

Class 9 Chapter1 - Matter in Our Surroundings Important Questions with Answers

Q1. A sample of water under study was found to boil at 102°C at normal temperature and pressure. Is the water pure? Will this water freeze at 0°C ? Comment.

Answer:

The boiling point of pure water is 100°C , and the freezing point of pure water is 0°C . The water sample boils at 102°C at standard pressure. Thus, the water sample is not pure. It will freeze below 0°C .

Q2. A student heats a beaker containing ice and water. He measures the temperature of the content of the beaker as a function of time. Which of the following (Fig. 1.1) would correctly represent the result? Justify your choice.

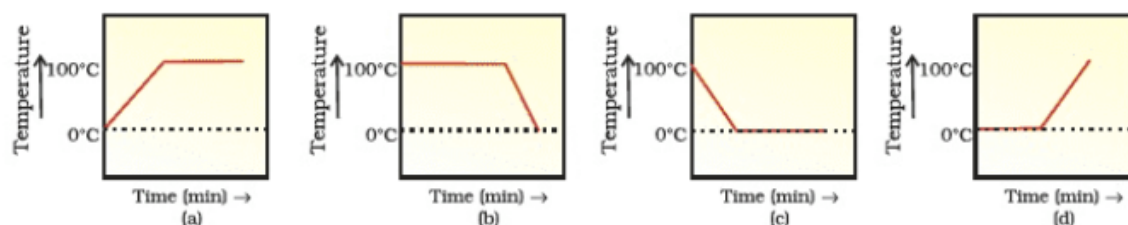


Fig. 1.1

Answer:

When we heat the mixture, the energy supplied is utilized to melt the ice, and the temperature does not change until all the ice melts because of the latent heat of fusion. On further heating, the temperature of the water would increase.

So, graph (d) correctly represents the result.

Q3. Fill in the blanks:

- Evaporation of a liquid at room temperature leads to a _____ effect.
- At room temperature, the forces of attraction between the particles of solid substances are _____ than those which exist in the gaseous state.
- The arrangement of particles is less ordered in the _____ state. However, there is no order in the _____ state.
- _____ is the change of gaseous state directly to solid state without going through the state.

(e) The phenomenon of the change of a liquid into the gaseous state at any temperature below its boiling point is called _____.

Answer:

(a) Evaporation of a liquid at room temperature leads to a cooling effect.

(b) At room temperature, the forces of attraction between the particles of solid substances are stronger than those which exist in the gaseous state.

(c) The arrangement of particles is less ordered in the liquid state. However, there is no order in the gaseous state.

(d) Sublimation is the change of a gaseous state directly to a solid state without going through the liquid state.

(e) The phenomenon of changes of a liquid into the gaseous state at any temperature below its boiling point is called evaporation.

Q4. Match the physical quantities given in column A to their SI units given in column B:

Column A	Column B
(a) Pressure	(i) cubic metre
(b) Temperature	(ii) kilogram
(c) Density	(iii) pascal
(d) Mass	(iv) kelvin
(e) Volume	(v) kilogram per cubic metre

Answer:

Column A	Column B
(a) Pressure	(iii) pascal
(b) Temperature	(iv) kelvin
(c) Density	(v) kilogram per cubic metre
(d) Mass	(ii) kilogram
(e) Volume	(i) cubic metre

Q6. Osmosis is a special kind of diffusion. Comment.

Answer:

Osmosis is a special kind of diffusion because, in both cases, particles move from a higher concentration to a lower concentration. The only difference is that osmosis applies to the direction of the solvent only through the semi-permeable membrane where the solvent is water.

Q7. Classify the following into osmosis/diffusion

- (a) Swelling up of a raisin on keeping in water.
- (b) Spreading of the virus on sneezing.
- (c) Earthworms die on coming in contact with common salt.
- (d) Shrinking of grapes kept in thick sugar syrup.
- (e) Preserving pickles in salt.
- (f) Spreading of the smell of cake being baked throughout the house.
- (g) Aquatic animals use oxygen dissolved in water during respiration.

Answer:

S. No.	Example	Osmosis / Diffusion
1.	Swelling up of a raisin on keeping in water.	Osmosis
2.	Spreading of the virus on sneezing.	Diffusion
3.	Earthworms die on coming in contact with common salt.	Osmosis
4.	Shrinking of grapes kept in thick sugar syrup.	Osmosis
5.	Preserving pickles in salt.	Osmosis
6.	Spreading of the smell of cake being baked throughout the house.	Diffusion
7.	Aquatic animals use oxygen dissolved in water during respiration.	Diffusion

Q8. Water as ice has a cooling effect, whereas water as steam may cause severe burns. Explain these observations.

Answer:

Water turns into ice when the temperature decreases to 0°C . Water turns into steam at 100°C when heat is supplied to the water. Water as steam has more latent heat, while water as liquid does not. Hence, water as steam may cause severe burns, while water as ice has a cooling effect.

Q9. Alka was making tea in a kettle. Suddenly she felt intense heat from the puff of steam gushing out of the spout of the kettle. She wondered whether the temperature of the steam was higher than that of the water boiling in the kettle. Comment.

Answer:

The boiling point of water is 100°C . The temperature of boiling water does not rise; instead, a continuous supply of heat is used to turn water into steam. Hence, steam has a lot of latent heat than boiling water, which can cause severe burns. That's why Alka felt intense heat from the puff of steam gushing out of the kettle's spout.

Q10. A glass tumbler containing hot water is kept in the freezer compartment of a refrigerator (temperature $< 0^{\circ}\text{C}$). If you could measure the temperature of the content of the tumbler, which of the following graphs (Fig. 1.2) would correctly represent the change in its temperature as a function of time.

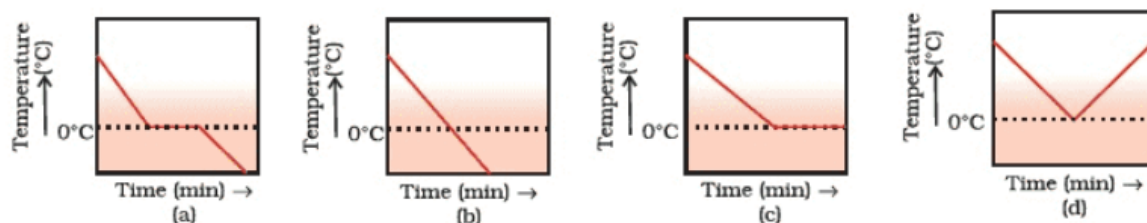


Fig. 1.2

Answer:

Graph A represents the correct change in temperature as a function of time.

As the temperature of water falls to 0°C first. Then it will be constant till all water turns into ice, and then it will decrease.

Q11. Look at Fig. 1.3 and suggest in which of the vessels A, B, C or D the rate of evaporation will be the highest? Explain.

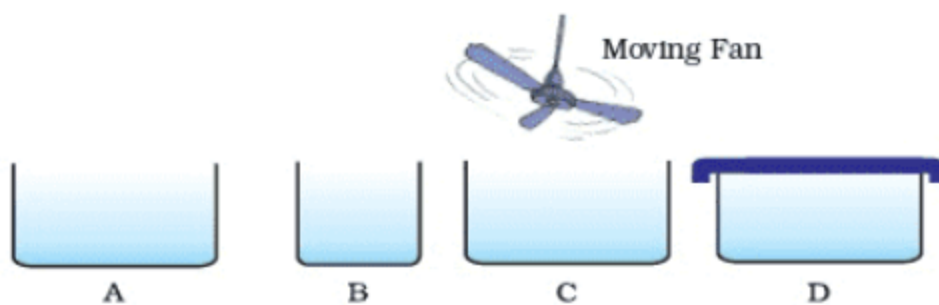


Fig. 1.3

Answer:

The rate of evaporation increases with the increase in surface area and wind speed. The surface areas of vessels C, A and D are similar, but the wind speed is more above vessel C because of the fan. Hence the rate of evaporation will be highest in vessel C.

- Q12.** (a) Conversion of solid to vapour is called sublimation. Name the term used to denote the conversion of vapour to solid.
(b) Conversion of solid-state to liquid state is called fusion; what is meant by the latent heat of fusion?

Answer:

- (a) Vapour conversion to solid without changing into liquid is also known as 'deposition'.
(b) Latent heat of fusion is the amount of heat required to convert a unit mass of the substance from a solid form to a liquid form without changing the temperature.

Long Answer Type Questions

- Q1.** You are provided with a mixture of naphthalene and ammonium chloride by your teacher. Suggest an activity to separate them with a well-labelled diagram.

Answer:

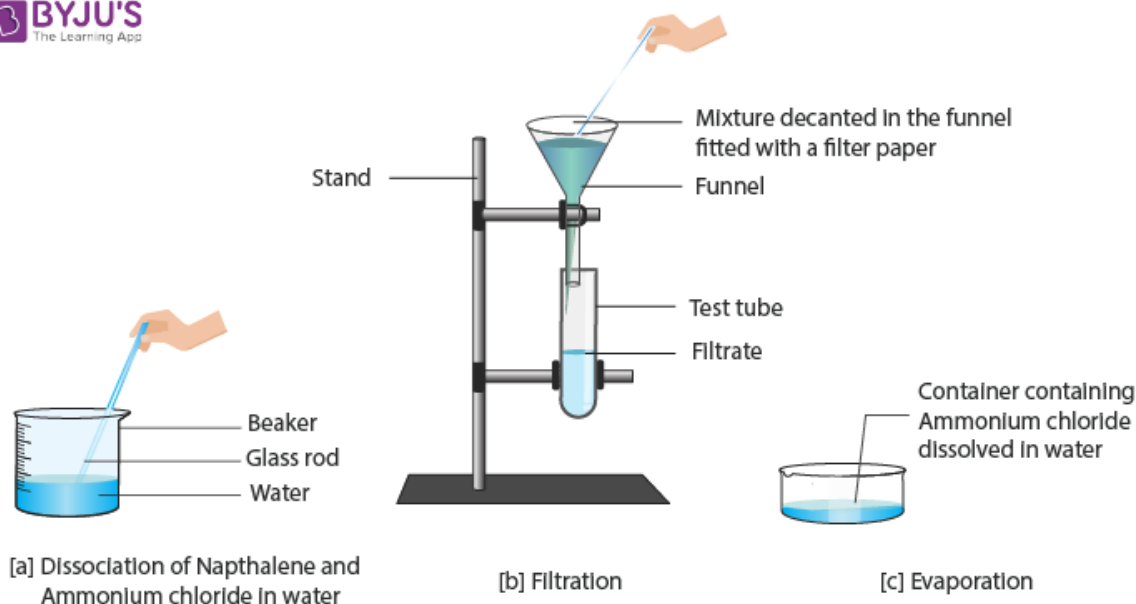
Naphthalene is insoluble in water but soluble in benzene, while Ammonium chloride is soluble in water but insoluble in benzene. Naphthalene changes into vapours at room temperature, whereas ammonium chloride changes into vapours on heating.

Procedure:

- Step 1: We will add water to the mixture and shake it vigorously to dissolve ammonium chloride.
Step 2: We will then filter the mixture. Naphthalene will be obtained as residue, whereas filtrate will contain ammonium chloride.

Step 3: We will crystallize the filtrate by heating it till a saturated solution of ammonium chloride is obtained.

Step 4: We will cool the hot saturated solution to get ammonium chloride crystals.



Q2. It is a hot summer day, Priyanshi and Ali are wearing cotton and nylon clothes respectively. Who do you think would be more comfortable and why?

Answer:

Priyanshi would be more comfortable than Ali. The reason is that we get a lot of sweat in our bodies on a hot summer day.

Cotton is a good absorber of water. It absorbs sweat from the body and provides a larger surface area for evaporation which causes a more cooling effect. Nylon does not absorb sweat, so the sweat does not evaporate, and Ali would feel uncomfortable.

Q3. You want to wear your favourite shirt to a party, but the problem is that it is still wet after a wash. What steps would you take to dry it faster?

Answer:

Wet clothes dry up because of evaporation. The rate of evaporation increases with the increase in temperature, surface area and wind speed.

(a) We can spread the shirt on a wire to increase the evaporation rate.

- (b) We can increase the evaporation rate by using a fan.
- (c) If it is daytime, we can arrange the above combination in the sun so that an increase in temperature would increase the evaporation rate.
- (d) If it is not daytime, we can use a hot iron to dry the shirt.

Q4. Comment on the following statements:

- (a) Evaporation produces cooling.
- (b) The rate of evaporation of an aqueous solution decreases with an increase in humidity.
- (c) Sponge though compressible is solid.

Answer:

- (a) Evaporation produces cooling because the liquid that gets evaporated draws the latent heat of vaporisation from the other particle in contact with it.
- (b) The rate of evaporation of an aqueous solution decreases with an increase in humidity because when the humidity is high, it is observed that the air possesses more water vapours. Due to this, it will not draw more water vapours. Therefore, it decreases with the increase in humidity.
- (c) Sponge is considered as solid because it has a defined volume and shape. It is compressible because of tiny holes where the air is trapped.

Q5. Why does the temperature of a substance remain constant during its melting point or boiling point?

Answer:

The temperature of a substance remains constant during its melting and boiling point because the change in any state of matter, as solid to liquid or liquid to gas, involves crossing the latent heat of fusion which causes a difference in the intermolecular spacing of the molecules in the substance.

CBSE Class 9 Science Chapter 1 MCQs

Q1. _____ phenomena would increase on raising 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

Answer:

- (c) Evaporation, diffusion, expansion of gases phenomena would increase on raising the temperature.

Q2. The property of flow is unique to fluids. _____ is the correct statement.

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

Answer:

(c) Gases and liquids behave like fluids.

Q3. What is the boiling point of water at sea level?

- (a) 0 °C
- (b) 273 K
- (c) 373 K
- (d) 273 °C

Answer:

(c), 373 K is the boiling point of water at sea level.