

NCERT MOST IMPORTANT QUESTIONS CLASS – 11

GEOGRAPHY CHAPTER- 10 WATER IN ATMOSPHERE

Question 1.

What is convectional rain?

Answer:

Convectional Rain: The air on being heated, becomes light and rises up in convection currents. As it rises, it expands and loses heat and consequently, condensation takes place and cumulous clouds are formed. With thunder and lightening, heavy rainfall takes place but this does not last for long.

Question 2.

What factors influence the process of condensation?

Answer:

Condensation is influenced by the volume of air, temperature, pressure and humidity.

Condensation takes place:

- when the temperature of the air is reduced to dew point with its volume remaining constant;
- when both the volume and the temperature are reduced;
- when moisture is added to the air through evaporation.

Question 3 .

Name and define three important types of rainfall.

Answer:

On the basis of origin, rainfall may be classified into three main types:

1. The convectional rain
2. Orographic or relief rain and
3. Cyclonic or frontal rainfall

1. Convectional rain: The air on being heated, becomes light and rises up in convection currents. As it rises, it expands and loses heat and consequently, condensation takes place and cumulous clouds are formed. With thunder and lightening, heavy rainfall takes place but this does not last for long.

Such rain is common in the summer or in the hotter part of the day. It is very common in the equatorial regions and interior parts of the continents, particularly in the northern hemisphere.

2. Orographic rain: When the saturated air mass comes across a mountain, it is forced to ascend and as it rises, it expands; the temperature falls, and the moisture is condensed. In this sort of rain the windward slopes receive greater rainfall. After giving rain on the windward side, when these winds reach the other slope, they descend, and their temperature rises. Then their capacity to take in moisture increases and hence, these leeward slopes remain rainless and dry. The area situated on the leeward side, which gets less rainfall is known as the rain-shadow area. It is also known as the relief rain.

3. Cyclonic rainfall: These rains take place in low pressure areas where air moves from low pressure area to high pressure area and this movement brings rainfall.

Question 4.

Explain the process of evaporation.

Answer:

Evaporation is a process by which water is transformed from liquid to gaseous state. Heat is the main cause for evaporation. The temperature at which the water starts evaporating is referred to as the latent heat of vapourisation. Increase in temperature increases water absorption and retention capacity of the given parcel of air. Similarly, if the moisture content is low, air has a potentiality of absorbing and retaining moisture. Movement of air replaces the saturated layer with the unsaturated layer. Hence, the greater the movement of air, the greater is the evaporation.

Question 5.

Explain cyclonic rain.

Answer:

Air expands when heated and gets compressed when cooled. This results in variations in the atmospheric pressure. The result is that it causes the movement of air from high pressure to low pressure, setting the air in motion. Air in horizontal motion is wind. Atmospheric pressure also determines when the air will rise or sink. The wind redistributes the heat and moisture across the planet, thereby, maintaining a constant temperature for the planet as a whole. The vertical rising of moist air cools it down to form the clouds and bring precipitation. It is called cyclonic rain.

Question 6.

Differentiate between

Answer:

(i) Precipitation and Condensation.

Basis	Precipitation	Condensation
Meaning	After the condensation of water vapour, the release of moisture is known as precipitation. This may take place in liquid or solid form.	The transformation of water vapour into water is called condensation. Condensation is caused by the loss of heat.
Sequence	Precipitation takes place after condensation.	Condensation takes place before precipitation.
Forms	It may take form of rainfall, snowfall, hailstorms, sleet etc.	It may take form of dew, smog, clouds, fog and mist etc.

(ii) Absolute humidity and Relative humidity.

Basis	Absolute Humidity	Relative Humidity
Meaning	The actual amount of the water vapour present in the atmosphere is known as the absolute humidity.	The percentage of moisture present in the atmosphere as compared to its full capacity at a given temperature is known as the relative humidity.
Unit	It is the weight of water vapour per unit volume of air and is expressed in terms of grams per cubic metre.	It is measured in percentage and hence is unit free.

(iii) Convection rain and Relief rain.

Basis	Convection Rain	Relief Rain
Meaning	The, air on being heated, becomes light and rises up in convection currents. As it rises, it expands and loses heat and consequently, condensation takes place and cumulous clouds are formed. With thunder and lightening, heavy rainfall takes place but this does not last for long.	When the saturated air mass comes across a mountain, it is forced to ascend and as it rises, it expands; the temperature falls, and the moisture is condensed. In this sort of rain is that the windward slopes receive greater rainfall. After giving rain on the windward side, when these winds reach the other slope, they descend, and their temperature rises. Then their capacity to take in moisture increases and hence, these leeward slopes remain rainless and dry.
Timing	Such rain is common in the summer or in the hotter part of the day.	Such rain is common in winters.
Prevalent	It is very common in the equatorial regions and interior parts of the continents, particularly in the northern hemisphere.	It is very common in terrestrial regions.

(iv) Fog and Mist.

Basis	Fog	Mist
Meaning	Fogs are drier than mist.	The mist contains more moisture than the fog.
Prevalent	They are prevalent where warm currents of air come in contact with cold currents.	Mists are frequent over mountains as the warm air rising up the slopes meets a cold surface.
Structure	In mist each nuclei contains a thicker layer of moisture.	Fogs are mini clouds in which condensation takes place around nuclei provided by the dust, smoke, and the salt particles.

Question 7.

Explain about condensation in detail.

Answer:

1. Meaning: The transformation of water vapour into water is called condensation. Cause: Condensation is caused by the loss of heat.
2. Sublimation: When moist air is cooled, it may reach a level when its capacity to hold water vapour ceases. Then, the excess water vapour condenses into liquid form. If it directly condenses into solid form, it is known as sublimation.
3. Process: In free air, condensation results from cooling around very small particles termed as hygroscopic condensation nuclei. Particles of dust, smoke and salt from the ocean are particularly good nuclei because they absorb water. Condensation also takes place when the moist air comes in contact with some colder object and it may also take place when the temperature is close to the dew point. Condensation, therefore, depends upon the amount of cooling and the relative humidity of the air.

Factors affecting condensation:

- When the temperature of the air is reduced to dew point with its volume remaining constant;
- When both the volume and the temperature are reduced;
- When moisture is added to the air through evaporation.

However, the most favourable condition for condensation is the decrease in air temperature. After condensation the water vapour or the moisture in the atmosphere takes form of dew, frost, fog and clouds.

Question 8.

Explain about fog and mist.

Answer:

When the temperature of an air mass containing a large quantity of water vapour falls all of a sudden, condensation takes place within itself on fine dust particles. So, the fog is a cloud with its base at or very near to the ground.

- Because of the fog and mist, the visibility becomes poor to zero. In urban and industrial centres smoke provides plenty of nuclei which help in the formation of fog and mist.
- Such a condition when fog is mixed with smoke, is described as smog.
- The only difference between the mist and fog is that mist contains more moisture than the fog.
- In mist each nuclei contains a thicker layer of moisture. Mists are frequent over mountains as the warm air rises up the slopes and meets a cold surface.
- Fogs are drier than mist and they are prevalent where warm currents of air come in contact with cold currents. Fogs are mini clouds in which condensation takes place around nuclei provided by the dust, smoke, and the salt particles.

Question 9.

On the basis of rainfall received, in how many groups can we classify the world?

Answer:

On the basis of rainfall received, we can classify the world into five groups.

1. The equatorial belt, the windward slopes of the mountains along the western coasts in the cool temperate zone and the coastal areas of the monsoon land receive heavy rainfall of over 200 cm per annum.
2. Interior continental areas receive moderate rainfall varying from 100 – 200 cm per annum.
3. The coastal areas of the continents receive moderate amount of rainfall.
4. The central parts of the tropical land and the eastern and interior parts of the temperate lands receive rainfall varying between 50-100 cm per annum.
5. Areas lying in the rain shadow zone of the interior of the continents and high latitudes receive very low rainfall-less than 50 cm per annum.

Question 10.

Use a diagram to explain the process of evaporation.

Answer:

Evaporation is a process by which water is transformed from liquid to gaseous state. Heat is the main cause for evaporation. Movement of air replaces the saturated layer with the unsaturated layer. Hence, the greater the movement of air, the greater is the evaporation.

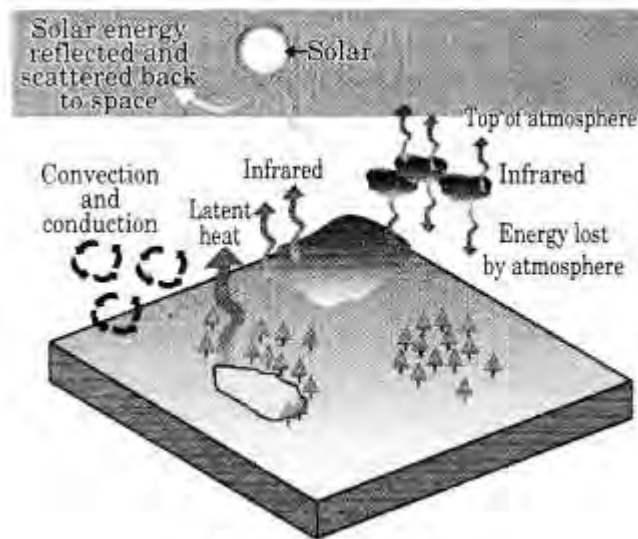


Fig: Water Cycle