

Multiple choice questions
Chapter – 1 Matter in our Surrounding

Multiple Choice Questions

1. Which one of the following sets of phenomena would show an increase on increasing the temperature?

- (a) Diffusion, evaporation, compression of gases
- (b) Evaporation, compression of gases, solubility
- (c) Evaporation, diffusion, expansion of gases
- (d) Evaporation, solubility, diffusion, compression of gases

Ans: (c) Evaporation, diffusion, expansion of gases

Explanation: (1) Evaporation is conversion of liquid into gas. **Evaporation** happens because of absorption of heat by liquid molecules. Increase in heat energy increases the kinetic energy of liquid particles. Hence, increasing the temperature increases the rate of evaporation of a liquid.

(2) Increased kinetic energy of particles also increases the rate of **diffusion** (movement of particles from a region of higher concentration to a region of lower concentration).

(3) Increase in temperature increases the kinetic energy of gas particles. Hence, **gases expand** (opposite of compression) when temperature is increased.

(4) Increase in temperature also leads to increase in **solubility** of solute particles.

(5) Compression of gases requires an increase in pressure and a decrease in temperature.

2. Seema visited a Natural Gas Compressing Unit. She found that a gas can be liquefied under specific conditions of temperature and pressure. While sharing her experience with her friends, she got confused. Can you help her to identify the correct set of conditions?

- (a) Low temperature and low pressure
- (b) High temperature and low pressure
- (c) Low temperature and high pressure
- (d) High temperature and high pressure

Ans: (c) Low temperature and high pressure

Explanation: Low temperature reduces the kinetic energy of gas particles. **High pressure** increases the inter-molecular forces of attraction

and reduces the intermolecular spaces between the gas particles. Thus, low temperature and high pressure contribute to compression and liquefaction of a gas.

3. Fluids have a unique property of flowing. Which of the following statements is correct in this respect?

- (a) Only gases behave like fluids.
- (b) Gases and solids - both behave like fluids.
- (c) Gases and liquids – both behave like fluids.
- (d) Only liquids are fluids.

Ans: (c) Gases and liquids – both behave like fluids.

Explanation: In both gases and liquids, inter-molecular forces of attraction and inter-molecular spaces are such that they facilitate the flow of these states of matter.

4. During summers, water kept in an earthen pot becomes cooler after some time. Which phenomenon leads to the cooling of water in an earthen pot?

- (a) Diffusion
- (b) Transpiration
- (c) Osmosis
- (d) Evaporation

Ans: (d) Evaporation

Explanation: Evaporation of water through the pores of the earthen pot reduces the temperature of the immediate surroundings. Due to this, water in the earthen pot becomes cooler after some time. Transpiration is a phenomenon that happens in plants. Osmosis happens between regions of different concentrations of solvent through a semi-permeable membrane.

5. Which of the following represents the correct arrangement of substances arranged in an increasing order of “forces of attraction” between their particles?

- (a) Water, air, wind.
- (b) Air, sugar, oil.
- (c) Oxygen, water, sugar.
- (d) Salt, juice, air.

Ans: (c) Oxygen, water, sugar

Explanation: Inter-molecular forces of attraction between the particles are the **weakest in gases** (such as oxygen or air) and the **strongest in**

solids (such as sugar or salt). In liquids (such as water, oil, juice, etc), the inter-molecular forces of attraction are intermediate of that in gases and solids.

6. When converted to Kelvin scale, what will be the correct sequence of the temperatures 25 °C, 38 °C and 66 °C?

- (a) 298 K, 311 K and 339 K
- (b) 298 K, 300 K and 338 K
- (c) 273 K, 278 K and 543 K
- (d) 298 K, 310 K and 338 K

Ans: (a) 298 K, 311 K and 339 K

Explanation: Add 273 to each Celsius measurement to convert it to a Kelvin measurement. $25\text{ °C} + 273 = 298\text{ K}$, $38\text{ °C} + 273 = 311\text{ K}$, $66\text{ °C} + 273 = 339\text{ K}$

7. Choose the correct statement for change of states of matter :-

- (a) Conversion of solid into vapours without passing through the liquid state is called vaporization.
- (b) Conversion of vapours into solid without passing through the liquid state is called sublimation.
- (c) Conversion of vapours into solid without passing through the liquid state is called freezing.
- (d) Conversion of solid into liquid is called sublimation.

Ans: (b) Conversion of vapours into solid without passing through the liquid state is called sublimation.

Explanation: Sublimation is the change of solid/gas phase directly from the solid/gas phase to the gaseous/solid phase without passing through the intermediate liquid phase.

8. Boiling points of diethyl ether, acetone and n-butyl alcohol are 35 °C, 56 °C and 118 °C respectively. Which of the following set correctly represents the boiling points on the Kelvin scale?

- (a) 306 K, 329 K, 391 K
- (b) 308 K, 329 K, 392 K
- (c) 308 K, 329 K, 391 K
- (d) 329 K, 392 K, 308 K

Ans: (c) 308 K, 329 K, 391 K

Explanation: Each Celsius measurement can be converted to a Kelvin

measurement by adding 273. So, $35\text{ }^{\circ}\text{C} + 273 = 308\text{ K}$, $56\text{ }^{\circ}\text{C} + 273 = 329\text{ K}$, $118\text{ }^{\circ}\text{C} + 273 = 391\text{ K}$

9. Identify the condition that will increase the evaporation of water?

- (a) Increase in the temperature of water.
- (b) Decrease in the temperature of water.
- (c) Less exposed surface area of water.
- (d) Adding common salt to water.

Ans: (a) Increase in the temperature of water

Explanation: Increasing the temperature of water will agitate the molecules of water. Rate of evaporation of water is directly proportional to the temperature of water and the exposed surface area. The other given conditions will reduce the rate of evaporation of water.

10. Identify the conditions where the distance between the molecules of hydrogen gas will increase?

- (i) Increasing the pressure on hydrogen gas contained in a closed container.
 - (ii) Leaking some hydrogen out of the container.
 - (iii) Increasing the volume of the container.
 - (iv) Addition of hydrogen gas to the container without increasing the volume of the container.
- (a) (i) and (iii)
 - (b) (i) and (iv)
 - (c) (ii) and (iii)
 - (d) (ii) and (iv)

Ans: (c) (ii) and (iii)

Explanation: Addition of hydrogen gas to the container without increasing the volume of container will increase the pressure inside the container and reduce the inter-molecular distances. For increasing the inter-molecular distances, either reduce the hydrogen molecules inside the container or increase the volume of the container.