

Chapter-11

Water in the Atmosphere

1. Multiple choice questions.

Question 1(i).

Which one of the following is the most important constituent of the atmosphere for human beings?

- (a) Water vapour**
- (b) Nitrogen**
- (c) Dust particle**
- (d) Oxygen.**

Answer:

- (a) Water vapour**

Question 1(ii).

Which one of the following process is responsible for transforming liquid into vapour?

- (a) Condensation**
- (b) Transpiration**
- (c) Evaporation**
- (d) Precipitation.**

Answer:

- (c) Evaporation**

Question 1(iii).

The air that contains moisture to its full capacity:

- (a) Relative humidity**
- (b) Specific humidity**
- (c) Absolute humidity**
- (d) Saturated air.**

Answer:

(d) Saturated air.

Question 1(iv).

Which one of the following is the highest cloud in the sky?

(a) Cirrus

(b) Stratus

(c) Nimbus

(d) Cumulus.

Answer:

(a) Cirrus

2. Answer the following questions in about 30 words.

Question 2(i).

Name the three types of precipitation.

Answer:

There are many forms of precipitation like dew, fog, rainfall, snowfall, hailstones etc.

1. Rainfall: The precipitation in the form of water is called rainfall.
2. Snowfall: When the temperature is lower than the 0°C , precipitation takes place in the form of fine flakes of snow and is called snowfall.
3. Hailstones: Sometimes, drops of rain after being released by the clouds become solidified into small rounded solid pieces of ice and which reach the surface of the earth are called hailstones.

Question 2(ii).

Explain relative humidity.

Answer:

The percentage of moisture present in the atmosphere as compared to its full capacity at a given temperature is known as the relative humidity. It is highest over oceans and lowest over continents. With the change of air temperature, the capacity to retain moisture increases or decreases and the relative humidity is also affected.

Question 2(iii).

Why does the amount of water vapour decreases rapidly with altitude?

Answer:

The quantity of water vapour existing in the air depends upon the rate of evaporation and the temperature of the air which determines its holding capacity of water vapour. Both temperature and evaporation decreases with altitude and as a result water vapour also decreases rapidly with altitude.

Question 2(iv).

How are clouds formed? Classify them.

Answer:

Cloud is a mass of minute water droplets or tiny crystals of ice formed by the condensation of the water vapour in free air at considerable elevations. As the clouds are formed at some height over the surface of the earth, they take various shapes. According to their height, expanse, density and transparency or opaqueness clouds are grouped under four types :

1. cirrus
2. cumulus
3. stratus
4. nimbus.

3. Answer the following questions in about 150 words.

Question 3(i).

Discuss the salient features of the world distribution of precipitation.

Answer:

Salient features of the world distribution of precipitation are given below:

1. Different places on the earth's surface receive different amounts of rainfall in a year and that too in different seasons. In general, as we proceed from the equator towards the poles, rainfall

goes on decreasing steadily. The coastal areas of the world receive greater amounts of rainfall than the interior of the continents. The rainfall is more over the oceans than on the landmasses of the world.

2. Between the latitudes 35° and 40° N and S of the equator, the rain is heavier on the eastern coasts and goes on decreasing towards the west. But, between 45° and 65° N and S of equator, the rainfall is first received on the western margins of the continents and it goes on decreasing towards the east.

3. In some regions rainfall is distributed evenly throughout the year such as in the equatorial belt and in the western parts of cool temperate regions. .

4. On the basis of the total amount of annual precipitation, major precipitation regimes of the world are identified as follows.

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 3(ii).

What are forms of condensation? Describe the process of dew and frost formation.

Answer:

Condensation: The transformation of water vapour into water is called condensation. Condensation is caused by the loss of heat. When the water vapour or the moisture in the atmosphere takes one of the following forms — dew, frost, fog and clouds. Forms of condensation can be classified on the basis of temperature and location. Condensation takes place when the dew point is lower than the freezing point as well as higher than the freezing point.

1. Dew: When the moisture is deposited in the form of water droplets on cooler surfaces of solid objects (rather than nuclei in air above the surface) such as stones, grass blades and plant leaves, it is known as dew.
2. Frost: Frost forms on cold surfaces when condensation takes place below freezing point (CPC), i.e. the dew point is at or below the freezing point.
3. Fog and Mist: 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.
4. Smog: Such a condition when fog is mixed with smoke, is described as smog.
5. Clouds: Cloud is a mass of minute water droplets or tiny crystals of ice formed by the condensation of the water vapour in free air at

considerable elevations. As the clouds are formed at some height over the surface of the earth, they take various shapes.