CHAPTER - 13
WATER OCEANS

1. Multiple choice questions.

(i) Identify the element, which is not a part of the hydrological cycle

(a) Evaporation
(b) Hydration
(c) Precipitation
(d) Condensation

Answer: (b) Hydration

(ii) The average depth of continental slope varies between

(a) 2-20m
(b) 200-2,000m
(c) 20-200m
(d) 2,000-20,000m

Answer: (b) 200-2,000m

(iii) Which one of the following is not a minor relief feature in the oceans:

(a) Seamount
(b) Atoll
(c) Oceanic Deep
(d) Guyot

Answer: (c) Oceanic Deep

(iv) Salinity is expressed as the amount of salt in grams dissolved in sea water per

(a) 10 gm
(b) 1,000 gm
(c) 100 gm
(d) 10,000 gm

Answer: (b) 1,000 gm

(v) Which one of the following is the smallest ocean:

(a) Indian Ocean
(b) Arctic Ocean

(c) Atlantic Ocean
(d) Pacific Ocean

Answer: (b) Arctic Ocean

2. Answer the following questions in about 30 words

(i) Why do we call the earth a Blue Planet?

Answer: It is estimated that 71 per cent of the total surface area of the earth is covered by water. Therefore, the earth has an abundant supply of water on its surface. Hence, the earth is called the 'Blue Planet'.

(ii) What is a continental margin?

Answer: The continental margin is the zone of the ocean floor that separates the thin oceanic crust from thick continental crust and occupied by relatively shallow seas and gulfs.

(iii) List out the deepest trenches of various oceans.

Answer: As many as 57 deeps have been explored so far; of which 32 are in the Pacific Ocean; 19 in the Atlantic Ocean and 6 in the Indian Ocean.

The Mariana Trench with maximum-known depth of 10,994 m is the deepest part of the Pacific Ocean as well as world's oceans.

- The Puerto Rico Trench has a maximum depth of 8,648 metres and is the deepest point in the Atlantic Ocean.

- The maximum depth of the Sunda or the Java Trench in the Indian Ocean is 7,725 metres.

- The deepest point in the Arctic Ocean is Litke Deep in the Eurasian Basin, at 5,450 m.

- The Southern Ocean's deepest point is in the South Sandwich Trench at 7,235 meters sea level.

(iv) What is a thermocline?

Answer: A thermocline is the transition layer between warmer mixed water at the ocean's surface and cooler deep water below. The boundary usually begins about 100-400 metres below and extends several hundred metres downward.

(v) When you move into the ocean what thermal layers would you encounter? Why the temperature varies with depth?

Answer: We generally encounter three thermal layers, when we move into the ocean.

First Layer: It represents the top layer of warm oceanic water. It is about 500 m thick with temperature ranging between 20°C and 25°C.

Second Layer: This layer called thermocline layer lies below the first layer and is characterized by rapid decrease in temperature with increasing depth. It is 500 to 1,000 m thick.

Third Layer: This layer is very cold and extends up to the deep ocean floor. The maximum temperature of the oceans is always at their surfaces because they directly receive the heat from the sun and the heat is transmitted to the lower sections of the oceans through the process of convection. The temperature falls very rapidly up to the depth of 200 m. Thereafter the thermal regime tracks the slow decay of radiogenic heat.

(vi) What is salinity of seawater?

Answer: Seawater is salty to taste because it contains a number of dissolved salts. Salinity is the term used to define the total content of dissolved salts in seawater. It is calculated as the amount of salt (in gm) dissolved in 1,000 gm (1 kg) of seawater. It is usually expressed as parts per thousand (o/oo) or ppt.

3. Answer the following questions in about 150 words

(i) How are various elements of the hydrological cycle interrelated?

Answer: The hydrological cycle describes the movement of water on, in, and above the earth. All the elements of water or hydrological cycle are interrelated. Water is present in lithosphere, hydrosphere and atmosphere in the forms of solid, liquid and gas. Evaporation is the change of water from a liquid to gas. Water vapour in the atmosphere help in the formation of clouds, which results in rain, hail, dew, snow or sleet. Some of the precipitation runs off over the surface in the form of steams and causes erosion and excess of water causes floods. Some water soaks into the ground and used by plants. Some amount of water reaches the deeper zones and percolates to maintain the streams during the dry season. The rivers return the water back to the oceans where it originated. This never-ending circulation of water from ocean to the atmosphere through the processes of Evaporation, Condensation, and Precipitation is called hydrological cycle. Thus, the hydrological or water cycle interconnects the lithosphere, the hydrosphere, and the atmosphere.

(ii) Examine the factors that influence the temperature distribution of the oceans.

Answer: The factors, which affect the distribution of temperature of ocean water, are:

- **Latitude:** Ocean water is hottest at the equator and coldest at the poles because the amount of insolation decreases polewards. The average annual temperature at the equator is 26°C and 1°C at the 60°latitudes.

- **Unequal distribution of land and water:** The oceans in the northern hemisphere receive more heat than the oceans of southern hemisphere due to their contact with larger extent of land.

- **Prevailing Winds:** Prevailing winds carry the surface water of the ocean with them. In order to compensate the loss of water at the surface, cold water from below the surface comes up and reduces the surface temperature.

- **Ocean Currents:** Warm ocean currents raise the temperature of the surrounding water, whereas cold currents lead to fall of temperature. For example, Gulf Stream raises the temperature of eastern coast of North America and western coast of Europe.