

Chapter

Hydrologic Cycle

I. Choose the Correct Answer.

1. The process in which the water moves between the oceans, atmosphere and land is called

- a) River Cycle
- b) Hydrologic Cycle
- c) Rock Cycle
- d) Life Cycle

Answer:

- b) Hydrologic Cycle

2. The percentage of fresh water on the earth is

- a) 71
- b) 97
- c) 2.8
- d) 0.6

Answer:

- c) 2.8

3. The process of changing of water from gaseous to liquid form is known as

- a) Condensation
- b) Evaporation
- c) Sublimation
- d) Rainfall –

Answer:

- a) Condensation

4. Water that flows in the sub-soil or through the ground into the streams, rivers, lakes and oceans is termed as

- a) Condensation
- b) Evaporation
- c) Transpiration
- d) Runoff

Answer:

- d) Runoff

5. The evaporation of water from the leaves of plants is called

- a) Transpiration
- b) Condensation
- c) Water vapour
- d) Precipitation

Answer:

a) Transpiration

6. Water that is good enough to drink is called

a) Groundwater

b) Surface water

c) Potable water

d) Artesian water

Answer:

c) Potable water

II. Fill in blank:

1. The degree of water vapour present in the atmosphere is known as

Answer:

humidity

2. There are phases in the water cycle.

Answer:

Three

3. The falling of water towards the earth surface from the atmosphere in any form is known as

Precipitation

4. The precipitation with a rain drop size of $<0.5\text{mm}$ in diameter is known as

Answer:

drizzle

5. Mist is denser than

Answer:

Fog

III. Match the following:

1. Vegetation	a) Clouds
2. Condensations	b) Sleet
3. Snow and raindrops	c) At the surface
4. Infiltration	d) Transpiration

Answer:

1. Vegetation	d) Transpiration
2. Condensations	a) Clouds

3. Snow and raindrops	b) Sleet
4. Infiltration	c) At the surface

IV. Choose the correct statement:

1. Evaporation refers to

- I. The process in which the gaseous form of water changes into liquid form.
- II. It refers to the process in which the liquid form of water changes into a gaseous form.
- III. Water boils at 100°C temperature but, it actually begins to evaporate at 0°C.
- IV. It is responsible for the formation of clouds.

- a) I, IV, and V are correct
- b) II only correct
- c) II and III are correct
- d) All are correct

Answer:

c) II and III are correct

V. State whether the following statements are True or False:

1. Water boils at 212°F temperature but, it begins to evaporate at 32°F.

Answer:

True

2. Mist is not the tiny droplets of water hanging in the air.

Answer:

False

3. The sub-surface runoff is usually referred to as interflow.

Answer:

True

VI. Answer in brief:

1. Write a short note on the aquifer.

Answer:

An aquifer is an underground layer of water-bearing rock.

2. Define “ hydrological cycle”.

Answer:

The hydrological cycle is a global sun-driven process where water is transported from oceans to the atmosphere, from the atmosphere to land, and from land back to oceans

3. How is the dew formation takes place?

Answer:

Dew is a water droplet formed by the condensation of water vapour on a relatively cold surface of an object. It forms when the temperature of an object drops below the dew point temperature.

4. Write a short note on surface run-off.

Answer:

Surface Runoff is the portion of rainfall, which enters the stream immediately after the rainfall. It occurs when the rainfall is longer, heavier, and exceeds the rate of infiltration. In this condition, the excess water makes a head over the ground surface, which tends to move from one place to another following land gradient and is known as overland flow. When the overland flow joins the streams, channels or oceans, it is termed as surface runoff or surface flow.

VII. Give reasons:

1. Infiltration of water is low in the region of non-porous soil.

Answer:

Because percolation moves the infiltrated water through the soil profile and rock layers to form groundwater.

2. Freshwater is less on the earth.

Answer:

Most of the water on the earth is saline and is found in seas and oceans, which constitutes about 97.2%.

3. Snowfall is common in the polar region and mountainous regions.

Answer:

Often water vapour in a cloud is converted directly into snow pieces due to lowering of temperature and so it is common in the polar and mountainous regions.

VIII. Answer in a paragraph:

1. Explain the different stages involved in the hydrological cycle.

Answer:

The three important phases of the hydrologic cycle are:

- Evapotranspiration,
- Precipitation and
- Runoff.

1. Evapotranspiration:

It is defined as the total loss of water from the earth through evaporation from the surface water bodies and the transpiration from vegetation. In cropped areas, it is difficult to determine the evaporation and transpiration separately. Therefore it is collectively called evapotranspiration.

2. Precipitation:

It refers to all forms of water that fall from clouds and reaches the earth's surface. For the occurrence of precipitation, cloud droplets or ice crystals must grow heavy enough to fall through the air. When the droplets grow large in size, they tend to fall. While moving down,

by collecting some small droplets, they become heavy enough to fall out of the cloud as raindrops.

3. Runoff:

Runoff is the water that is pulled by gravity across the land's surface. It replenishes groundwater and surface water as it percolates into an aquifer (it is an underground layer of water-bearing rock) or moves into a river, stream, or watershed. It comes from unabsorbed water from rain, snowmelt, irrigation or other sources, comprising a significant element in the water cycle as well as the water supply when it drains into a watershed. Runoff is also a major contributor to erosion which carves out canyons, gorges, and related landforms.

2. Distinguish between evaporation and transpiration.

Water boils at 100°C temperature but, it actually begins to evaporate at 0°C. Much of the water taken up by the plants is released through transpiration.

Evaporation	Transpiration
1. The process in which the liquid form of water changes into gaseous form.	The process by which the water content in the plant are released into the atmosphere in the form of water vapour.
3. The amount of water gets evaporated is about the same as the amount of water delivered to earth as precipitation.	The soil water content and the ability of the soil to conduct water the roots and the nature of the plant parts also determine the transpiration rate.
4. The rate of evaporation is low during the periods of calm winds than during windy times.	The rate of transpiration is affected by the temperature, wind and humidity.

3. Give a detailed explanation on different forms of precipitation.

The form of precipitation in a region depends on the kind of weather or the climate of the region. The Precipitation in the warmer parts of the world is always in the form of rain or drizzle.

In colder region, precipitation may fall as snow or ice.

Common types of precipitation include rain, sleet, freezing rain, hail & snow.

Rain:

- The most common kind of precipitation is rain.
- The precipitation in the form of water droplet is rain.
- Below 0.5 mm in diameter is known as drizzle and above 0.5 mm in diameter is known as rain.

Sleet:

The precipitation which takes place in the form of a mixture of water droplets and tiny particles of ice is known as sleet.

Freezing Rain:

- Raindrops falling through cold air near the ground do not freeze in the air.
- Instead, the raindrops freeze when they touch a cold surface.
- This is called freezing rain.

Hail:

The precipitation which consists of round pellets of ice which are larger than 5mm in diameter is called as hail or hailstones.

Snow:

The precipitation in form of a powdery mass of ice is known as snowfall which is common in the polar and high mountainous regions.

4. Explain the run-off and its types.

Runoff is the water that is pulled by gravity across the land's surface. It replenishes groundwater and surface water as it percolates into an aquifer (it is an underground layer of water-bearing rock) or moves into a river, stream, or watershed.

Types of Runoff:

Based on the time interval between the instance of rainfall and generation of runoff, the runoff may be classified into the following three types

1. Surface Runoff:

It is the portion of rainfall, which enters the stream immediately after the rainfall. It occurs when the rainfall is longer, heavier, and exceeds the rate of infiltration. In this condition, the excess water makes a head over the ground surface, which tends to move from one place to another following a land gradient and is known as overland flow. When the overland flow joins the streams, channels, or oceans, it is termed as surface runoff or surface flow.

2. Sub – Surface Runoff:

The water that has entered the subsoil and moves laterally without joining the water-table to the streams, rivers or oceans is known as sub-surface runoff. The subsurface runoff is usually referred as interflow.

3. Base Flow:

It is a flow of underground water from a saturated groundwater zone to a water channel. It usually appears at a downstream location where the channel elevation is lower than the groundwater table. Groundwater provides the streamflow during dry periods of small or no precipitation.