Chapter 12: Water (Oceans)

Exercises — Exercises

Q1 Multiple choice question (i): Identify the element which is not a part of the hydrological cycle. (a) Evaporation (b) Hydration (c) Precipitation (d) Condensation

(b) Hydration. Evaporation, condensation and precipitation are all listed processes of the water cycle, whereas hydration is not.

Q2 Multiple choice question (ii): The average depth of continental slope varies between (a) 2-20 m (b) 200-2,000 m (c) 20-200 m (d) 2,000-20,000 m

(b) 200-2,000 m. The chapter gives the slope depth as roughly 200 to 3,000 m, so 200-2,000 m is the closest option; the other ranges are far too shallow or too deep.

Q3 Multiple choice question (iii): Which one of the following is not a minor relief feature in the oceans? (a) Seamount (b) Atoll (c) Oceanic Deep (d) Guyot

(c) Oceanic Deep. Oceanic deeps (trenches) are one of the four major divisions of the ocean floor, while seamounts, atolls and guyots are described as minor relief features.

Q4 Multiple choice question (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

(b) 1,000 gm. Salinity is the grams of salt dissolved in 1,000 gm (1 kg) of seawater, usually expressed as parts per thousand (ppt).

Q5 Multiple choice question (v): Which one of the following is the smallest ocean? (a) Indian Ocean (b) Arctic Ocean (c) Atlantic Ocean (d) Pacific Ocean

(b) Arctic Ocean. Of the options, the Arctic is the smallest; the Pacific, Atlantic and Indian Oceans are all much larger.

Q6 Answer in about 30 words (i): Why do we call the earth a Blue Planet?

Water is found in abundance on the earth's surface, and about 91 per cent of the planet's water is in the oceans. No other body in the solar system has water, so the earth is called the Blue Planet.

Q7 Answer in about 30 words (ii): What is a continental margin?

A continental margin is the zone where a continent meets the ocean basin. It includes the continental shelf, the shallow extended margin of the continent, and the continental slope, which drops steeply from the shelf break to the deep ocean floor and marks the end of the continent.

Q8 Answer in about 30 words (iii): List out the deepest trenches of various oceans.

The ocean trenches are the deepest parts of the oceans: 57 deeps have been explored, of which 32 lie in the Pacific Ocean, 19 in the Atlantic Ocean and 6 in the Indian Ocean. The Pacific therefore has the most trenches.

Q9 Answer in about 30 words (iv): What is a thermocline?

The thermocline is the boundary region between the warm surface waters and the deep cold layers, usually beginning 100-400 m below the sea surface. Here temperature decreases rapidly with depth. About 90 per cent of ocean water lies below it.

Q10 Answer in about 30 words (v): When you move into the ocean what thermal layers would you encounter? Why the temperature varies with depth?

In low and middle latitudes there are three layers: the warm surface layer (about 500 m, 20-25 degrees C), the thermocline (500-1,000 m thick, temperature falls rapidly) and the very cold deep layer. Temperature falls with depth because the sun heats the surface and heat reaches lower levels only slowly by convection.

Q11 Answer in about 30 words (vi): What is salinity of sea water?

Salinity is the total content of dissolved salts in sea water. It is the amount of salt, in grams, dissolved in 1,000 gm of seawater and is expressed in parts per thousand (ppt). The normal open-ocean range is 33 to 37 ppt.

Q12 Answer in about 150 words (i): How are various elements of the hydrological cycle interrelated?

The hydrological cycle is the continuous circulation of water between the oceans, atmosphere, land surface, subsurface and living organisms, in liquid, solid and gaseous forms. About 91 per cent of the planet's water is in the oceans. Evaporation (including evapotranspiration and sublimation) carries water from oceans and land into the atmosphere, where condensation forms clouds and precipitation returns it as rain or snow. Part of the water falling on land evaporates again, about 59 per cent in all, while the rest runs off on the surface as stream flow, infiltrates into the ground to become groundwater, or is stored as glaciers and snow. Snowmelt feeds streams, and groundwater discharges through springs into rivers, which finally carry water back to the oceans. Thus every component, ocean storage, atmosphere, ice, runoff and groundwater, is linked through these processes, and the cycle has worked for billions of years, sustaining all life.

Q13 Answer in about 150 words (ii): Examine the factors that influence the temperature distribution of the oceans.

Four factors affect ocean temperature. (i) Latitude: surface temperature decreases from the equator towards the poles because insolation decreases poleward. (ii) Unequal distribution of land and water: oceans in the northern hemisphere, in contact with a larger extent of land, receive more heat than those in the southern hemisphere, so their average annual temperatures are about 19 degrees C against 16 degrees C. (iii) Prevailing winds: winds blowing from land to sea drive warm surface water away from the coast, causing cold water to upwell from below, whereas onshore winds pile up warm water near the coast and raise the temperature. (iv) Ocean currents: warm currents raise temperatures in cold areas, as the Gulf Stream does near eastern North America and western Europe, while cold currents lower them, as the Labrador current does near north-east North America. Enclosed seas in low latitudes are warmer than open seas; those in high latitudes are cooler.