

Sublimation Chemistry Questions with Solutions

Q1. Which of the following is known as the reverse of sublimation?

- (a) Desublimation
- (b) Solidification
- (c) Both (a) and (b)
- (d) None of the above

Answer: (a) Desublimation is known as the reverse of sublimation.

Q2. Dry ice is an example of a solid that undergoes

- (a) Solidification
- (b) Sublimation
- (c) Both (a) and (b)
- (d) None of the above

Answer: (b) Dry ice is an example of a solid that undergoes sublimation.

Q3. Which of the following state is not formed during sublimation?

- (a) Solid
- (b) Liquid
- (c) Gas
- (d) None of the above

Answer: (b) Liquid state is not formed during sublimation.

Q4. Which of the following mixture can be separated by sublimation?

- (a) Iodine and Ammonium chloride
- (b) Iodine and sodium chloride
- (c) Magnesium chloride and sodium chloride
- (d) Lead chloride and sodium chloride

Answer: (a) Iodine and ammonium chloride can be separated by using sublimation.

Q5. Which of the following undergo sublimation?

- (a) Naphthalene balls
- (b) Ammonium chloride
- (c) Carbon dioxide
- (d) All of the above
- (e) None of the above

Answer: (d) Naphthalene balls, ammonium chloride and carbon dioxide, undergo sublimation.

Q6. What do you understand by the term sublimation?

Answer: The conversion of a compound directly from solid to gaseous state without getting converted into liquid is known as sublimation. Naphthalene balls, iodine, ammonium chloride, camphor and carbon dioxide undergo sublimation.

Q7. Why do naphthalene balls vanish with time without leaving any solid?

Answer: Naphthalene balls disappear with time without leaving any solid because they undergo sublimation, i.e. they convert directly into vapours and disappear into the air without leaving any solid.

Q8. Why does the smell of the perfume spread all around the room?

Answer: The smell of the perfume spreads all around the room because perfume particles diffuse quickly into the air, and we can sense its fragrance several miles away.

Q9. What will happen if the dry ice is at room temperature and one atmospheric pressure? Name the phenomenon involved.

Answer: Dry ice sublimates at room temperature and one atmospheric pressure without leaving any residue. Sublimation is involved.

Q10. What is dry ice? Explain its significance.

Answer: Solid carbon dioxide is known as dry ice. It does not change into the liquid state on heating but directly into the gaseous state.

Q11. Why does a substance sublime?

Answer: A substance sublimates due to heat absorption that supplies sufficient energy for molecules to overwhelm the neighbour's attractive forces and flee into the gaseous state.

Q12. Does sublimation require heat?

Answer: Yes, sublimation requires some heat. It is an endothermic process.

Q13. Match the following.

Column A	Column B
Solid	Can flow in all directions.
Sublimation	The temperature at which liquid changes into the gaseous state.
Boiling point	Any number of free surfaces.
Gases	Gaps between particles.
Intermolecular space	Change of state from solid to gas.

Answer:

Column A	Column B
Solid	Any number of free surfaces.
Sublimation	Change of state from solid to gas.
Boiling point	The temperature at which liquid changes into the gaseous state.
Gases	Can flow in all directions.
Intermolecular space	Gaps between particles.

Q14. Match the following.

Column A	Column B
Sublimation	Change the liquid state into vapours without reaching its boiling point.
Evaporation	Heat required to change the state of 1 Kg of solid into a liquid.
Latent heat of vaporisation	Heat required to change the state of 1 Kg liquid into vapours.
Latent heat of fusion	Change of solid directly into vapours.

Answer:

Column A	Column B
Sublimation	Change of solid directly into vapours.
Evaporation	Change the liquid state into vapours without reaching its boiling point.
Latent heat of vaporisation	Heat required to change the state of 1 Kg of solid into a liquid.
Latent heat of fusion	Heat required to change the state of 1 Kg liquid into vapours.

Q15. How will you differentiate between sublimation and evaporation?

Answer: We can differentiate between sublimation and evaporation in the following ways.

S. No.	Sublimation	Evaporation
1.	Sublimation refers to the change of the solid form into the gaseous state.	Evaporation refers to the change of the liquid state into the gaseous state.
2.	The initial state of sublimation is solid.	The initial state of evaporation is liquid.
3.	The enthalpy of sublimation tells us about the energy required for sublimation to occur.	The enthalpy of evaporation tells us about the energy required for evaporation to occur.

Practise Questions on Sublimation

Q1. How will you separate a mixture of naphthalene and ammonium chloride? Instruct an activity to isolate them with a well-labelled diagram.

Answer: Naphthalene is insoluble in water but soluble in benzene (organic solvent). 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.

Method:

Step 1: Add water to the mixture and shake it vigorously to dissolve ammonium chloride.

Step 2: Filter the mixture. Naphthalene is obtained as residue, whereas filtrate contains ammonium chloride. Crystallise the filtrate by heating till a saturated solution of ammonium chloride is obtained.

Step 3: Cool the hot saturated solution to get ammonium chloride crystals.

Q2. How will you separate a mixture of sand, iron filings, ammonium chloride and sodium chloride? Instruct an activity to isolate them.

Answer: Iron filings are magnetic. Ammonium chloride changes into vapours at room temperature. Sodium chloride is soluble in water, while sand is insoluble in water.

Method:

Step 1: Separate iron filings with the help of a magnet.

Step 2: Sublimation of the remaining mixture separates ammonium chloride when solid directly converts to gaseous vapours.

Step 3: Add water to the remaining mixture, stir and filter out sand by filtration.

Step 4: The filtrate can be evaporated to get back sodium chloride.

Q3. Which substance undergoes sublimation?

Answer: A range of solids, including water, iodine, arsenic, and solid carbon dioxide (dry ice), can sublime at normal temperatures and pressures. We can sometimes make other materials sublime by creating low-pressure conditions.

Q4. Explain a good example of sublimation in everyday life?

Answer: The bathroom air freshener is an example of sublimation in everyday life—the strong sublimes and releases the good smell in the bathroom over a certain time. Naphthalene mothballs are used to scare moths and other pests home.

Q5. What do you understand by the term sublimation molar heat?

Answer: The sublimation molar heat (or enthalpy) is the amount of energy that must be applied to a solid mole at constant pressure to convert it directly into a gas (without going through the liquid phase).

