1. DEFINITIONS FROM TOPO MAPS

1. REPRESENTATIVE FRACTION (RF): It is the ratio between the distances on the map to its corresponding distance on actual ground. The RF on this map is 1:50,000.

2. SCALE: Scale is the ratio between the distance of any two points on the map and the actual distance of the same points on the ground.
The scale of the given map extract is 2 cm: 1 km or 1:50,000.

3. CONTOUR: Contours are imaginary lines drawn on maps, joining all places with the same height above sea level.

4. CONTOUR INTERVAL: The interval between two consecutive contours is called contour interval (*it is a constant 20 mts in your toposheets.)

5. INDEX CONTOUR: Contour lines are thickened at regular intervals to make it easier to read contours. For example at every 100 mts the contour line is made darker. The darker lines are called Index Contours.

6. TRIANGULATED HEIGHT: It is the height of a place which has been calculated using trigonometry, represented by a small triangle e.g. - 540π

7. SPOT HEIGHT: The height of random places between contours shown with a dot. Eg - .425

8. BENCH MARK - Height of a place actually marked on a stone pillar, rock or shown on a building as a permanent reference. It is written as BM 200 m.

9. RELATIVE HEIGHT: Relative height is the height of a feature with reference to the height of the surrounding land and NOT to sea level.
It is represented by the height with a small ‘r’ eg –12r.

10. ROCK OUTCROP: It is a portion of rock jutting above the surface of the earth.

11. SHEET ROCK: Large areas of rock where the overlying soil layers have been eroded and removed due to mechanical weathering.

9 STONY WASTE: A large area usually in arid/semi arid regions where the finer sand/soil has blown away leaving a surface covered with boulders, stones and pebbles.

10. BROKEN GROUND: A relief feature found mostly in dry regions around rivers and streams. It is land around river, which is totally weathered (exfoliated) due to alternate cooling and heating.

11. FIRELINE: A cleared pathway in a forest to prevent the spread of forest fires.

12. MIXED FOREST: A forest with more than two varieties of trees growing in close proximity to each other.

13. OPEN JUNGLE: A forest where trees are widely scattered.

14. DENSE JUNGLE. : A forest where trees grow very close to each other.

15. OPEN SCRUB: Scrub is vegetation found in regions with less than100 cms of rainfall. Therefore it indicates a dry region.

16. BRACKISH: It is a well, which has water with very high salt content – generally unfit for drinking purposes.

17. CAUSEWAY: It is a raised road over a small water body. (Usually a road used only in the non rainy months.}

18. CUTTING: A portion of land, which has been cut in order to make land available for transport routes. (it is indicative of a rocky region)

19. EMBANKMENT: They are raised rock or soil filled constructions on which roads/railway tracks are built. Also made near tanks and rivers to prevent flooding.

20. FORM LINES: Form lines are contour lines, but show only approximate heights above sea level as they are used to indicate the elevations of the area which are not accessible for proper survey. Hence they are drawn as broken lines and are called 'form lines'.

21. Q.C. Q.D., OC, OD,PQ, ETC : These are alphabetical codes used to represent the biggest grid sq. of 10,000 square kms. The Govt of India has adopted metric system for all measurements. All the ordnance survey maps issued by the Survey of India were drawn to the scale 2 cm = 1 km. In this system, the surveyed territory is divided into 100km X 100 km squares, and each square is denoted by English alphabets. For example, OC, OD, PQ, PG, etc. This system of map drawing is known as National Grid Reference.

22. LAYER TINTING: (colouring)
While spot heights show the height of the land, they only do so at certain points. To provide an overall image which conveyed height, a technique called layer tinting was developed. Layer tinting uses different colours (or shades) to represent different heights. It is a mapping convention for darker colours to signify greater height. When using layer tinting, green is often used for low land, yellow for higher land and brown for the highest land. Layer tinting is most commonly found on physical maps. While layer tinting is useful, it does not show the detailed shape of the land.

23. DEP: It is a depression often found in sandy areas where the wind, having blown away the sand, leaves a hollow or a depression.

24. HACHURING: Early cartographers attempted to show surface features on maps by using the technique of hachuring. Hachures use short lines of varying thickness to show the shape and slope of the land. In accordance with this technique, the steeper the slope is, the thicker the lines are which represent it. While hachuring was initially innovative for its time, it gradually began to be replaced since the actual height of the land was not depicted.

25. LIME KILN OR BRICK KILN: These are open furnaces where limestone is purified or bricks are baked for construction purpose.

26. HILL SHADING: Hill shading resembles a light and shadow effect. Valleys and the sides of mountains appear as though they are cast in shadow. This is a visually striking method, which is ideal for providing an overall view of the relief of an area. Hill shading, however, does not show height which means that it is no more accurate than hachuring.

1. Climate of India

1. Name
a. One region which gets rainfall due to the western disturbances.
North-west India (Punjab)
b. A hot local wind that blows in summer in the northern plains.
Loo
c. A region in India which gets most of its rainfall during winter.
Tamil Nadu
d. A place in India which receives the heaviest rainfall in the world.
Mawsynram
e. A region which receives very little or no rainfall due to the south west monsoon season.
Tamil Nadu /Coromandal coast
f. Winds that bring rain to the coast of Tamil Nadu.
North-east monsoon
g. Devastating storm occurring in West Bengal in summer.
Kalbaisakhi
h. State in India which receives 'mango showers'.
Kerala
i. Area from where the 'Western disturbances' originate.
Mediterranean Sea
j. Two branches of the south west monsoon.
Arabian Sea Branch, Bay of Bengal Branch
k. State where the monsoon arrives first
Kerala
l. Place where monsoon arrives first
Kanyakumari
m. Area of intense low pressure in the northern plains in summer
Low Pressure Trough
n. Two states in India frequently struck by tropical cyclones
West Bengal and Orissa
o. Months in which cyclones originate in the Andaman Sea.
October and November

2. What do you understand by the following?
a. Climatic divide
A bold relief feature which has two different types of climates on its either side is called a climatic divide.
b. Annual range of temperature
The difference between highest monthly mean temperature and the lowest monthly mean temperature is called annual range of temperature. In other words, it is the difference in mean temperature of the hottest month subtracted by the mean temperature of the coldest

month. Annual Range of temperature = Mean temperature of hottest month – mean temperature of the coldest month

c. Moderating influence of the sea

In coastal areas, land is in contact with the sea. Hence, the heat absorbed by the land in the day is
transferred to the sea. Vice-versa, the heat absorbed by the sea is transferred back to the land in the
night. As a result, places in coastal areas do not become very hot in the day or very cold in the night. This phenomenon is called moderating influence of the sea.

d. Equable climate

If the annual range of temperature is very less (<5° C), a place is said to have equable climate mostly found in the coastal areas.

e. Extreme climate

If the annual range of temperature is quite high (>20° C), a place is said to have extreme climate normally found in interior areas. Also known as continental climate.

f. Loo

Loo is a local name given to hot and dry winds which blow into the low pressure trough created in the northern plains in summer.

g. Kal Baisakhi

Kalbaisakhi (Calamity in the month of harvest or Baisakh) is the name given to violent storms hitting the coast of West Bengal in April and May. These cause widespread destruction.

h. Mango Showers

Pre-monsoon showers in Kerala that help in ripening of mangoes are known as mango showers.

i. Western disturbances

Western Disturbance is the term used in India, Pakistan, Afghanistan and Nepal to describe cyclones which bring sudden winter rain and snow to the north western parts of the Indian subcontinent. This precipitation pattern is driven by the meeting of the warm Westerlies with the cool dry NE monsoons. The moisture in these storms usually originates over the Mediterranean Sea.

j. Retreating monsoon

After September 23, the sun moves south of the equator due to which India becomes cooler. The low pressure existing over the Indian sub-continent is gradually replaced by high pressure. As a result, the monsoon decreases in intensity. The methodical withdrawal of the south west monsoon from the Indian sub-continent is called retreating monsoon or retreating south-west monsoon.

k. Orographic Rainfall

When a cloud is encountered by a mountain, it rises on the windward side. The temperature towards the top is less on account of altitude. At a lesser temperature, air loses its moisture carrying capacity and the excess moisture is given off as rainfall. This phenomenon is called orographic or relief rainfall.

l. North East Monsoon

In winter, winds blow from land to sea. In the Indian sub-continent, winds blow from India into the Indian Ocean from north-east to south-west in accordance with Ferrell's Law. This seems to be the return of the south-west monsoon as is therefore named as north east monsoon. The phenomenon is also sometimes stated as reversal of monsoons.

m. October Heat

In the month of October due to high temperature and humidity the weather becomes oppressive and called October heat. The retreat of the monsoon is marked by clear skies and rise in temperature but the land is still moist, so it becomes very oppressive - hot and moist.

3. State three characteristics of the monsoon kind of climate.

Following are the three characteristics of the monsoon kind of climate.

a. There is a distinct rainy season from June to September

b. Rainfall occurs due to seasonal winds called monsoons.

c. Rainfall is sudden, unpredictable and uncertain.

4. Why is India sometimes said to have a 'sub-tropical' kind of climate?

The Tropic of Cancer divides India into two equal halves. The southern half is completely in the Torrid Zone while the northern Half is completely in the Temperate Zone. Yet, the climate of places in both the northern and southern region is not very different from each other on account of the Himalayas and the monsoons. It is for this reason that India is sometimes said to have a 'sub-tropical' kind of climate which means that the typical tropical kind of climate has been modified by the
monsoons.

5. List three reasons for the extremes prevalent in the climate of India.

Three reasons for the extremes of climate prevalent in India are

a. Physical Features (rainfall)

b. Distance from the Sea (annual range of temperature)

c. Altitude (annual mean temperature)

6. List the factors affecting the climate of India.

Factors affecting climate of India are

Major factors

1. Latitude
2. Physical features like Himalayas, Arakan Yoma Range, Aravallis, Western Ghats etc.
3. Distance from the sea
4. Altitude

Minor Factors

1. Western Disturbances
2. Conditions surrounding India
3. Jet Streams

7. What is the influence of the following on the climate of India?

a. The Himalayas

b. The Arakan Yoma Range

c. The Aravallis

The Himalayas affect the climate of India in the following ways.

a. They prevent cold winds coming from the north.

b. They force the monsoons to shed their moisture over India.

c. They also cause the western disturbances to cause rainfall in north-west India and deflect them into the Bay of Bengal making the north-east monsoon stronger.

8. Name the months of the following.

a. Cold weather season – December, January and February

b. Hot weather season – March, April and May

c. South West Monsoon season – June, July, August and September

d. Retreating monsoon season – October and November

9. Give reasons for the following.

a. Thiruvananthapuram is warmer than Agra in December.

Thiruvananthapuram is closer to the equator than Agra. For this reason, it is warmer than Agra in December, when the sun rays are directly overhead in the southern hemisphere.

b. Deccan plateau is cooler than the northern plains in summer.

The Deccan plateau is higher than the northern plains. As altitude increases, temperature decreases. Hence, it is cooler than the northern plains in summer.

c. The south west monsoon approaches Uttar Pradesh from the east.

The winds which bring rainfall to Uttar Pradesh are the Bay of Bengal Branch of the south-west monsoons which upon deflection by the Arakan Yoma Range, travels north-westward into India. So, these winds would approach Uttar Pradesh from the east.

d. Delhi has a higher annual range of temperature than Mumbai.

Delhi is in the interior of India where the moderating influence of the sea is absent. Mumbai on the other hand lies closer to the sea. Hence, the annual range of temperature in Delhi is more than the annual range of temperature in Mumbai.

e. Shillong experiences lesser rainfall than Mawsynram.

Mawsynram lies in the funnel shaped depression caused by the Khasi range in Meghalaya. The Bay of Bengal branch of monsoons is trapped in it, causing heavy rainfall. Shillong, on the other hand, lies on the leeward side of the Khasi hills and gets lesser rainfall.

f. Punjab gets winter rainfall

Punjab lies on the foothills of the Himalayas. The western disturbances originating over the Mediterranean Sea in winter travel eastward towards India where are forced to shed their moisture in Punjab. Therefore, Punjab receives rainfall in the winter.

g. Bikaner has a high diurnal range of temperature.

Bikaner lies on the edge of the Thar Desert. The land has little vegetation cover so it absorbs heat quickly in the day and loses it quickly in the night. For this reason, it is very hot during the day and quite cold during the night. Hence, Bikaner is said to have a high diurnal range of temperature.

h. Thar desert gets little or no rainfall

The Aravallis are parallel to the direction of the Arabia Sea branch of the South West Monsoon. Hence there is no rainfall in Rajasthan due to this branch. On the other hand, the Aravallis block the Bay of Bengal branch towards their east which is why there is little or no rainfall in the western part of Rajasthan where the Thar Desert lies.

i. Western Rajasthan is the region where the pressure is lowest in May.

Rajasthan is away from the moderating influence of the sea. As a result, the monthly mean temperature is very high in May and June. The hot air rises and creates a regime of extremely low pressure.

j. In spite of extremely low pressure over the northern plains in summer, monsoon winds are not drawn into the Indian sub-continent.

As the peninsular plateau is at an altitude, the summer temperatures are lower than in the northern plains. This creates an area of slightly higher pressure over the peninsular plateau which does not allow the monsoons to come over India.

k. The monsoon winds in India are divided into two components.

Due to the triangular shape of the Indian peninsula and the fact that the western part of the peninsular tip is higher, the south-west monsoon winds are divided into two components – the Arabian Sea branch and the Bay of Bengal branch.

l. South East Trade winds are attracted into India.

In June, India becomes extremely hot which is why the entire Indian subcontinent becomes a region of extremely low pressure. This causes the South East Trade Winds (which usually blow only till the equator) to cross the equator, be deflected due to Coriolis force and enter India.

m. Tamil Nadu gets winter rainfall.

Tamil Nadu lies on the leeward side of the Western Ghats because of which it does not receive any rainfall in summer due to the south-west monsoon. However, in winter, the north-east monsoon picks up moisture from the Bay of Bengal and sheds rainfall in Tamil Nadu.

n. Mumbai receives more rainfall than Chennai.

Mumbai lies on the windward side of the Western Ghats where the south-west monsoons strike first and are forced to shed their moisture. Chennai lie on the east which does not receive any rainfall due to the south-west monsoon. The rainfall in winter is substantially less than Mumbai.

o. Mangalore and Chennai are on the same latitude yet both these cities receive rainfall in different months.

Mangalore gets rainfall between June to September because it is on the windward side of the Western Ghats. It receives rainfall from the south-west monsoon winds. Chennai which lies in the rain-shadow area of the Western Ghats gets a little rainfall from the south-west monsoon winds. It gets rainfall from the north-east winds in winter because Chennai faces the north-east monsoon. It is situated on the windward side of the Eastern Ghats.

p. North Eastern Part of Kashmir receives practically no rainfall.

North Eastern Kashmir lies on the other side of the mighty Himalayas. None of the branches of the south-west monsoon are able to cross them and as a result, north-east Kashmir receives practically no rainfall.

q. Patna gets heavier rainfall than Agra.

Patna is in the middle Ganga valley while Agra is in the upper Ganga Valley. By the time the Bay of

Bengal branch of the south-west monsoon reaches Agra, it has lost much of its moisture and therefore,

Agra receives lesser rainfall than Patna.

r. Mawsynram receives the highest rainfall in the world.

Mawsynram lies in the funnel shaped depression caused by the Khasi range in Meghalaya. The Bay of Bengal branch of monsoons is trapped in it and causes heavy rainfall.

s. The monsoon rain is unevenly distributed over India.

Because of the uneven relief of India due to the presence of a number of hill ranges, the monsoon is not able to shed its moisture evenly over India. Windward sides receive more rainfall and leeward sides receive less rainfall.

t. Most of the rainfall of the Indian sub-continent is received only in four months of the year.

In spite of being in the Trade Wind belt, India is unaffected by the Trade Winds due to the presence of the Himalayas. Instead, India receives rainfall due to the monsoon winds which are seasonal in nature and are on-shore winds only in four months – June to September. For the remaining part of the year, they are off-shore winds and do not bring rainfall.

u. The Indo-Gangetic plain gets some rain during December and January.

The western part of the Indo-Gangetic Plains receives rainfall due to the western disturbances originating over the Mediterranean Sea in December and January.

v. Nainital is cooler than Agra.

Nainital is cooler than Agra because Nainital is at a higher altitude (2700 m) than Agra

w. The Coromandel Coast gets most of its rain in the winter season.

Coromandel Coast lies on the leeward side of the Western Ghats because of which it does not receive any rainfall in summer due to the south-west monsoon. However, in winter, the north-east monsoon picks up moisture from the Bay of Bengal and sheds rainfall on the Coromandel Coast.

10. Why do the monsoons retreat?

After the monsoons have shed their moisture over India, the land becomes cool. In addition, the sun now moves from the equator towards the Tropic of Capricorn. India becomes cooler and the initial low pressure which existed over the Indian sub-continent now changes to high pressure. As a result, the intensity of the south-west monsoons decreases and they follow a systematic withdrawal from India. The south-west monsoon then called 'Retreating South West Monsoon'.

11. Explain the mechanism of the westerly depressions.

In winter, the sub-tropical high pressure belt moves over the Mediterranean Sea, *which* is why the Westerlies blow in the form of shallow cyclonic depressions from the Mediterranean Sea north-eastward into Europe. The north-western part of the Indian sub-continent lies in the Westerlies wind belt. These western disturbances arrive in this region and cause winter rainfall.

12. State the characteristics of the following.

a. The advancing south west monsoon season.

Following are the characteristics of the advancing south-west monsoon season.

1. They occur from June to September.
2. They give rainfall to almost entire India.
3. They are very strong and moisture laden.

b. The retreating south west monsoon season.

Following are the characteristics of the retreating south-west monsoon season.

1. They occur in October and November.
2. They give rainfall only to peninsular India.
3. They are not strong and contain little moisture.

13. List three differences between

a. The Retreating south west monsoons and the North East monsoons.

	Retreating south west monsoon	**North East monsoon**
Months	October and November	December, January and February
Direction	From South West to North East (sea to land)	From north-east to south-west (land to sea)
Rainfall	West Coast	East Coast

b. The Arabian Sean branch and the Bay of Bengal Branch

	Arabian Sea branch	**Bay of Bengal Branch**
Source of moisture	Arabian Sea	Bay of Bengal
Direction	South west to north east	South-east to north-west
Rainfall	Southern &Western India	Eastern and Central India

c. Equable and Extreme climate

	Equable Climate	Extreme climate
1	Moderating influence of sea present	Moderating influence of sea absent
2	Characteristic of coastal areas	Characteristic of interior regions
3	Annual Range of Temperature is low	Annual Range of temperature is high

d. Precipitation and Rainfall

	Precipitation	Rainfall
1	May occur in many forms such as snow, hail, sleet, etc.	Occurs as descending droplets of water
2	Occurs in specific areas only	Occurs almost everywhere
3	Cloud formation not necessary in some cases	Cloud formation essential

14. State the economic importance of the following.

a. Relief rain in Tamil Nadu

Relief rainfall in Tamil Nadu (Palni and Shevaroy hills) is beneficial for the millets and rice crops.

b. Cyclonic Rainfall in Punjab

Cyclonic rainfall in Punjab during winter is highly useful for rabi crops in Punjab, Haryana and Western Uttar Pradesh.

c. Mango Showers in Kerala

Mango showers on the Kerala coast are early Pre-monsoon showers before the south-west monsoons which are good for the mango trees.

15. State the salient features of the monsoon rainfall in India.

Following are the salient features of the monsoon rainfall in India.

a. It occurs in mostly in summer

b. It is erratic and unpredictable.

c. It is very unevenly distributed

d. The rainfall is mainly orographic (relief) in nature.

e. Rainfall also occurs due to cyclones and convection currents.

16. Study the climate data given below and answer the questions that follow.

Station	Months	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
A	Temp(°C)	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	1.3	1.8	7.4	19.3	17.8	11.9	1.3	0.2	1.6
B	Temp(°C)	24.4	24.4	26.7	26.7	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	24.8	4.8	1.0	----

1. Calculate the annual rainfall for Station A.

The annual rainfall for Station A is 67.6 cm. it is calculated by adding the rainfall received in a year.

2. What is the annual range of temperature at Station B?

The annual range of temperature at Station B is 5.6 ˚C. it is the difference between the highest and the lowest temperatures in a year.

3. In which hemisphere do you think Station A lies?

Station A lies in the Northern Hemisphere. This is because it has summers in June and winter in December.

4. Which of these Stations has an equable climate?

Station B has an equable climate because the annual range of temperature is small (5.6° C). Summers are not very hot and winters are not very cold.