

Exercise :3 A

1. Water exists in all the three states. Discuss

Solution:

In free State, water is a liquid. When water gets freezes to 0°c degree Celsius, it will turn to ice, which is in solid form. When we heat water to 100°c , it vaporises into water vapours, which are the gaseous state of water; hence, it is said that water exists in all the three states.

2. Why water is considered a compound.

Solution:

Water is made up of two elements Hydrogen and Oxygen, which are in the ratio of 1:8 by mass; hence, water is considered as a compound.

3. a) Why does temperature in Mumbai and Chennai not fall as low as it does in Delhi.

b) Give the properties of water responsible for controlling the temperature of our body.

Solution:

The temperature in Mumbai and Chennai does not fall as low as it does in Delhi because Mumbai and Chennai are on the shores of the sea. This increase the specific heat capacity of the area and the presence of a large amount of water keeps the climate warmer in winter and cooler in summer.

b) Water has a high specific heat capacity. Presence of water in our body also gives stability to our body. These two reasons help in controlling our body temperature.

4. 'Water is a universal solvent' comment

Solution:

Water dissolves most of the compound to form a solution. Water can dissolve all three states of matter solids, liquids and gases. Hence water is called a universal solvent.

5. What causes the violence associated with torrential rain?

Solution:

Torrential rains release the latent heat of condensation suddenly this causes violence associated with torrential rain.

- 6. (a) Which property of water enables it to modify the climate ?**
(b) Density of water varies with temperature. What are its consequences?
(c) What is the effect of impurities present in water on melting point and boiling point of water?

Solution:

- a) Water's specific heat capacity enables it to modify the climate
- b) Water when cooled till 4°C (maximum density level) it starts expanding and continues till it is cooled to Zero degree Celsius the point at which it turns to ice. This property of water enables marine life in cold regions where water freezes at the top will be liquid below the ice layer.
- c) Impurities present in the water decreases the freezing temperature of the water, and in the same way, impurities increase the boiling point of the water.

- 7. How do fishes and aquatic animals survive when the pond gets covered with thick ice?**

Solution:

Even though ponds covered with thick ice, beneath there will be water because of the maximum density level of water which helps the fishes and aquatic animals survive.

- 8. The properties of water are different from the properties of the elements of which it is formed. Discuss.**

Solution:

Water is formed by the combination of Hydrogen and Oxygen in the ration of 2:1. When the two elements are joined, the atoms lose their individual properties and have different properties from the elements by which they are made. Water remains liquid in room temperature whereas Hydrogen and Oxygen are gases which when combine changes the state due to the chemical reaction.

- 9. How is aquatic life benefitted by the fact that water has maximum density at 4°C ?**

Solution:

Maximum density of water benefits aquatic life because in cold regions top layer of the water turn to ice but beneath that water will remain in liquid form which allows the existence of aquatic life even in cold regions.

- 10. What are your observations and conclusion when tap water is boiled and evaporated in watch glass?**

Solution:

When tap water is boiled and evaporated in a watch glass, we can observe certain concentric rings of the dissolved matter remain in the watch glass which concludes that tap water contains dissolved salts in it.

11. What is the importance of dissolved salts in water?**Solution:**

Importance of dissolved salts in water are as follows

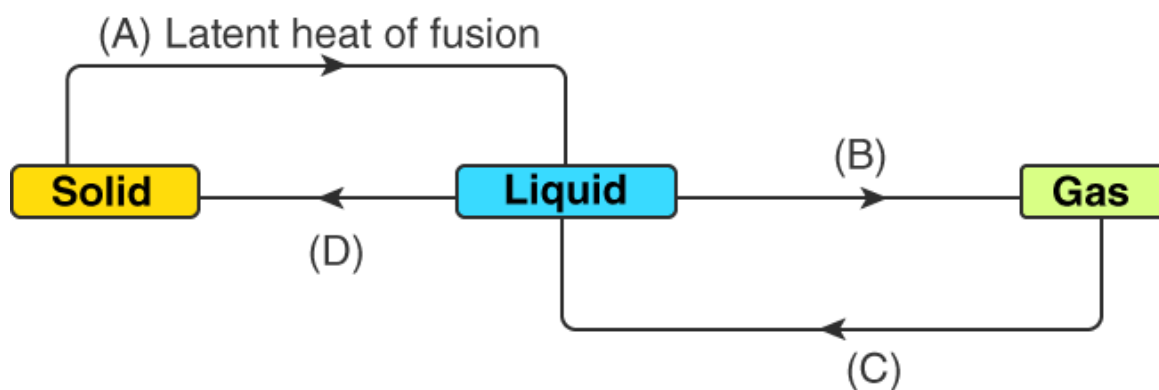
- Dissolved minerals and salts are essential for the growth of plants
- Dissolved salts add taste to water
- Dissolved salts and minerals in water provide essential minerals required for our body.

12. State the importance of the solubility of CO₂ and O₂ in water.**Solution:**

CO₂ dissolved in water is used by aquatic plants to prepare their food by photosynthesis. Oxygen dissolved in water is used by aquatic animals for respiration and survive.

13. How is air dissolved in water different from ordinary air?**Solution:**

Ordinary air consists of 78% Nitrogen, 21% oxygen and 0.01% carbondioxide. But Nitrogen is less soluble in water when compared to carbon dioxide and Oxygen. Hence the composition of air dissolved in different than ordinary air. Composition of air dissolved in water is 33% Oxygen when compared to 21% in ordinary air; Nitrogen is 66% when compared to 78% of ordinary air and carbon dioxide is 1% when compared to 0.01% in ordinary air.

14. Identify A, B, C and D; first one is done for you.

Solution:

- B) Latent Heat of vaporisation
- C) Condensation

15. Explain why:

- (a) Boiled or distilled water tastes flat.
- (b) Ice at zero degree centigrade has greater cooling effect than water at 0°C.
- (c) Burns caused by steam are more severe than burns caused by boiling water.
- (d) Rivers and lakes do not freeze easily?
- (e) Air dissolved in water contains a higher proportion of oxygen.
- (f) If distilled water is kept in a sealed bottle for a long time, it leaves etchings on the surface of the glass.
- (g) Rain water does not leave behind concentric rings when boiled.

Solution:

- a) Boiled or distilled water does not have any minerals, salts or dissolved gases in it hence it tastes flat.
- b) Ice at zero degree centigrade has a greater cooling effect than water at 0°C because Ice at zero degree centigrade absorbs 336 J per gram of energy to melt to zero degrees centigrade water.
- c) Burns caused by steam are more severe than burns caused by boiling water because 1 g of steam contains 2268 J more energy than 1 g of boiling water.
- d) Ice is a good insulator and bad conductor of heat because of this portions of a lake or river that are exposed to the cold winter air will freeze into ice, and this ice insulates the water below from further rapid freezing.
- e) Air consists of 78% Nitrogen and 21% oxygen. But oxygen dissolves in water easily than Nitrogen hence water contains a higher portion of oxygen.
- f) If distilled water is kept in a sealed bottle for a long time, it leaves etchings on the surface of the glass because substances that are insoluble in water dissolve in trace amounts even small amounts of glass dissolves in water which will make etching on the glass surface.
- g) Rainwater does not leave behind concentric rings when boiled because rainwater does not contain dissolved solvents.