14. Movements of Ocean Water

1. Multiple choice question

(i) Upward and downward movement of ocean water is known as the:

(a) tide
(b) current
(c) wave
(d) none of the above

Answer: (a) tide

(ii) Spring tides are caused:

(a) As result of the moon and the sun pulling the earth gravitationally in the same direction.

(b) As result of the moon and the sun pulling the earth gravitationally in the opposite direction.

(c) Indention in the coast line.

(d) None of the above.

Answer: (a) As result of the moon and the sun pulling the earth gravitationally in the same direction.

(iii) The distance between the earth and the moon is minimum when the moon is in:

(a) Aphelion
(b) Perigee
(c) Perihelion
(d) Apogee

Answer: (b) Perigee

(iv) The earth reaches its perihelion in:
(a) October
(b) September
(c) July
(d) January

Answer: (d) January

2. Answer the following questions in about 30 wor

(i) What are waves?

Answer: Ocean waves are oscillatory movements in water, manifested by an alternate rise and fall of the ocean/sea surface.

(ii) Where do waves in the ocean get their energy from?

Answer: Wind provides energy to the waves. Wind causes waves to travel in the ocean and the energy is released on shorelines. The size and force of waves depends upon three factors:

- the velocity of the wind,
- the duration of the wind and
- the distance over which the wind can blows unhindered

(iii) What are tides?

Answer: Seawater is not stationary, but rises and falls of sea level, once or twice a day, mainly due to the attraction of the sun and the moon, is called tide.

(iv) How are tides caused?

Answer: The gravitational pull of moon and the sun are the major causes for the occurrence of tides on earth. Another factor is centrifugal force, which is the force that acts to counter balance the gravity.

(v) How are tides related to navigation?

Answer: Tides also help in making some of the rivers navigable for ocean-going vessels. The Port of Kolkata is a riverine port in the city of Kolkata, located around 203 kms from the sea and become important ports owing to the tidal nature of the mouths of the Hooghly River.

3. Answer the following questions in about 150 words

(i) How do currents affect the temperature? How does it affect the temperature of coastal areas in the N. W. Europe?

Answer: Oceans currents have far-reaching effect on the temperature. Western margins of the continents within the tropics are washed by cold currents, which do not cause much rainfall. Warm currents raise the temperature of the ocean water, whereas cold currents lead to fall of temperature. The west coasts of the continents are bordered by warm currents and enjoy distinct marine climate. Warm currents flow parallel to the east coasts of the continents in tropical and subtropical latitudes, which results in warm and rainy climates. North Atlantic and

the Labrador Current decrease the temperature of the western Atlantic coast, while the warm Gulf Stream increases the temperature of the ocean water along the western European coast. The mixing of warm and cold currents favour the growth of planktons, which is the primary food for fish population. Therefore, such areas are the best fishing grounds of the world.

(ii) What are the causes of currents?

Answer: Large amounts of water in the ocean move in definite path of the surface. These are called ocean currents. The following factors cause ocean currents:

- **Prevailing Winds**: The pushing action of prevailing winds makes the waters flow as they do. All ocean currents in the northern hemisphere move in the clockwise direction, while in the southern hemisphere anticlockwise direction.

- **Temperature Differences**: The equatorial water becomes lighter on heating while water in polar areas becomes heavy due to cooling. To maintain the balance, water from equatorial areas moves towards the polar areas in the form of currents.

- **Landmasses**: Mountain, plateau, and coastal landforms are also responsible for changing the course of a current.

- **Salinity Differences**: Water having high salinity is heavier. As a result, light water with less salinity rushes towards the area of high salinity in the form of ocean currents.

- **Rotation of the Earth**: Coriolis force becomes effective due to the earth's rotation, which results in the formation of ocean currents. For example, Canaries Current is formed in the Atlantic Ocean due to the Coriolis force.