on the other hand, can be defined as the sum of the weather conditions of a large area over a long period. It is thus the average weather as well as the variations and extreme characteristic of weather of an area. The basic elements of both weather and climate are the same. Temperature, humidity, precipitation, cloudiness, sunshine, pressure and winds are the most important elements of weather and climate.

CLIMATE OF INDIA

The climate of India is described as of *monsoon type*. Derived from an Arabic word 'mausim', monsoon refers to the seasonal reversal in the wind direction through the year. This type of climate is found mainly in the south and the south-east Asia. Despite an overall unity and commonality in the general pattern, there are perceptible regional variations in climatic conditions within the country.

The temperature touches as high as 50°C in the western deserts during the summer season whereas it drops down as low as –45°C in Leh during the winter season. Similarly, variations are noticeable not only in the type of precipitation but also in its amount.

Weather	Climate
1. It refers to short-run atmospheric conditions that exist for a given time in a specific area.	1. Climate is the aggregate of day to day weather conditions over a long period of time.
2. Weather refers to a particular place.	2. Climate refers to a large area.
3. Weather may change at a very short interval of time.	3. Climate remains more or less unchanged year after year.
4. Weather is influenced by any one of its predominant elements *i.e.*, temperature humidity, etc.	4. Climate is the collective effect of all its elements.

- While precipitation is mostly in the form of snowfall in the upper parts of Himalayas, it rains over the rest of the country.
- The annual precipitation varies from over 400 cm in Meghalaya to less than 10 cm in Ladakh and western Rajasthan.
- Most parts of the country receive rainfall from June to September except parts of the Tamil Nadu coast which gets most of its rain during October and November.

CHARACTERISTICS OF MONSOON CLIMATE

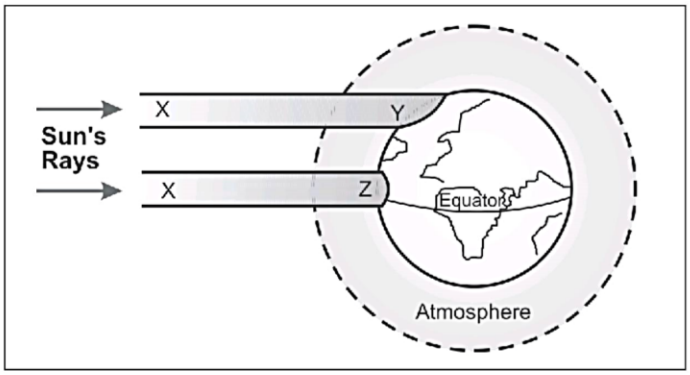
- The seasonal reversal of wind direction throughout the year.
- Cool and dry winter whereas hot and dry summer.
- Seasonal rainfall lasting upto three months.
- The monsoons are experienced in the tropical areas roughly between 20°N and 20°S.

CLIMATIC CONTROLS

1. Latitude: The latitude at which a place is located affects the temperature of the place.

The spherical shape of the Earth causes the different parts of the Earth to be heated to different degrees. The regions near the Equator get more direct rays of the Sun. The direct rays are concentrated over a smaller area and so they heat up the Earth more. As we move away from the Equator, due to the curvature, the Sun's rays strike the Earth at an angle. The slanting rays of the Sun spread the heat over a larger area and so do not heat to the same extent as the direct rays.

Thus, **the temperature decreases as the distance increases from the Equator.** The **amount of rainfall also decreases** from the Equator to the poles since the rate of evaporation is related to temperature.



Temperatures decreases from the Equator to the Poles

2. Altitude: As height increases, the density of air decreases. Thus, with an increase in height above the surface of the Earth, the temperature decreases.

GEO SKILL

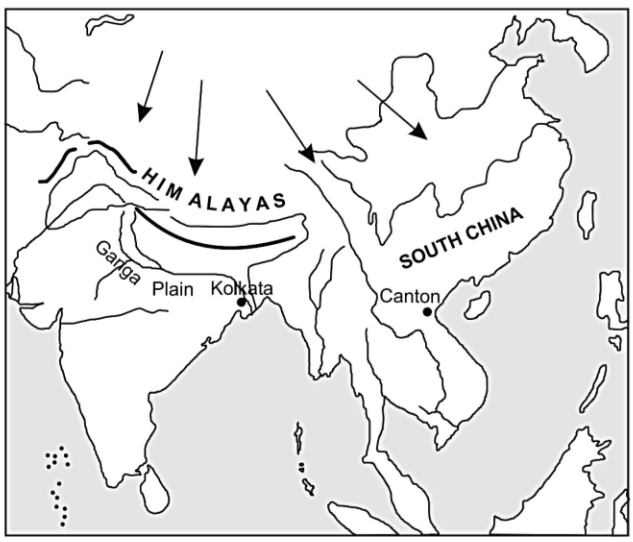
Both Amritsar and Shimla are approximately situated at the same latitude but Shimla is much more cooler in summer as compared to Amritsar. Do you know why?

3. Pressure and Wind: The pressure and wind system of any region depends on the latitude and altitude of the place. Thus, it influences the temperature and rainfall pattern.

4. Distance from the sea: Land heat up and also cools down faster than water. Because of this, land is warmer than the ocean in the summer and cooler than the oceans in winter. Thus, oceans have a moderating influence on the temperature of coastal places. Therefore, **places near the sea are cool in summer and warm in winter. Interior of continents are hot in summer and cold in winter.**

5. Ocean Currents: Ocean currents transfer heat from lower latitudes to the higher latitudes. The temperature of the coastal areas is affected by the ocean currents that wash it. A cold current will have a **cooling effect** whereas a warm current will have a warming effect.

6. Direction of Mountain Ranges: Mountains act as barriers to the movement of wind, hence affect both temperature and rainfall. Depending on the direction of a mountain range, they can protect from cold winds and thus keep temperatures



The Himalayan Barrier

Kolkata is protected from the cold winds of the north by the Himalayas but there is no mountain range to protect Canton from the cold winds.

warmer. For example, Kolkata in India and Canton in China, both lie on the coast and on the same latitude, but Canton is much colder than Kolkata in winter.

As already discussed, Mountain ranges also bring about contrasts in rain, with the windward side receiving heavier rainfall than the leeward side. On the windward side the rainfall increases with height as the temperature cools and more condensation occurs. This is true upto heights below ordinary cloud level.

FACTORS AFFECTING THE CLIMATE OF INDIA

1. Latitude: India lies between 8°N and 37°N latitudes. The Tropic of Cancer passes through the middle of India. While the southern part lies in the tropical zone, the northern part falls in the sub-tropical zone. As such the temperature remains quite high during summer season all over the country except in the areas of high altitudes. But during winter, temperature falls considerably in the northern plains and records below freezing point in many parts of the Himalayan belt. However, it is low to moderate in rest of the country. Thus, India by and large enjoys a hot tropical climate.

2. Himalayan Mountains: The Himalayas are also responsible for the tropical climate of India. This high and extensive mountain system protects India from the cold winds of the north. At the same time, the Himalayas obstruct the south-westerly monsoon thereby causing a heavy rainfall in the Northern Plains of India.

3. Conditions in the regions surrounding India: Temperature and pressure conditions in East Africa, Iran, Central Asia and Tibet determine the strength of the monsoon and the occassional dry spells.

The ***climate*** and associated weather conditions in India are governed by the following atmospheric conditions:

- Pressure and surface winds
- Western cyclonic disturbances and
- Upper air circulation
- Tropical cyclones.

(a) Pressure and Surface Winds:

India lies in the region of North –East Trade winds. These winds originate from the sub-tropical High-Pressure belt of the Northern Hemisphere. They blow to south, get deflected to the right due to the ***Coriolis force***, and move on towards the Equatorial Low-Pressure area. Generally, these winds carry very little moisture as they originate and blow over land. Therefore, they bring little or no rain. Hence, India should have been an arid land, but it is not so. Let us see why?

The pressure and wind conditions over India are unique.

(i) During winter, due to low temperature there is a high-pressure area north of the Himalayas. Cold dry winds blow from this region to the low-pressure areas over the oceans to the south.

(ii) In summer, due to high temperature a low-pressure area develops over interior Asia as well as over North-western India. This causes a complete reversal of the direction of winds during summer. Air moves from the high-

Coriolis force: An apparent force caused by the earth's rotation. The Coriolis force is responsible for deflecting winds towards the right in the Northern Hemisphere and towards the left in the Southern Hemisphere. This is also known as Ferrel's Law.

Climate: The average weather conditions of a sizeable area of the earth's surface over a period of time (usually spread over a span of at least 30 years).

pressure area over the southern Indian Ocean, in a south-easterly direction, crosses the Equator, and turns right towards the low-pressure areas over the Indian subcontinent. These are known as the **South-West Monsoon winds**. As these winds blow over the warm oceans, gather moisture and bring widespread rainfall over the mainland of India.

(b) Upper Air circulation:

The upper air circulation in this region is dominated by a westerly flow. An important component of this flow is the ***Jet Stream***. These jet streams are located approximately over 27°-30° north latitude, therefore, they are known as *sub-tropical westerly jet streams*. Over India, these jet streams blow south of the Himalayas, all through the year except in summer.

> **Jet stream:** These are a narrow belt of high altitude (above 12,000 m) westerly winds in the troposphere. Their speed varies from about 110 km/h in summer to about 184 km/h in winter. A number of separate jet streams have been identified. The most constant are the mid-latitude and the sub-tropical jet stream.

(c) Western Cyclonic Disturbances:

The Western Cyclonic Disturbances experienced in the north and north-western parts of the country are brought in by this westerly flow. In summer, the sub-tropical westerly jet stream moves north of the Himalayas with the apparent movement of the sun. An easterly jet stream, called the *sub-tropical easterly jet* stream blows over peninsular India, approximately over 14°N during the summer months.

> **Western Cyclonic Disturbances**
>
> The western cyclonic disturbances are weather phenomena of the winter months brought in by the westerly flow from the Mediterranean region. They usually influence the weather of the north and north-western regions of India. Tropical cyclones occur during the monsoon as well as in October - November, and are part of the easterly flow. These disturbances affect the coastal regions of the country. These Disturbances cause heavy rainfall on Odisha and Andhra coast.

(d) Tropical cyclones:

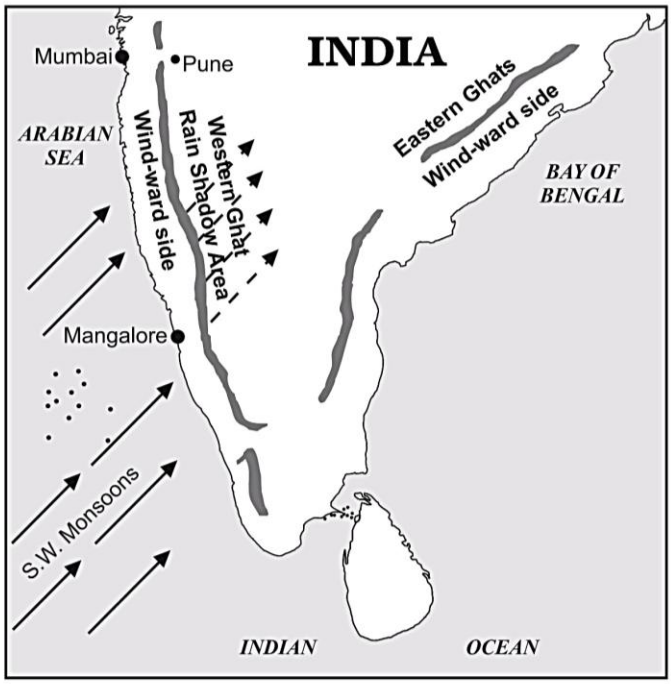
The low pressure conditions during the months of October–November, over North–Western India, get transferred to the Bay of Bengal. This helps in the occurrence of cyclonic depressions.

Apart from this, it has also been noticed that changes in the pressure conditions over the southern oceans also affect the monsoons. Normally when the tropical eastern south Pacific Ocean experiences high pressure, the tropical eastern Indian Ocean experiences low pressure. But in certain years, there is a reversal in the pressure conditions and the eastern Pacific has lower pressure in comparison to the eastern Indian Ocean. This periodic change in pressure conditions is known as the **Southern Oscillation** or **SO**. The difference in pressure over Tahiti

El Nino: This is a name given to the periodic development of a warm ocean current along the coast of Peru as a temporary replacement of the cold Peruvian current. 'El Nino' is a Spanish word meaning 'the child', and refers to the baby Christ, as this current starts flowing during Christmas. The presence of the El Nino leads to an increase in sea-surface temperatures and weakening of the trade winds in the region.

Jet Stream: The air currents blowing in the upper layer of the atmosphere.

(Pacific Ocean, 18°S/149°W) and Darwin in northern Australia (Indian Ocean, 12°30.S/131°E) is computed to predict the intensity of the monsoons. If the pressure differences are negative, it would mean below average and late monsoons. A feature connected with the SO is the ***El Nino*** phenomenon in which a warm ocean current that flows past the Peruvian Coast, in place of the cold Peruvian current, every 2 to 5 years. The changes in pressure conditions are connected to the El Nino. Hence, the phenomenon is referred to as **ENSO** (El Nino Southern Oscillations).



Hints

Winds full of Moisture →

4. Varied relief: Relief plays an important role in the climatic condition of the continent.

The Western Ghats rise abruptly like a wall from the Western Coastal plains more or less parallel to the coastline. This wall like mountain range forces the moisture laden South-West monsoons from the Arabian Sea to ascend the slope thereby giving heavy rainfall in the Western Coastal Plain and still heavier rainfall on the western slopes of the Western Ghats, *i.e.*, the ***windward side*** of the mountain range. But these winds have to descend the slope after crossing the crest of the Ghats. In the process their temperature rises and their humidity decreases. Therefore, they cause little rainfall and the area east of the Ghats is called the ***'leeward side'*** or the ***'rain shadow region'***. Thus while Mumbai on the west coast records about 190 cm, and Pune about 160 km away from Mumbai on the leeward side receives only 50 cm rainfall during the monsoon season. This phenomenon is observed almost all along the Western Ghats.

Leeward side: The side of the mountain which receives less rainfall.

Windward side: The side of the mountain facing the wind and receiving heavy rainfall.

To understand the mechanism of the monsoons, meteorological data has been taken from the Indian Ocean region as well as from the other areas of the world. Following factors have emerged and are considered responsible for the wind reversal:

(a) The heat low around the Arabian Sea caused due to intensive heating during the premonsoon months.

(b) The northernmost position of Inter Tropical Convergence Zone (ITCZ) in summer, which is also known as the monsoon-trough during the monsoon season.

(c) The intensity and position of this high-pressure area affects the Indian monsoon.

(d) The Tibetan high-level plateau gets intensely heated during summer which results in strong vertical air currents and the formation of high pressure over the plateau at about a kilometre above the sea level.

(e) The movement of the westerly jet to the north of the Himalayas and the presence of the tropical easterly jet over the Indian peninsula during summer.

ITCZ: The Inter Tropical Convergence Zone or the ITCZ, is a broad trough of low pressure in equatorial latitudes. This is where the north-east and the south-east trade winds converge. This convergence zone lines are more or less parallel to the equator but moves north or south with the apparent movement of the sun.

CYCLE OF SEASONS

There are four distinct seasons in India:

1. The cold weather season
2. The hot weather season
3. The season of the advancing monsoon
4. The season of the retreating monsoon

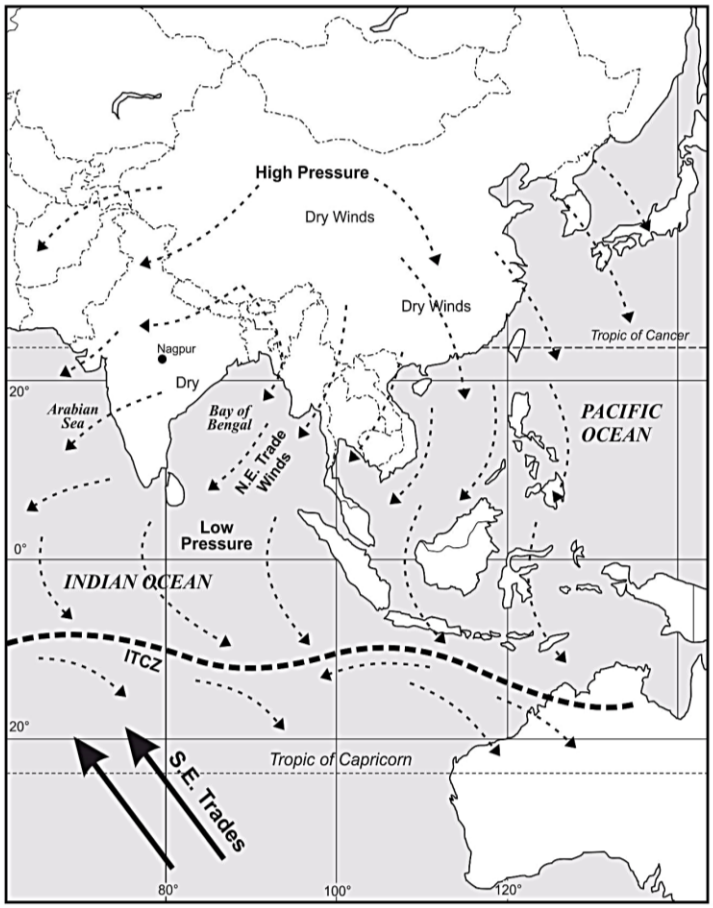
1. THE COLD WEATHER SEASON OR THE WINTER SEASON

The cold weather season commences in mid-November in northern India and continues till February. December and January are the coldest months in the northern part of the country.

(a) Major characteristics: Clear sky, pleasant weather, low temperature and humidity, high range of temperature, cool and slow northern winds are the main characteristics of this season.

(b) Temperature: The northern two-third of the country has mean temperature below 21°C. January is the coldest month when the temperature in the Ganga plain varies from 10° to 15° C.

The southern one-third has rather warmer conditions and does not have a distinctly defined winter season. The isotherm of 20°C runs in east-west direction, roughly parallel to Tropic of Cancer and divides India climatically into the northern and southern parts. To the south of this isotherm the temperature always remains above 21°C and in extreme south above 25°C.



(c) Pressure and winds: As the temperature in the northern plains is low so a high pressure prevails there. The winds start blowing from high pressure area of north-west to low pressure area of south-east. So, North-East Trade winds prevail over the country. They blow from land to the sea over most parts of the country and do not cause much rainfall.

Western disturbances: The fine weather conditions which prevail during this season, sometimes, get disturbed by shallow cyclonic depressions are known as **Western disturbances**. They originate over the Mediterranean Sea and travel eastwards across West Asia, Iran-Afghanistan and Pakistan before they reach the north-western parts of the country. On their way, their moisture content gets augmented when they blow over Caspian Sea in the north and the Persian Gulf in the south.

These western disturbances cause in their way light rainfall. Although the amount is meagre, yet it is highly beneficial to the rabi crops especially the wheat. The precipitation is in the form of light rain in the plains and heavy snowfall in the western Himalayas. It is this snow that sustains the flow of water in the Himalayan rivers during summer months. The precipitation goes on decreasing from west to east in the plains and from north to south in the mountains.

(d) Precipitation: The winds blow from land to the sea and do not cause much rainfall. These winds pick up some moisture while crossing the Bay of Bengal and cause winter rainfall in Tamil Nadu, south Andhra Pradesh, south-east Karnataka and south-east Kerala. The highest seasonal rainfall of about 75 cm between October and December occurs along the south-eastern coast of Tamil Nadu and adjoining parts of south of Andhra Pradesh.

2. THE HOT WEATHER SEASON

Due to the apparent northward movement of the Sun, the global heat belt shifts northward.

The hot weather season begins in March and ends in May.

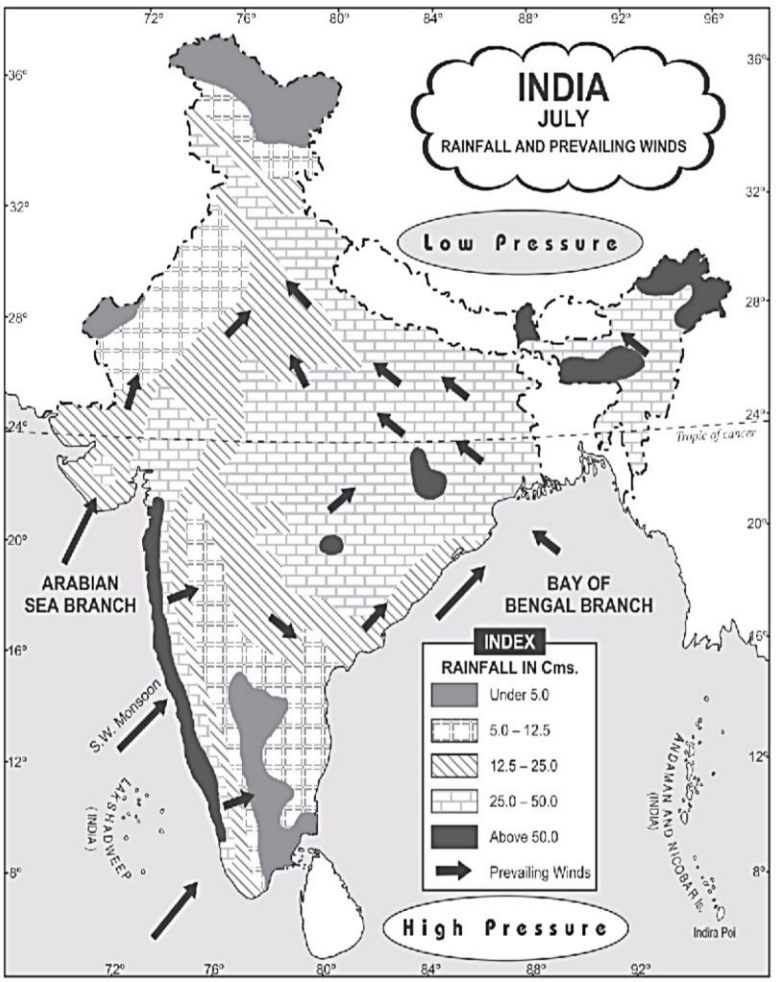
Main characteristics:

(i) This is a period of rising temperature and falling air pressure.

(ii) There is steady increase in temperature from south to north with the highest temperature in the interior parts of the country.

Temperature: Temperature begins to rise in March and the highest temperature reaches by the end of May. In March, the highest day temperature is found in the Deccan Plateau. It is around 38°C. In April, the heat belt moves further north to Gujarat and Madhya Pradesh. The average temperature ranges from 42°C to 43°C. In May, the heat belt moves further north.

In the north-western part of the country temperature is around 48°C.



Pressure and winds: As almost the whole country has high temperature so the low pressure conditions develop over land. On the other hand, the surrounding seas are cooler hence high pressure prevails in the seas. The north-east trade winds which blow from south-east to north-west in southern hemisphere are attracted towards the mainland of India. This marks the end of summer season and south-west monsoon sets in the month of June.

LOCAL WINDS

(a) **Kal Baisakhi:** In Bengal, the local winds are called Kal Baisakhi meaning "the calamity of the month of Baisakhi". These local winds are accompanied by thunderstorms and bring rainfall. This rain in the month of April-May is good for tea crops in Assam and jute and rice in Bengal.

(b) **Loo:** Loo is the name given to the hot, dry wind which blows particularly in the month of May and June in the Northern Plain. Loo is common in Bihar, Punjab, Haryana and Uttar Pradesh.

(c) **Mango shower or pre-monsoon shower:** These occur in South India during April-May. They bring a little rain which is important for mango, tea and coffee plants. Hence, the name mango shower is used.

3. THE RAINY SEASON OR THE SOUTH-WEST MONSOON SEASON

The rainy season in India starts with the onset of the South-West monsoon in June and lasts until September.

Temperature: Temperature all over the country begins to fall as the monsoon rainfall intensifies. The north-western parts and desert areas of Rajasthan still have temperatures reaching upto 40°C.

Pressure and winds: The temperatures in north-western plains are still very high as a result of which low pressure conditions prevail there. By early June the low pressure conditions are powerful enough to attract the trade winds of Southern Hemisphere. These South-East Trade winds are of oceanic origin. Coming from the Indian Ocean they cross the Equator and enter the Bay of Bengal and the Arabian Sea. After crossing the Equator they follow a south-westerly direction. This is why they are known as South-West monsoons. It is of interest to note that these monsoon winds follow a south-westerly direction throughout Peninsular India but their direction undergoes a change in Indo-Gangetic plain where they move from east to west. The change in direction is due to relief features and thermal low pressure over north-west India.

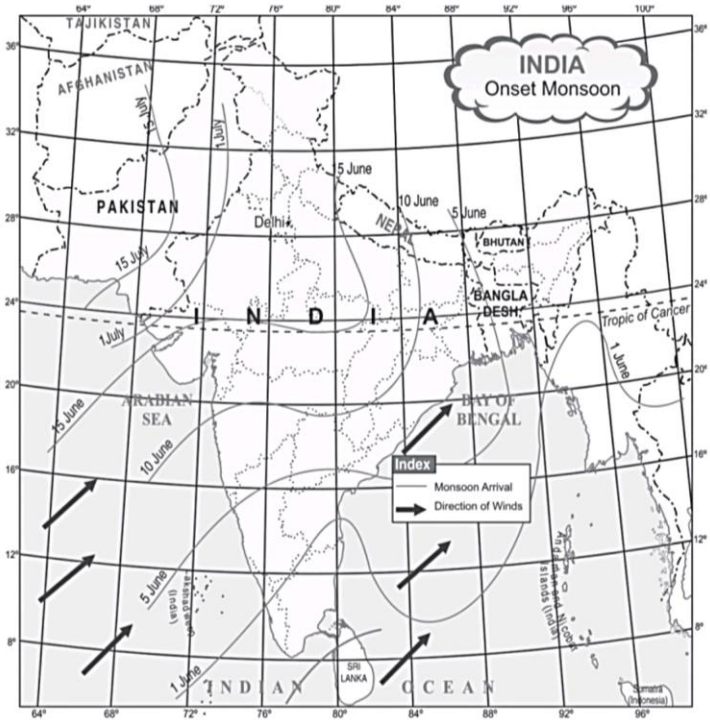
Rainfall: Three-fourths of the total annual rainfall of India is received during this season. The progress of the monsoon winds beyond south Kerala is in the form of two branches.

(a) The Arabian Sea branch

(b) The Bay of Bengal branch

Kalbaisakhi: These are thunderstorms, accompanied with strong winds and heavy rainfall.

Loo: It is a local wind which blows during the hot season in North India.



(a) The Arabian Sea branch:

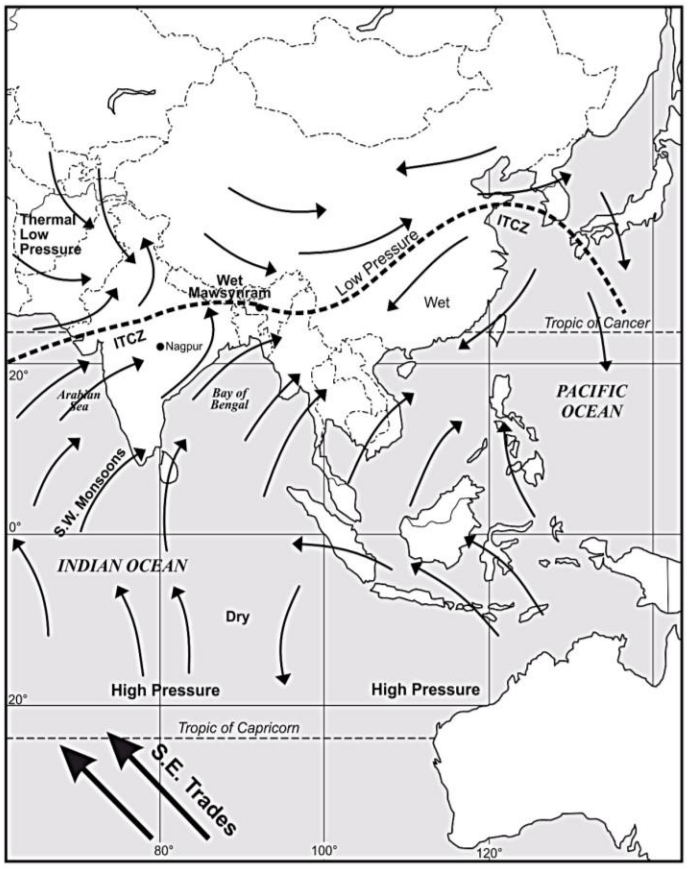
1. The Arabian Sea branch of the south-west monsoon strikes the western coast of India in Kerala on the 1st June. The windward side of the Sahyadris receives very heavy rains.

2. Crossing the Ghats they overrun the Deccan plateau and Madhya Pradesh causing fair amount of rainfall.

3. Thereafter they enter the Ganga plains and mingle with the Bay of Bengal branch.

4. Another part of the Arabian Sea branch strikes the Saurashtra peninsula and the Kutch.

5. It then passes over west Rajasthan and along the Aravallis, causing only scanty rainfall. In Punjab and Haryana, it joins the Bay of Bengal branch. These two branches, reinforced by each other cause rain in the Western Himalayas.



Break or burst of Monsoon: The sudden approach of the moisture laden winds associated with violent thunder and lightning.

(b) The Bay of Bengal branch:

1. This branch is originally directed towards the coast of Myanmar and part of the south-east Bangladesh. But the Arakan Yoma range along the coast of Myanmar is good enough to deflect a big chunk of this branch, enabling it to enter the Indian subcontinent.

2. The monsoon, therefore, enters Bengal and Bangladesh from south and south-east instead of the south westerly direction.

3. Thereafter, this branch splits into two under the influence of the mighty Himalayas and the thermal low in north-west India.

4. One branch moves westward along the Ganga plains reaching as far as Punjab plains.

5. The other branch moves up the Brahmaputra valley in the north and north-east causing widespread rains in the North-eastern India. Its sub-branch strikes the Garo and Khasi Hills of Meghalaya. Mawsynram, located on the crest of the southern range of Khasi Hills, receives the highest average annual rainfall in India. Cherapunji, located 16 km east of Mawsynram holds earlier rainfall records.

MONSOON-BURST

The rain bearing winds are strong. They blow at an average speed of more than 30 km/h. The sudden onset of moisture-laden winds is associated with violent thunder, lightning and heavy downpour. This sudden onset of rain is termed as the ***monsoon burst.***

The Aravalli Range receives scanty rainfall because:

(i) The orientation of the Aravalli Range is parallel to the direction of the prevailing monsoon winds, so it does not offer any obstacles in the way of these winds.

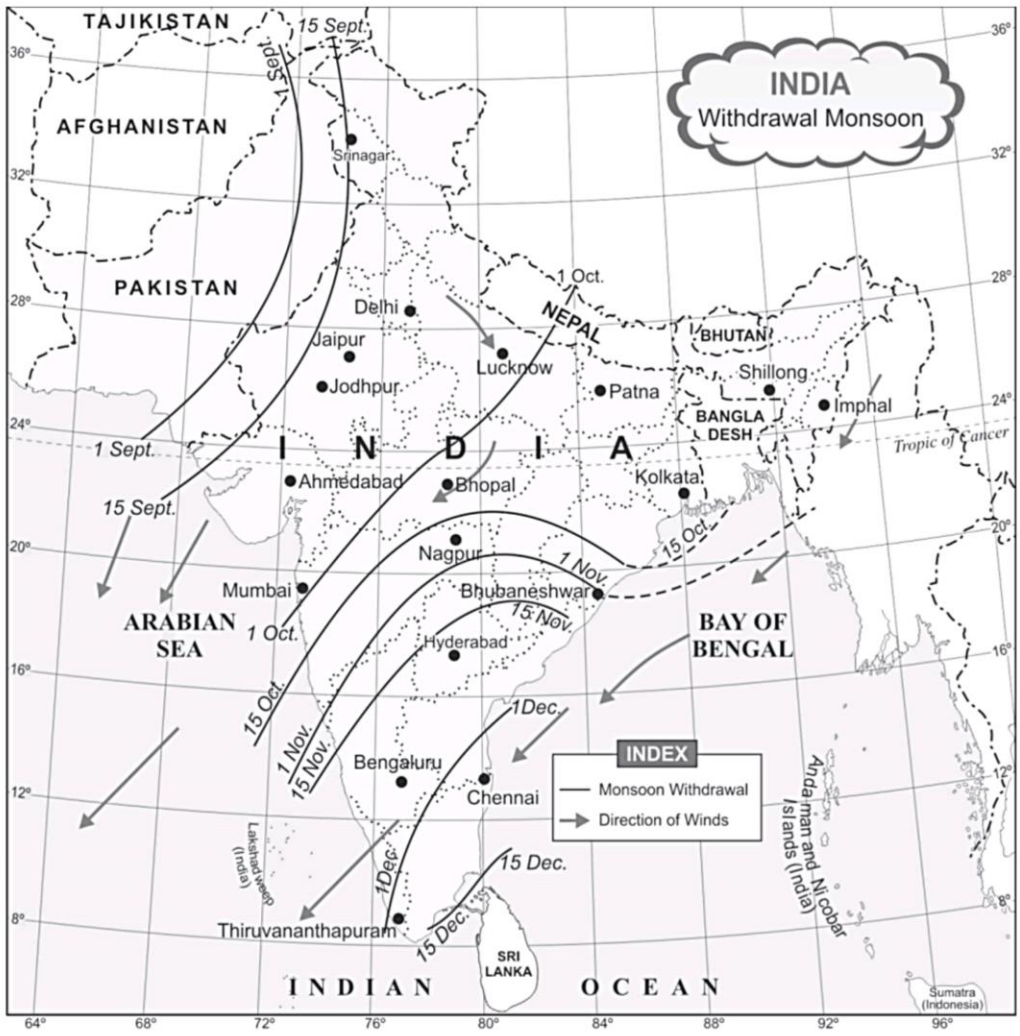
(ii) The moisture laden winds, passing over Rajasthan do not saturate as the heat in the desert region increases its capacity to hold moisture.

Breaks in rainfall:

Breaks in the rainfall is the most important phenomenon associated with the monsoon. Thus, it has wet and dry spells, in other words, the monsoon rains take place only for a few days at a time. They are interspersed with rainless intervals. These breaks in monsoon are related to the movement of the monsoon trough. For various reasons, the trough and its axis keep on moving northward or southward, which determines the spatial distribution of rainfall. When the axis of the monsoon trough lies over the plains, rainfall is good in these parts. On the other hand, whenever the axis shifts closer to the Himalayas, there are longer dry spells in the plains, and widespread rain occurs in the mountainous catchment areas of the Himalayan rivers.

MAJOR FEATURES OF THE INDIAN MONSOON

1. Most of the country gets rainfall from south-west monsoons.
2. The rainfall from the monsoon winds is variable and quite undependable.
3. Much of the rainfall is received in 3-4 months.
4. The distribution of rainfall is highly uneven.
5. Indian rainfall is controlled by orography *i.e.*, most of the rainfall is caused due to the obstruction of moisture bearing winds.



4. THE SEASON OF RETREATING MONSOON

The months of October and November are known as the season of retreating monsoon season. During this season due to the apparent movement of the sun towards the south, the temperature in northern plains begins to decrease because sun rays no longer fall directly at the Tropic of Cancer. The low pressure trough becomes weaker and is no longer strong enough to attract the monsoon winds. This results in the retreat of the monsoon.

Temperature: The retreat of the monsoon is marked by clear skies and rise in temperature. During this period humidity is very high. Due to high temperature and humidity, the weather becomes rather oppressive. This is commonly known as **'October heat'.** In the second half of October the mercury begins to fall rapidly, particularly in northern India.

Pressure and winds: As the monsoon retreats the elongated trough of the low pressure which once prevailed over north-western India gets transferred to the centre of Bay of Bengal by early November. This is the season when south-west monsoons give place to the north-east monsoons.

Cyclones: The period is associated with occurrence of cyclonic depressions which originate over the Andaman Sea. The areas most vulnerable to these storms include the coastal belts of Tamil Nadu, Andhra Pradesh and Bangladesh.

Precipitation: Most parts of India remain dry during this season. Only Kerala, Tamil Nadu and adjoining areas of Andhra Pradesh receive rainfall. The north-east monsoon absorbs moisture while passing over the Bay of Bengal and causes rainfall in the south-eastern coast of India.

DISTRIBUTION OF RAINFALL

In a large country like India accompanied with variations of relief, the distribution of rainfall cannot be uniform. The distribution of rainfall in our country is determined by direction of the rain-bearing winds and relief features.

The world's heaviest rainfall is recorded around **Mawsynram** near Cherrapunji in **Meghalaya** which is about 1,142 cm per annum.

1. Areas of heavy rainfall (over 200 cm of annual rainfall): The southern slopes of the eastern Himalayas, Assam, Bengal and east coast receive heavy rainfall.

2. Areas of moderately heavy rainfall (100-200 cm of annual rainfall): The middle Ganga valley, the Western Ghats, eastern Maharashtra, Madhya Pradesh and Odisha receive moderately heavy rainfall.

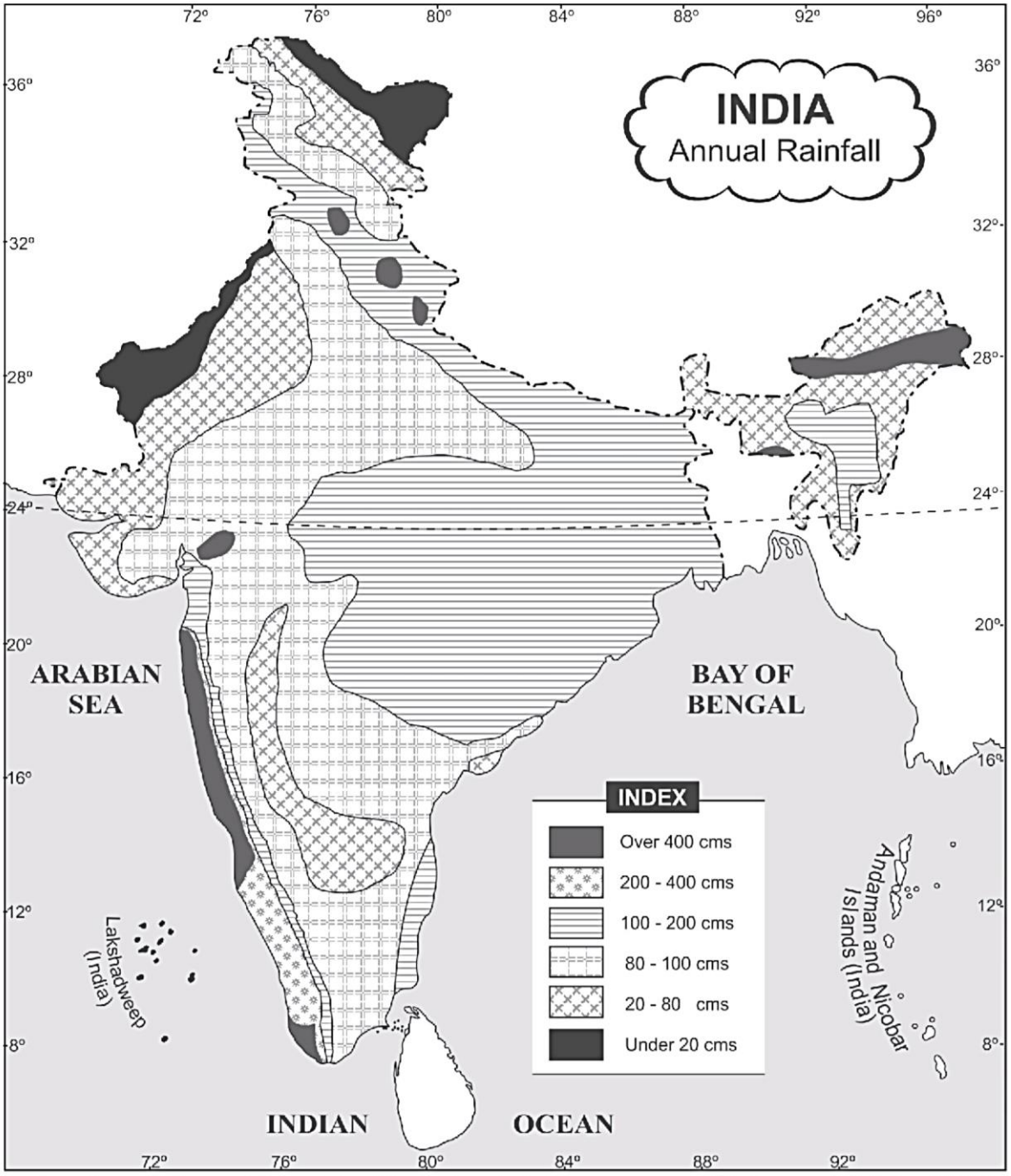
3. Areas of moderate rainfall (50-100 cm of annual rainfall): The Upper Ganga valley, eastern Rajasthan and Punjab, southern plateaus of Karnataka, Andhra Pradesh and Tamil Nadu.

4. Areas of scanty rainfall (less than 50 cm of annual rainfall): Northern part of Kashmir, western Rajasthan and Punjab and Deccan Plateau (rain-shadow areas of the Western Ghats).

MONSOON AS A UNIFYING BOND

Importance of the Monsoons:

1. The life of the Indian people including the agricultural activities revolves around the monsoon.
2. India is an agricultural land. Monsoon plays an important role in the agricultural production.
3. Despite climatic contrasts and variations from region to region, the monsoons provide a rhythmic cycle of seasons year after year.



Based upon Survey of India map with the permission of Surveyor General of India. © Government of India Copyright 2014.
The territorials waters of India extend into the sea to a distance of twelve nauticals miles measured from the appropriate base line.
The boundary of Meghalaya shown on this map is as interpreted from the North Eastern Areas (Reorganisation) Act,1971 but has yet to be verified.
The boundaries between Bihar and Jharkhand, Madhya Pradesh and Chattishgarh and Uttar Pradesh and Uttarakhand have not been verified by the Government Concerned.

4. The Indian landscape, its animal and plant life, its entire agricultural calendar and the life of the people, including their festivities, revolve around this phenomenon year after year, people of India from north to south and from east to west, eagerly await the arrival of the monsoon.
5. These monsoon winds bind the whole country by providing water to set the agricultural activities in motion. The river valleys which carry this water also unite as a single river valley unit.

A COMPARATIVE STUDY OF THE NORTH-EAST AND SOUTH-WEST MONSOONS

Summer Monsoons	Winter Monsoons
1. They blow during the months of June to September.	1. They blow during the months of December to February.
2. These blow from the high pressure area on the sea to the low pressure area on the land.	2. These blow from the high pressure area on the land to the low pressure area on the sea.
3. These bring rain to the greater part of India.	3. These bring a little rain only to the Tamil Nadu coast.
4. These blow into India in two branches, i.e., the Arabian Sea and Bay of Bengal branch.	4. These have only one branch.
5. These are characterised by oppressive heat and humidity known as 'October Heat'.	5. These are characterised by pleasant season with low temperature, low humidity and clear skies.

RECAPITULATION

- The climate of India is described as of monsoon type. Derived from an Arabic word 'mausim', monsoon refers to the seasonal reversal in the wind direction through the year.
- The cold weather season or winter season: The cold weather season commences in November and continues till February.
- There are four distinct seasons in India:
  (i) The cold weather season (ii) The hot weather season
  (iii) The season of the advancing monsoon (iv) The season of the retreating monsoon
- The hot weather season: The hot weather season begins in March and ends in May.
- The rainy season in India starts with the onset of the south-west monsoon in June and lasts till September.
- The months of October and November are known as the season of retreating monsoon season.
- The world's heaviest rainfall is recorded around Mawsynram near Cherrapunji in Meghalaya which is about 1,142 cm per annum.

ASSIGNMENT - I

Q.1. Which of the following places experiences the maximum variation in day and night temperature?

Options:

(*a*) Kerala (*b*) Andaman and Nicobar island

(*c*) Thar desert, Rajasthan (*d*) Coromandel coast

Q.2. Which among the following is not a major control of the climate of any place?

Options:

(*a*) Latitude (*b*) Altitude

(*c*) Ocean currents (*d*) Temperature

Q.3. Which imaginary line passes through the centre of India?

Options:

(*a*) Equator (*b*) Tropic of Cancer

(*c*) Tropic of Capricorn (*d*) Prime Meridian

Q.4. During which season the Inter Tropical Convergence Zone shifts over the Northern plain?

Options:

(*a*) Winter season (*b*) Summer season

(*c*) Autumn season (*d*) Spring season

Q.5. What is climate?

Q.6. What are the elements of weather and climate?

Q.7. What are the two branches of monsoon in India?

Q.8. What is Jet Stream?

Q.9. What is the Inter Tropical Convergence Zone?

Q.10. What is Southern Oscillation?

Q.11. What are the different atmospheric conditions that govern the climate and weather conditions of India?

Q.12. Describe the role of El Nino and Southern Oscillation to control the climate of India.

Q.13. How many major climatic controls are there?

Q.14. The western part of Rajasthan remains almost dry during the southwest monsoon season. Give three reasons in support of this statement.

Q.15. Why is the distribution of rainfall uneven in India? Mention any five factors?

ASSIGNMENT - II

Q.1. What causes winter rain and snowfall in the north western part of India during winter?

Options:

(*a*) Northeast monsoon wind (*b*) Southwest monsoon wind

(*c*) Cyclonic disturbance from west (*d*) All of these

Q.2. Which among the following has an unifying influence on Indian subcontinent?

Options:

(*a*) Western disturbance (*b*) Kal Baisakhi

(*c*) Monsoon (*d*) El Nino

Q.3. Most parts of India receive rainfall during which of the following months?

Options:

(*a*) June to September (*b*) May to July

(*c*) April to August (*d*) April to September

Q.4. On which hill is Mawsynram located?

Options:

(*a*) Aravalli hill (*b*) Anantagiri hill

(*c*) Khasi hill (*d*) Mahendragiri hill

Q.5. What is 'Kal Baisakhi'?

Q.6. Which place receives the highest average rainfall in the world?

Q.7. Which wind causes rainfall in Tamil Nadu during winter?

Q.8. What is 'Mango Showers'?

Q.9. What do you understand by the 'Retreating of the Monsoon'? When does it occur?

Q.10. What is 'October heat'?

Q.11. Write a short note on the trade winds.

Q.12. Why do the Western Ghats receive more rainfall than the Eastern Ghats?

Q.13. Describe the effect of western cyclonic disturbances on the Indian climate?

Q.14. Describe the regional variations in the climatic conditions of India with the help of suitable examples.

Q.15. Write a short note on withdrawal or retreat of monsoon.

OBJECTIVE TYPE QUESTIONS (Self Practice)

A. Multiple Choice Questions:

1. Which one of the following places receive the highest rainfall in the world?
   (*a*) Silchar (*c*) Cherrapunji (*b*) Mawsynram (*d*) Guwahati
2. The wind blowing in the northern plains in summer is known as:
   (*a*) Kaal Baisakhi (*b*) Loo (*c*) Trade Winds (*d*) None of these
3. Which one of the following causes rainfall during winter in north-western part of India?
   (*a*) Cyclonic depression (*b*) Retreating monsoon
   (*c*) Western disturbances (*d*) South-west monsoon
4. Monsoon arrives in India approximately in:
   (*a*) Early May (*c*) Early June
   (*b*) Early July (*d*) Early August
5. Which one of the following characterises the cold weather season in India?
   (*a*) Warm days and warm nights (*b*) Warm days and cold nights
   (*c*) Cool days and cold nights (*d*) Cold days and warm nights

B. Fill in the blanks:

1. Dust storms in West Bengal during hot weather season are called ..... .
2. The low pressure conditions, over north western India, get transferred to the Bay of Bengal by early November and cause the occurrence of ..... .
3. The wind blowing in the northern plains in summer is known as ..... .

C. Match the columns:

Column A	Column B
(*i*) Northern most range of Himalayas	(*a*) Himachal
(*ii*) Outer most range of Himalayas	(*b*) Himadri
(*iii*) Range lying to the south of the Himadri	(*c*) Shiwaliks

D. Assertion and Reason Based Question:

Two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes, (*i*), (*ii*), (*iii*) and (*iv*) as given below:

(*i*) Both A and R are true and R is correct explanation of the assertion.
(*ii*) Both A and R are true but R is not the correct explanation of the assertion.
(*iii*) A is true but R is false.
(*iv*) A is false but R is true.

Assertion: The world is divided into a number of climatic regions.

Reason: The climate of India is described as the 'monsoon' type.

Options:

(*i*) ☐ (*ii*) ☐ (*iii*) ☐ (*iv*) ☐

E. Write the appropriate term:

1. The sum total of weather conditions and variations over a large area for a long period of time.
2. Pre-monsoon showers that help in the early ripening of mangoes.

F. Correct the following statement and rewrite:

1. Coastal areas experience more contrasts in temperature conditions.
2. Due to curvature of the earth, the amount of solar energy received varies according to longitude.

BOARD QUESTIONS

1. Why does Mumbai receive more rainfall in summer season while Chennai receives rainfall in winter? *[CBSE 2011]*
2. Discuss the factors which influence the climate of India. *[CBSE 2012, 2013]*
3. Explain the major factors which affects the monsoon winds. *[CBSE 2013]*
4. Describe the main features of retreating monsoon season of India. *[CBSE 2011]*
5. Why does mercury rise up to 50 degree celsius in certain places in Rajasthan whereas 20 degree celsius in Pahalgam in Jammu and Kashmir? *[CBSE 2014]*
6. Distinguish between weather and climate. Name the type of Indian climate. *[CBSE 2014]*
7. Mention any six important factors that control climate of a place. *[CBSE 2014]*
8. What is the windward side of the mountain? *[CBSE 2014]*
9. What are 'western cyclonic disturbances'? State its significance. *[CBSE 2014]*
10. Explain ITCZ and its role in development of Monsoon. *[CBSE 2014]*
11. Why do the Monsoon winds change their direction? *[CBSE 2014]*
12. What type of climate does Rajasthan desert have? *[CBSE 2014]*
13. Evaluate spread of monsoon over the Indian sub-continent from Kerala to Jammu and Kashmir. *[CBSE 2014]*
14. Compare and contrast 'Loo' with 'western disturbances'. *[CBSE 2014]*
15. Give any three features of advancing monsoon season in India. *[CBSE 2014, 2015]*
16. Distinguish between advancing monsoon and retreating monsoon. *[CBSE 2014]*
17. What is a Jet Stream? *[CBSE 2015]*
18. 'Monsoon acts as a unifying bond.' Explain. *[CBSE 2015]*
19. Name the areas affected by tropical cyclones in India. *[CBSE 2016]*
20. In which months of the year in India, day temperatures are high while nights are cool and pleasant? *[CBSE 2016]*
21. Explain the onset and advancement of monsoon in India. *[CBSE 2016]*
22. Discuss the main features of the hot weather season of India. Also write its duration. *[CBSE 2016]*