

## Chapter 4: Climate

**Question 1:** Choose the right answer from the four alternatives given below.

**(i) Which one of the following places receives the highest rainfall in the world?**

- (a) Silchar
- (b) Mawsynram
- (c) Cherrapunji
- (d) Guwahati

**(ii) The wind blowing in the northern plains in summers is known as:**

- (a) Kaal Baisakhi
- (b) Loo
- (c) Trade Winds
- (d) None of the above

**(iii) Which one of the following causes rainfall during winters in north-western part of India.**

- (a) Cyclonic depression
- (b) Retreating monsoon
- (c) Western disturbances
- (d) Southwest monsoon

**(iv) Monsoon arrives in India approximately in:**

- (a) Early May
- (b) Early July
- (c) Early June
- (d) Early August

**(v) 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

**Answer :**

- (i) (b) Mawsynram
- (ii) (b) Loo
- (iii) (c) Western disturbances
- (iv) (c) Early June
- (v) (b) Warm days and cold nights

**Question 2:** Answer the following questions briefly.

**(i) What are the controls affecting the climate of India?**

**Answer :** There are six major controls of the climate of any place. They are:

- Latitude
- Altitude
- Pressure and wind system
- Distance from the sea (continentality)
- Ocean currents
- Relief features

**(ii) Why does India have a monsoon type of climate?**

**Answer :** India has monsoon type of climate because of strong influence of the monsoon winds. The summer monsoon causes heavy rainfall when they blow from sea to land. The winter monsoon winds blow from the interior of the continents to the sea and do not cause much rain. There is a seasonal reversal of the wind system 'monsoon'.

**(iii) Which part of India does experience the highest diurnal range of temperature and why?**

**Answer :** Thar Desert is the part of India that experiences the highest diurnal range of temperature. This is present towards western side of India in the state of Rajasthan. This is because it is filled with sand which gets heated up quickly during day and cooled up very quickly during nights. There is no sea closer to this area and hence there is no moderating effect.

**(iv) Which winds account for rainfall along the Malabar coast?**

**Answer :** South-West Monsoon Winds are responsible for rainfall along the Malabar coast.

**(v) What are Jet streams and how do they affect the climate of India?**

**Answer :** Jet streams are high velocity westerly winds in the top most layer of the atmosphere. The westerly flows are responsible for the western disturbances experienced in the north and north-western parts of the country.

The movement of a jet stream affects temperatures and precipitation.

**(vi) Define monsoons. What do you understand by "break" in monsoon?**

**Answer :** The seasonal reversal in wind direction during a year is called monsoon.

Break in monsoon is the absence of rains during the period of monsoon.

**(vii) Why is the monsoon considered a unifying bond?**

**Answer :** The monsoon is considered a unifying bond because: The Indian landscape, its flora and fauna, etc. are highly influenced by the monsoon. These monsoon winds bind the whole country by providing water for agricultural activities. Most of the festivals in India that are related to agricultural cycle may be known by different names in different parts of the country, but their celebration is decided by the monsoon. Year after year, people of India from north to south and from east to west, eagerly await the arrival of the monsoon. The river valleys which carry this water also unite as a single river valley unit.

**Question 3:** Why does the rainfall decrease from the east to the west in Northern India.

**Answer :** The rainfall decreases from east to west in Northern India because the Bay of Bengal branch of Southwest monsoon moves towards north east carrying more moisture and they give heavy rainfall in this region. As they move further towards west, they carry less moisture content with themselves resulting in a decrease in rainfall in the west.

**Question 4:** Give reasons as to why.

**(i) Seasonal reversal of wind direction takes place over the Indian subcontinent?**

**Answer :** Seasonal reversal of wind direction over the Indian subcontinent takes place due to the differential heating and cooling of land and sea . This leads to the seasonal reversal of wind direction over the Indian subcontinent.

**(ii) The bulk of rainfall in India is concentrated over a few months.**

**Answer :** The monsoon begins from the first week of June and advances very rapidly to cover almost the whole country by mid- July. Hence, the bulk of rainfall in India is concentrated over a few months that is mainly from June to September.

**(iii) The Tamil Nadu coast receives winter rainfall.**

**Answer :** The Tamil Nadu coast receives winter rainfall because of the movement of low-pressure condition to the Bay of Bengal. So, the winds now move from sea to land over Tamil Nadu.

**(iv) The delta region of the eastern coast is frequently struck by cyclones.**

**Answer :** This is due to the fact that the low-pressure condition over North Western India, which get transferred to the Bay of Bengal by early November. This shift is associated with the occurrence of cyclonic depression which originated in the history of the east coast of India.

**(v) Parts of Rajasthan, Gujarat and the leeward side of the Western Ghats are drought-prone.**

**Answer :** It is because these places fall in the rain shadow region. Western parts of Rajasthan receive very low rainfall since Aravali Hills lie Parallel to monsoon winds. However, the leeward side of Western Ghats also experience very low rainfall because by the time the rain bearing winds move to this side, they are almost dry.

**Question 5: Describe the regional variations in the climatic conditions of India with the help of suitable examples.**

**Answer :** Despite an overall Unity in the general pattern there are susceptible regional variation in the climatic conditions within the country. For example

### 1) Temperature

- The Mercury occasionally touches 50 degrees Celsius in some parts of Rajasthan whereas it may be about 20 degrees Celsius and welcome in Pahalgam Jammu and Kashmir
- On a winter night, temperature in Dras in Jammu and Kashmir, may be as low as - 45 degree Celsius. However, in Thiruvananthapuram, it is around 20 degrees Celsius.
- In the Thar desert, the day temperatures may rise to 50 degrees Celsius and drop down to nearly 15 degrees Celsius the same night.

### 2) Precipitation

- Precipitation is mostly in the form of snowfall in the upper parts of Himalayas, while 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 but some parts like Tamil Nadu coast get most of the rain during October and November.

**Question 6: Discuss the mechanism of monsoons.**

**Answer :**

- Due to Sun, there is differential heating of land and water.
- The Intertropical Convergence Zone (ITCZ) shifts over Ganga plains during the Summer.
- The high-pressure area, east of Madagascar affects the monsoon.
- Strong vertical air currents and formation of high pressure over Tibetan plateau, the plateau gets intensely heated during the summer.
- Southern Oscillation affects the monsoon.

**Question 7: Give an account of weather conditions and characteristics of the cold season.**

**Answer :** Cold Weather season begins from mid - November in Northern India and stays till February. December and January are the coldest month in the Northern parts of India. The northern parts of India experience high pressure and low temperature. However, Himalayas experience snowfall. A Characteristic feature of winter season is the western disturbances. These are the cyclonic disturbances which are brought to India by westerly jet stream and bring rainfall to Punjab and Haryana, snowfall to Jammu and Kashmir and Himachal Pradesh. This rainfall is very good for the Rabi crop wheat. The Peninsular India does not have a well-defined winter season. Tamil Nadu coast experiences winter rainfall.

**Question 8:** Give the characteristics and effects of the monsoon rainfall in India.

**Answer :**

Characteristic:

- Monsoon is highly unreliable in nature.
- It is unevenly distributed throughout the country.
- The approximate time of arrival of monsoon in India is in the first week of June and it stays till September.
- Monsoons are pulsating in nature.
- It rains for a few days and then it has rainless intervals.

Effects:

- The country faces a twin problem of flood and famine at the same time of the year.
- The monsoon arrives in India with a loud thunder and lightning also known as burst of monsoon.
- Farmers eagerly await the arrival of monsoon in India.
- The river valleys which carried this water also unite as a single river valley unit.
- The Indian landscape is animal and plant life its entire agricultural calendar and festivals revolve around this phenomenon.

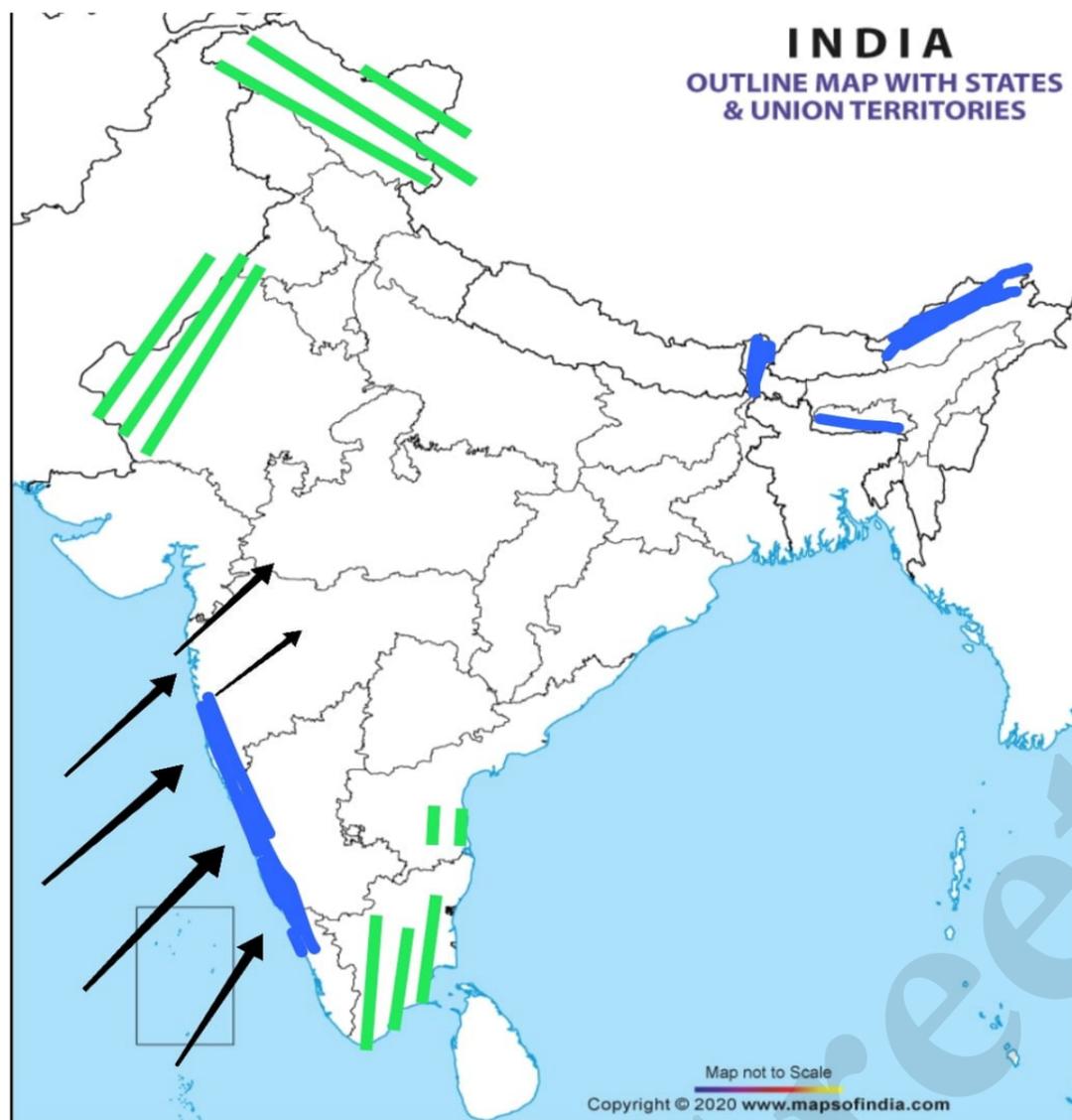
### MAP SKILLS

**Question :** On an outline map of India, show the following.

- Areas receiving rainfall over 400 cm.
- Areas receiving less than 20 cm of rainfall.
- The direction of the south-west monsoon over India.

**Answers :**

- Blue region shows the area receiving rainfall over 400 cm.
- Green region the areas receiving less than 20 cm of rainfall.
- Arrows shows the direction of the south-west monsoon over India.



**FOR DOING IT YOURSELF**

**Table I**

Stations	Latitude	Altitude (Metres)	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual Rainfall
Temperature (°C) Bengaluru	12°58'N	909	20.5	22.7	25.2	27.1	26.7	24.2	23.0	23.0	23.1	22.9	18.9	20.2	
Rainfall (cm)			0.7	0.9	1.1	4.5	10.7	7.1	11.1	13.7	16.4	15.3	6.1	1.3	88.9
Temperature (°C) Mumbai	19° N	11	24.4	24.4	26.7	28.3	30.0	28.9	27.2	27.2	27.2	27.8	27.2	25.0	
Rainfall (cm)			0.2	0.2	-	-	1.8	50.6	61.0	36.9	26.9	4.8	1.0	-	183.4
Temperature (°C) Kolkata	22°34' N	6	19.6	22.0	27.1	30.1	30.4	29.9	28.9	28.7	28.9	27.6	23.4	19.7	
Rainfall (cm)			1.2	2.8	3.4	5.1	13.4	29.0	33.1	33.4	25.3	12.7	2.7	0.4	162.5
Temperature (°C) Delhi	29° N	219	14.4	16.7	23.3	30.0	33.3	33.3	30.0	29.4	28.9	25.6	19.4	15.6	
Rainfall (cm)			2.5	1.5	1.3	1.0	1.8	7.4	19.3	17.8	11.9	1.3	0.2	1.0	67.0
Temperature (°C) Jodhpur	26°18' N	224	16.8	19.2	26.6	29.8	33.3	33.9	31.3	29.0	20.1	27.0	20.1	14.9	
Rainfall (cm)			0.5	0.6	0.3	0.3	1.0	3.1	10.8	13.1	5.7	0.8	0.2	0.2	36.6
Temperature (°C) Chennai	13°4' N	7	24.5	25.7	27.7	30.4	33.0	32.5	31.0	30.2	29.8	28.0	25.9	24.7	
Rainfall (cm)			4.6	1.3	1.3	1.8	3.8	4.5	8.7	11.3	11.9	30.6	35.0	13.9	128.6
Temperature (°C) Nagpur	21°9' N	312	21.5	23.9	28.3	32.7	35.5	32.0	27.7	27.3	27.9	26.7	23.1	20.7	
Rainfall (cm)			1.1	2.3	1.7	1.6	2.1	22.2	37.6	28.6	18.5	5.5	2.0	1.0	124.2
Temperature (°C) Shillong	24°34' N	1461	9.8	11.3	15.9	18.5	19.2	20.5	21.1	20.9	20.0	17.2	13.3	10.4	
Rainfall (cm)			1.4	2.9	5.6	14.6	29.5	47.6	35.9	34.3	30.2	18.8	3.8	0.6	225.3
Temperature (°C) Thiruvananthapuram	8°29' N	61	26.7	27.3	28.3	28.7	28.6	26.6	26.2	26.2	26.5	26.7	26.6	26.5	
Rainfall (cm)			2.3	2.1	3.7	10.6	20.8	35.6	22.3	14.6	13.8	27.3	20.6	7.5	181.2
Temperature (°C) Leh 34° N	34°N	3506	-8.5	-7.2	-0.6	6.1	10.0	14.4	17.2	16.1	12.2	6.1	0.0	-5.6	
Rainfall (cm)			1.0	0.8	0.8	0.5	0.5	0.5	1.3	1.3	0.8	0.5	-	0.5	8.5

**Question 1:** In Table-I, the average mean monthly temperatures and amounts of rainfall of 10 representative stations have been given. It is for you to study on your own and convert them into 'temperature and rainfall' graphs. A glance at these visual representations will help you to grasp instantly the similarities and differences between them. One such graph (Figure 1) is already prepared for you. See if you can arrive at some broad generalisations about our diverse climatic conditions. We hope you are in for a great joy of learning. Do the following activities.

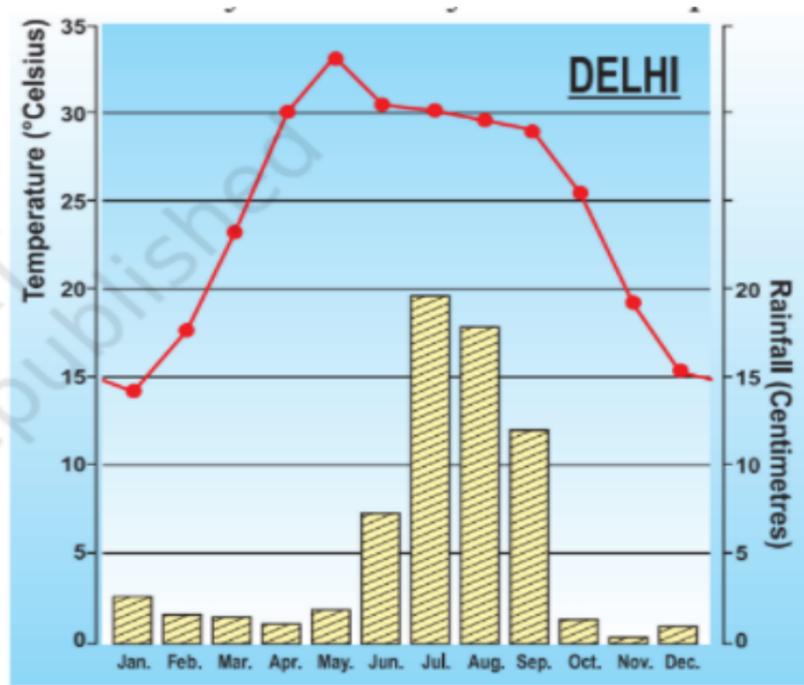
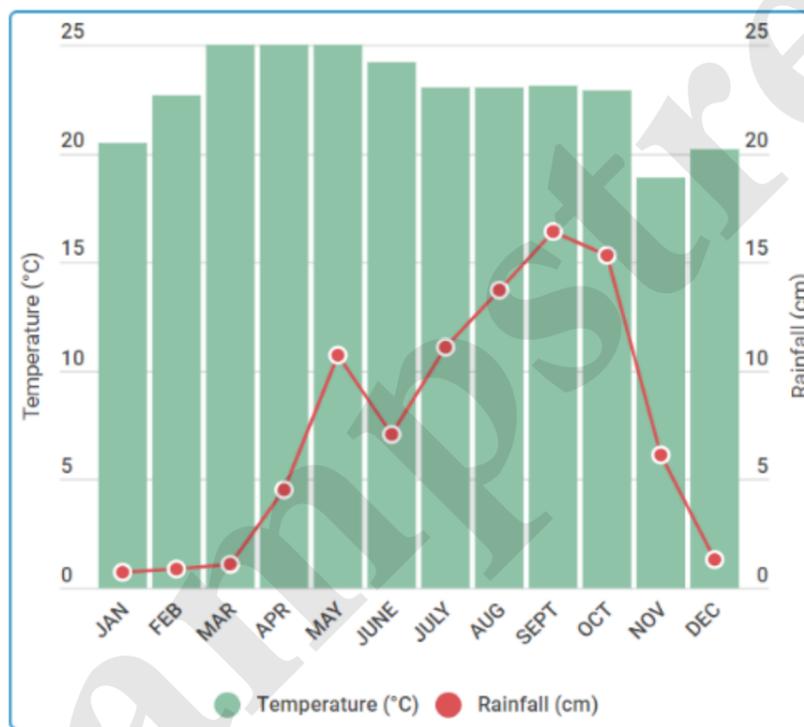


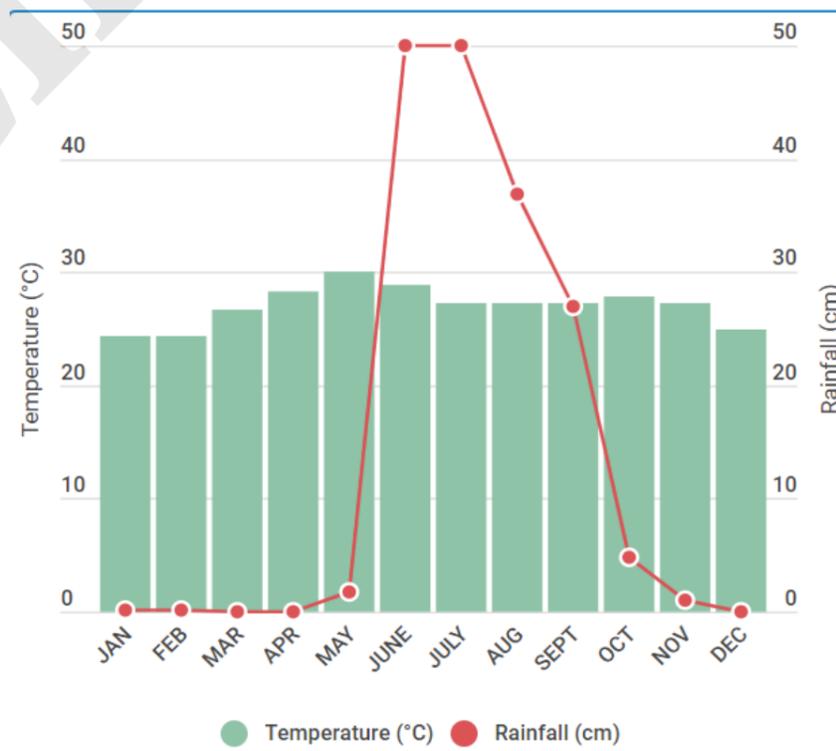
Figure 1 : Temperature and Rainfall of Delhi

Answers :

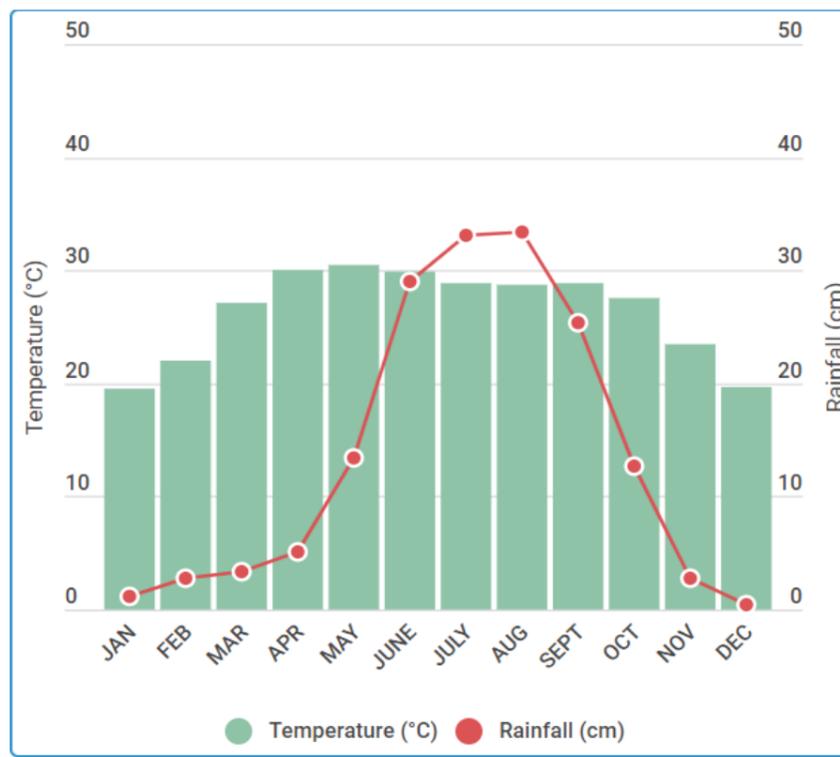
1. Bengaluru



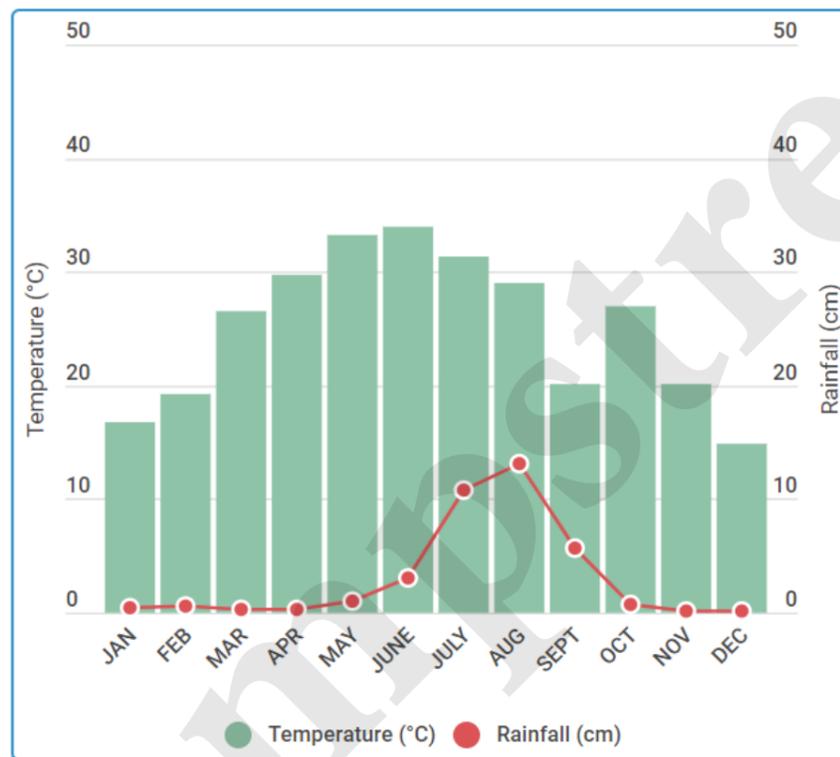
2. Mumbai



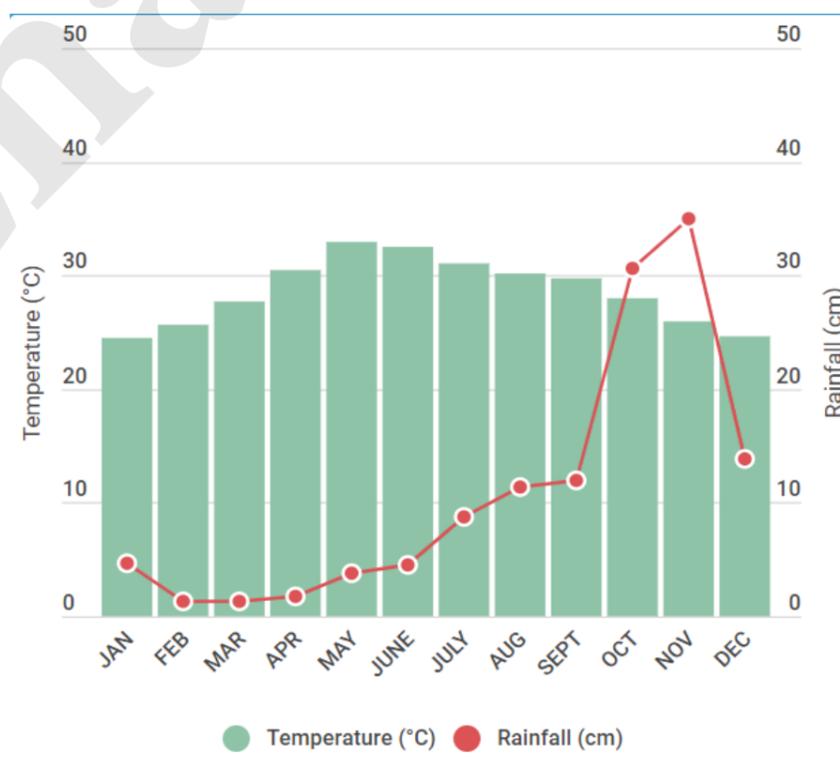
3. Kolkata



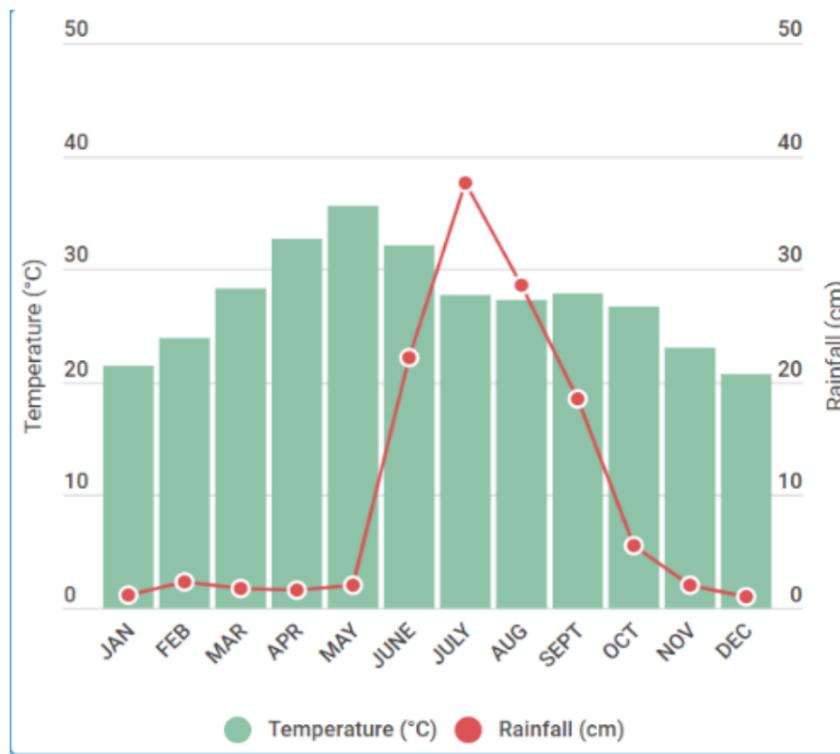
#### 4. Jodhpur



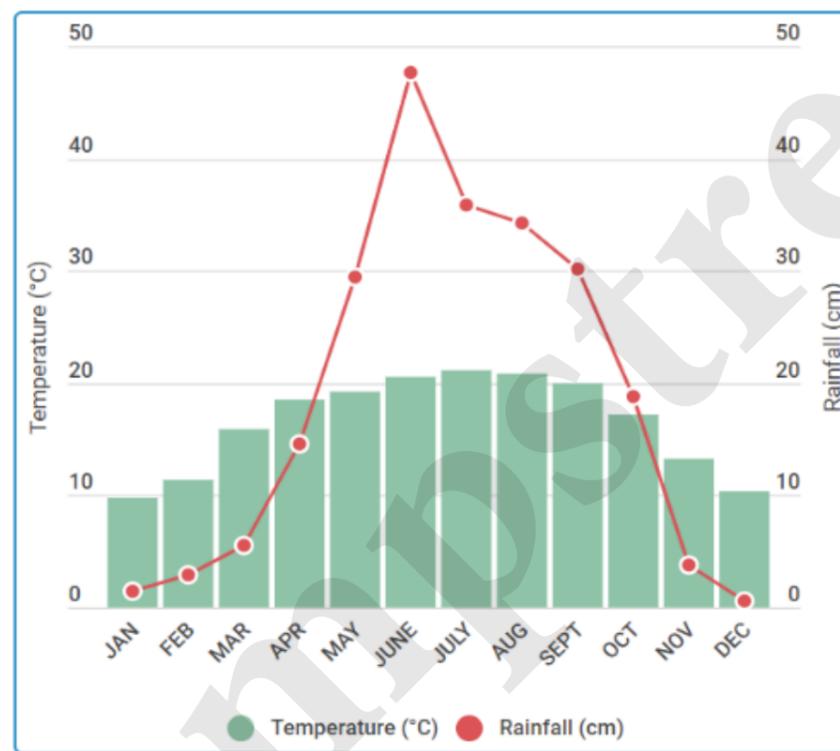
#### 5. Chennai



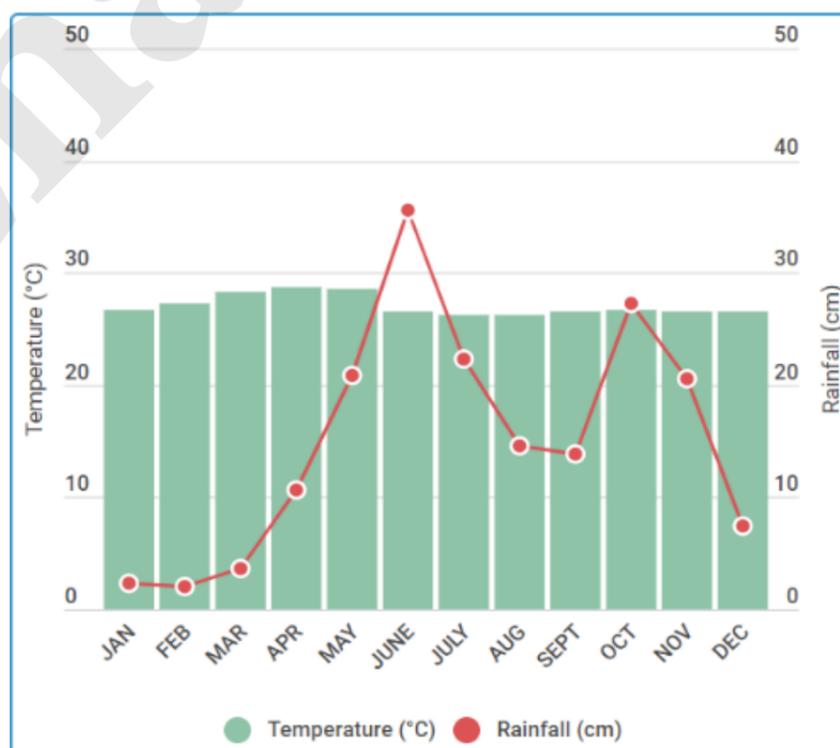
#### 6. Nagpur



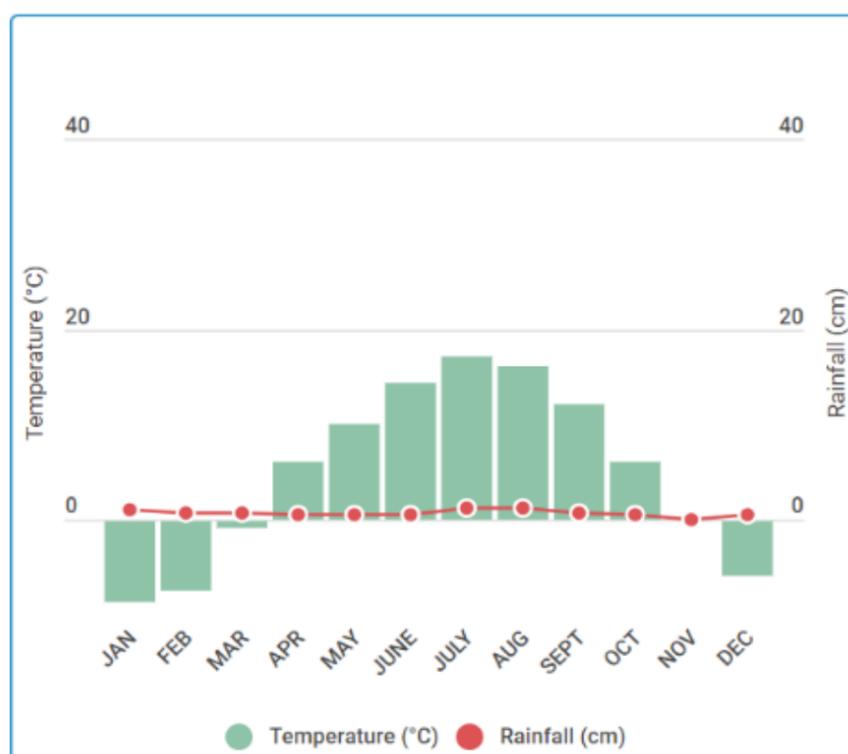
### 7. Shillong



### 8. Thiruvananthapuram



### 9. Leh



**Question 2:** Re-arrange the 10 stations in two different sequences:

(i) According to their distance from the equator.

**Answers :** Thiruvananthapuram (closest) → Bengaluru → Chennai → Mumbai → Nagpur → Kolkata → Shillong → Jodhpur → Delhi → Leh (farthest).

(ii) According to their altitude above mean sea level.

**Answers :** Kolkata (lowest) → Chennai → Mumbai → Thiruvananthapuram → Delhi → jodhpur → Nagpur → Bengaluru → Shillong → Leh (highest).

**Question 3:**

(i) Name two rainiest stations.

**Answers :** Mumbai and Shillong.

(ii) Name two driest stations.

**Answers :** Leh and Jodhpur.

(iii) Two stations with most equable climate.

**Answers :** Chennai and Thiruvananthapuram

(iv) Two stations with most extreme climate.

**Answers :** Leh (Coldest) and Jodhpur( Hottest).

(v) Two stations most influenced by the Arabian branch of southwest monsoons.

**Answers :** Mumbai and Thiruvananthapuram

(vi) Two stations most influenced by the Bay of Bengal branch of southwest monsoons.

**Answers :** Shillong and Kolkata

(vii) Two stations influenced by both branches of the southwest monsoons

**Answers :** Delhi and Kolkata

(viii) Two stations influenced by retreating and northeast monsoons.

**Answers :** Chennai and Bengaluru

(ix) Two stations receiving winter showers from the western disturbances.

**Answers :** Jodhpur and Delhi

**(x) The two hottest stations in the months of**

**Answer :**

(a) February- Thiruvananthapuram and Chennai

(b) April- Nagpur and Chennai

(c) May – Nagpur, Jodhpur and Delhi

(d) June- Jodhpur and Delhi

**Question 4: Now find out**

**(i) Why are Thiruvananthapuram and Shillong rainier in June than in July?**

**Answer :** The south-west monsoons hit Thiruvananthapuram and Shillong around the first of June.

Thiruvananthapuram receives rain from the Arabian Sea branch while Shillong receives rain from the Bay of Bengal branch. After causing rains in these regions, the Arabian Sea Branch moves from south-west to north-east, while the Bay of Bengal branch moves from north-east to north-west. As a result, these regions receive lesser rainfall in the months succeeding June.

**(ii) Why is July rainier in Mumbai than in Thiruvananthapuram?**

**Answer :** The Arabian Sea branch of the south-west monsoons reaches Thiruvananthapuram around the first of June. It reaches Mumbai around the tenth of June. So, Thiruvananthapuram receives much of its rainfall in the month of June, while Mumbai receives much of its rainfall in the month of July.

**(iii) Why are southwest monsoons less rainy in Chennai?**

**Answer :** Chennai is situated on the Western Ghats, and is far away from the western coast. The Arabian Sea branch causes greater rainfall on the western coastline, while the eastern branch passes over Bay of Bengal, on to the north-eastern part of the country. As a result, Chennai gets low rainfall from the south-west monsoons.

**(iv) Why is Shillong rainier than Kolkata?**

**Answer :** Shillong is surrounded by hills and mountains, which causes the Bay of Bengal branch of the south-west monsoons to accumulate in this region. This is the reason why this region experiences heavy rainfall. On the other hand, Kolkata does not lie in a hilly area. Thus, it receives lesser rainfall as compared to Shillong.

**(v) Why is Kolkata rainier in July than in June unlike Shillong which is rainier in June than in July?**

**Answer :** The Bay of Bengal branch of the south-west monsoons reaches Shillong around the first of June. It gradually progresses from east to west. As a result, the amount of rainfall received by this region decreases from June to July. The monsoon winds reach Kolkata later than they arrive in Shillong. Hence, Kolkata receives more rainfall in July.

**(vi) Why does Delhi receive more rain than Jodhpur?**

**Answer :** Due to the decrease in the humidity of the monsoon winds, the amount of rainfall decreases from east to west in northern India. Delhi lies to the east of Jodhpur therefore it receives more rain.

**Question 5: Now think why**

**– Thiruvananthapuram has equable climate?**

**Answer :** Thiruvananthapuram has an equable climate because of it is located near the sea. The sea exerts a moderating influence on the climate of the region.

**– Chennai has more rains only after the fury of monsoon is over in most parts of the country?**

**Answer :** Chennai experiences a lot of rainfall after the fury of monsoon is over in most parts of the country because of the retreating monsoons, and also because of the tropical cyclones.

— Jodhpur has a hot desert type of climate?

**Answer :** Jodhpur lies in the north-western part of the country. The Great Indian Desert is located in this region. Due to the presence of sand, the region experiences high diurnal range of temperature. Hence, Jodhpur has a hot desert type of climate.

— Leh has moderate precipitation almost throughout the year?

**Answer :** Leh experience snowfall due to the extremely low temperatures. As a result, it experiences moderate precipitation almost throughout the year.

— while in Delhi and Jodhpur most of the rain is confined to nearly three months, in Thiruvananthapuram and Shillong it is almost nine months of the year?

**Answer :** Delhi and Jodhpur receive rainfall mostly from the south-west monsoons. Hence, the rains in these regions are confined to the monsoon period. While Thiruvananthapuram and Shillong receive heavy rains during the monsoons, their proximity to the sea makes them experience rains apart from the ones received during the monsoon period.

--In spite of these facts see carefully if there are strong evidences to conclude that the monsoons still provide a very strong framework lending overall climatic unity to the whole country.

**Answer :** factors like wind systems, pressure, latitude, altitude, distance from the sea, presence of mountains, etc., are responsible for the presence of variations across the country, the seasonal arrival and retreat of monsoons provides a kind of climatic unity to the entire country.

### Intext Questions

**Question :** Why most of the world's deserts are located in the western margins of continents in the subtropics?

**Answer :** Most of the world's deserts are located in the western margins of continents in the subtropics because of the tropical easterly winds. The tropical easterly winds become dry by the time they reach the western margins of the continents and so they bring no rainfall. Thus, the region gets no moisture which causes dry conditions leading to formation of deserts.

**Question :** Why the houses in Rajasthan have thick walls and flat roofs?

**Answer :** Because Rajasthan receives less rainfall so these thick walls prevent the heat from entering into the houses while the flat roofs help to retain the little water that has been collected during rainfall.

**Question :** Why is it that the houses in the Tarai region and in Goa and Mangalore have sloping roofs?

**Answer :** Because they are the region of heavy rainfalls therefore the sloping roofs helps them to get rid of the collected rainwater which flows down from the roof to the ground.

**Question :** Why houses in Assam are built on stilts?

**Answer :** Houses in Assam are built on stilts or above the ground level to avoid flooding of houses due to heavy rainfall.

### Activity

**Question :**

# Devastated by deluge

## Haze hazard on road Chennai submerged

### Hint of an early summer

Tuesday: 28.4 °C

HT Correspondent  
New Delhi, January 31

THE MERCURY is soaring, paving the way for what could be an early onset of summer, the weatherman has said. It may touch 30 degrees Celsius within a couple of days in Delhi.

The mercury settled at 28.4 degrees Celsius on Tuesday, nearly six degrees above the average, breaking a decade-old record.

### FOG CHECK

Flight operations at Delhi Airport was normal with the runway visibility at 1,200 metres. However, thick fog in the NCR made driving difficult in the early hours.

**DELHI:** If morning trains, departure of six trains was rescheduled.

**CHENNAI:** Kashi Vishwanath from New Delhi to Varanasi, Utkashi Express from New Delhi to Mumbai, Bhagat Singh Express from New Delhi to Bikaner, Jaisalmer Express from New Delhi to Jaisalmer, Saurashtra Express from Delhi to Saurashtra and Janta Express from Delhi to Howrah.

### Cold comfort for New Year revellers

# A day Mumbai won't forget

SORAB Ghaswala  
Mumbai, December 30

JULY 26, 2005 started off as just another soggy day in Mumbai. But, the rainfall was one of the heaviest Mumbai had seen over the past century. As citizens went about their morning chores, they had no inkling that by dusk the city would be swamped.

By sunset, 435 residents had either drowned in their houses or vehicles as rain-water started rising with alarming rapidity. By night, the city and its people were defeated. No transport, no electricity and no place to go. Mumbai was on its knees.

The weather bureau had predicted just another "normal" rainy day for the city. But it poured 944.2 m.m. (three feet of rain) over 24 hours, the highest in 100 years.

Before 26/7, Mumbaiites, used to about 15 cm of rain, would tease, "What's a Mumbai monsoon without some days of disruption?" On 26/7, the joke was on them.

G.G. Shekhar  
Chennai, December 30

IF 2004 was the year of the tsunami, 2005 turned out to be the year of rains and floods in Tamil Nadu. Unlike the tsunami, which affected a belt of six coastal districts in Tamil Nadu and Pondicherry, the floods wreaked havoc across the state.

In five furious spells, the last two being cyclones that weakened before hitting the coast, the rain gods lashed Tamil Nadu from October to December with almost every district drenched and drowned.

Chennai, which was haunted as an alternative to Bangalore, found itself floating on water on three occasions. The rains and floods killed 100

people. Fields were inundated, crops damaged, roads looked like backwaters. And this was the city that cried for water in summers.

The rains showed up the state's failure to liberally tap the resources as 90 tmc of water flowed into the sea. Irrigation tanks and reservoirs were breached. The suburbs were the worst hit as many localities remained under water from October to December.

When the relief efforts began, that brought calamity of another order. Rush for rations resulted in one of the most avoidable tragedies as 40 people were killed in stampedes outside two relief centres.

This was one rain cloud

### Fog is in, get ready for disruptions

A thin blanket of fog enveloped the city in the early hours of Friday. Visibility was reduced to 500 metres in most areas. There

# Freezing Kashmir

RASHID Ahmad  
Srinagar

### Celsius up, temperature takes normal course

IF YOU are in Kashmir, you will be surprised to hear that the temperature has risen to 10 degrees Celsius.

The weather bureau has said that the temperature has risen to 10 degrees Celsius.

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## After 2 days of biting cold, sun shines

### Expect a ballistic winter after western winds are in

HT Correspondent  
New Delhi, November 30

ACROSS NORTH India, it's a winter of woes. Amritsar is icy with a minimum temperature of 5°C. Snowfall, of up to 76 cm, has blanketed Srinagar. In Delhi, it's still a pleasant nip. This mild wintry condition, however, will definitely not last, says the Met.

In a day or two, winds from Afghanistan, known as western disturbances, will lash the Capital. Conditions are perfect for harsh winter ahead, said Met officials, who have declared "official winter" in Delhi from Thursday.

"Wednesday's morning mist, moisture in the air, low night temperature and the cold winds that hit the city by evening are enough indications for the weather department to declare the onset of winter a day in advance," an official said.

Winter may have been delayed in much of north India by about a fortnight, but it has set in on time in Delhi, he added.

In vast swathes of north India, the past week has been colder than average. "Winter trying to make up for the lost time," the weatherman added in a lighter vein. With temperatures consistently below the average for this year, there is a spectre of this year's winter being colder than usual.

In the ski resort of Gulmarg, there's heavy snow. Night temperature dipped four degrees past normal and Churu in Rajasthan has become bitterly cold. But Delhi continues to be comfortable. Night temperature on Wednesday hovered around 10°C.

"The western disturbances are unpredictable. They might hit Delhi within the next 72 hours or may not for another week. But it is time to get your woollens out. Temperatures will drop progressively in the days to come," said Delhi Met chief R.D. Singh. With mornings getting misty, the dreaded fog may not be far behind. And with pollution levels at a five-year high, the fog this time may be worse.

Delhi has been colder this fortnight compared to the same period last year. The temperature pattern is similar to the record-

### So, it's officially winter in the Capital

#### Delhi

Max: 25°C, Min: 8 In a day or two, winds from Afghanistan—western disturbances—will lash the Capital. Winter declared from Dec 1.

#### Srinagar

Max: 8°C, Min: -3 It's a sea of snow there. Like much of Kashmir, it is experiencing sub-zero temperatures and bitterly cold weather.

#### Amritsar

Max: 23°C, Min: 5 The great plains are extremely cold. The coming days will be worse with expected sub-zero temperatures.

#### Shimla

Max: 18°C, Min: -4 The Himachal capital is blanketed in heavy snow. Higher reaches are even colder.

breaking winter of 2005 — the worst in 40 years.

The Met office says it cannot forecast so far ahead in future. "It may not be record breaking winter but it will definitely be chillier than an average winter," said a weather official.

The official pointed out that snowfall in Kashmir and Shimla has been heavier and earlier than usual. The temperature in Shimla dropped two degrees below normal. Srinagar at 4.5°C was cold too.

Northerly cold winds have struck Rajasthan, affecting normal life last night with Churu and Sriganganagar shivering at 5°C each, about two-three degrees below normal. Nights in Jodhpur, Bikaner, Ajmer and Jaipur divisions have become harsh.

(i) On the basis of the news items above, find out the names of places and the seasons described.

**Answer :** Chennai- rainy season, Mumbai- rainy season, Kashmir-winter, Delhi-summer, Srinagar- winter, Amritsar- winter, Shimla- winter.

(ii) Compare the rainfall description of Chennai and Mumbai and explain the reasons for the difference.

**Answer :** In Chennai, much of the fury was unleashed by the Adyar river. As water from the Chembarambakkam reservoir was released into the river, whose depth and width had shrunk due to rapid urbanization and encroachments, it disgorged water into the neighborhoods along the banks.

In Mumbai, the thick slush-filled stench-emanating rivulet, the Mithi, which stretches from Powai Lake in the eastern suburbs to the Mahim Creek in the western part, was once a river that flowed out into the Arabian Sea. Like Adyar, Mithi too was lined with encroachments.

Owing to massive concretization of roads and unplanned constructions that have flattened the natural topography, almost 90 to 100 per cent of the rainwater in both cities drains off into the stormwater drains instead of being absorbed into the ground.

(iii) Evaluate flood as a disaster with the help of a case study.

**Answer :**  
**Kerala flood case:**

The Indian state of Kerala receives some of India's highest rainfall during the monsoon season. However, during 2018 the state experienced its highest level of monsoon rainfall in decades. According to the India Meteorological Department (IMD), there was 2346.3 mm of rainfall, instead of the average 1649.55 mm.

Kerala received over two and a half times more rainfall over the average for August. Between August 1 and 19, the state received 758.6 mm of rainfall, compared to the average of 287.6 mm, or 164% more. This was 42% more than during the entire monsoon season.

In some areas, floodwater was between 3-4.5m deep. Floods in the southern Indian state of Kerala killed more than 410 people since June 2018 in what local officials said was the worst flooding in 100 years. Many of those who died had been crushed under debris caused by landslides. More than 1 million people were left homeless in the 3,200 emergency relief camps set up in the area.

Parts of Kerala's commercial capital, Cochin, were underwater, snarling up roads and leaving railways across the state impassable. The state's airport, which is used by domestic and overseas tourists, was closed, causing major disruption.

Local plantations were inundated by water, endangering the local rubber, tea, coffee and spice industries.

Schools in all 14 districts of Kerala were closed, and some districts have banned tourists because of safety concerns.

Maintaining sanitation and preventing disease in relief camps housing more than 800,000 people was a significant challenge. Authorities also had to restore regular supplies of clean drinking water and electricity to the state's 33 million residents.

Champpstreet