

BYJU'S Study Planner for Board Term I (CBSE Grade 12)

Date: 19/11/2021

Subject: Chemistry

Topic : Solutions

Class: Standard XII

1. Read the passage given below and answer the following questions:

A soluble solid in solution has the effect of raising its boiling point and depressing its freezing point. The addition of non-volatile substances to a solvent decreases the vapor pressure and the added solute particles affects the formation of pure solvent crystals. According to many researches the decrease in freezing point directly correlated to the concentration of solutes dissolved in the solvent. This phenomenon is expressed as freezing point depression and it is useful for several applications such as freeze concentration of liquid food and to find the molar mass of an unknown solute in the solution. Freeze concentration is a high quality liquid food concentration method where water is removed by forming ice crystals. This is done by cooling the liquid food below the freezing point of the solution. When a non-volatile solid is added to pure water it will

- A. Boils above $100^{\circ}C$ and freezes above $0^{\circ}C$
- B. Boils above $100^{\circ}C$ and freezes below $0^{\circ}C$
- C. Boils below $100^{\circ}C$ and freezes above $0^{\circ}C$
- D. Boils below $100^{\circ}C$ and freezes below $0^{\circ}C$

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2. Read the passage given below and answer the following questions:

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Identify which of the following is colligative property:

- A.** Freezing point
- B.** Boiling point
- C.** Osmotic pressure
- D.** All of the above

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3. Read the passage given below and answer the following questions:
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- A. A
 - B. B
 - C. C
 - D. All have same freezing point
4. Which of the following analogies is correct regarding Raoult's law:
 Depression in freezing point : molality :: Raoult's law : — — —
- A. Molality
 - B. Molarity
 - C. Mole Fraction
 - D. Percentage composition ($\frac{w}{v}$)

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5. Match the items given in Column I and Column II.

	Column I		Column II
(i)	Saturated solution	(a)	Solution having the same osmotic pressure at a given temperature as that of the given solution.
(ii)	Binary solution	(b)	A solution whose osmotic pressure is less than that of another.
(iii)	Isotonic solution	(c)	Solution with two components
(iv)	Hypotonic solution	(d)	A solution which contains the maximum amount of solute that can be dissolved in a given amount of solvent at a given temperature.
(v)	Solid Solution	(e)	A solution whose osmotic pressure is more than another.
(vi)	Hypertonic Solution	(f)	A solution in the solid phase

- A.** (i) → (b), (ii) → (c), (iii) → (d), (iv) → (a), (v) → (e), (vi) → (f)
- B.** (i) → (c), (ii) → (b), (iii) → (d), (iv) → (a), (v) → (e), (vi) → (f)
- C.** (i) → (b), (ii) → (d), (iii) → (c), (iv) → (a), (v) → (e), (vi) → (f)
- D.** (i) → (d), (ii) → (c), (iii) → (a), (iv) → (b), (v) → (f), (vi) → (e)

6. Assertion (A): Elevation in boiling point is a colligative property.

Reason (R): Elevation in boiling point is directly proportional to molality.

- A.** Both *A* and *R* are true and *R* is the correct explanation of *A*
- B.** Both *A* and *R* are true but *R* is NOT the correct explanation of *A*
- C.** *A* is true but *R* is false
- D.** *A* is false and *R* is true

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7. Assertion (A): An ideal solution obeys Henry's law.
Reason (R): In an ideal solution, solute-solute as well as solvent-solvent interactions are similar to solute-solvent interaction.
- A. Both A and R are true and R is the correct explanation of A
 - B. Both A and R are true and R is NOT the correct explanation of A
 - C. A is true but R is false
 - D. A is false but R is True
8. Assertion : Azeotropic mixtures are formed only by non - ideal solutions and they may have boiling points either greater than both the components or less than both the components.
Reason : The composition of the vapour phase is same as that of the liquid phase of an azeotropic mixture.
- A. Both assertion and reason are correct and the reason is a correct explanation of the assertion
 - B. Both assertion and reason are correct but reason is not a correct explanation of the assertion
 - C. The assertion is correct but reason is incorrect
 - D. Both assertion and reason are incorrect
9. The gas with highest value of Henry's constant for the solubility in water among the following
- A. He
 - B. O_2
 - C. Methane
 - D. Vinyl chloride

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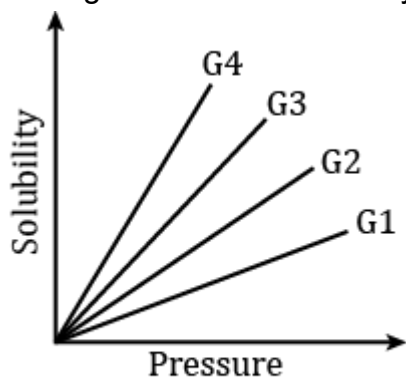
10. p_A and p_B are the vapour pressures of pure liquid components, A and B , respectively of an ideal binary solution. If x_A represents the mole fraction of component A , the total pressure (P) of the solution will be:
- A. $p_A + x_A(p_B - p_A)$
 - B. $p_A + x_A(p_B + p_A)$
 - C. $p_B + x_A(p_B - p_A)$
 - D. $p_B + x_A(p_A - p_B)$
11. An unripe mango placed in a concentrated salt solution to prepare pickle, shrivels because:
- A. It gains water due to osmosis
 - B. It loses water due to reverse osmosis
 - C. It gains water due to reverse osmosis
 - D. It loses water due to osmosis
12. Which of the following statements is false?
- A. Units of atmospheric pressure and osmotic pressure are the same
 - B. In reverse osmosis, solvent molecules move through a semipermeable membrane from a region of lower concentration of solute to a region of higher concentration
 - C. The value of molal depression constant depends on nature of solvent
 - D. Relative lowering of vapour pressure, is a dimensionless quantity

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13. If molality of the dilute solution is doubled, the value of molal depression constant (K_f) will be:
- A. Doubled
 - B. Halved
 - C. Tripled
 - D. Unchanged
14. 20 g of non-electrolyte, non-volatile solute ($C_xH_{2x}O_x$) when dissolved in 100 g water at 100°C , lowers the vapour pressure of solution by $\left(\frac{1}{100}\right)$ th of the vapour pressure of pure water. What is formula of the compound?
- A. $C_6H_{12}O_6$
 - B. $C_{12}H_{24}O_{12}$
 - C. $C_{44}H_{88}O_{44}$
 - D. $C_3H_6O_3$

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15. The variation of solubility of four different gases (G_1, G_2, G_3, G_4) in a given solvent with pressure at a constant temperature is given below. The gas having lowest value of Henry's law constant is:



- A. G_1
- B. G_2
- C. G_4
- D. G_3
16. A mixture of 2 moles of H_2 , 3 moles of NH_3 , 4 moles of CO_2 and 5 moles of N_2 exerts a total pressure of 798 torr. What is the partial pressure of CO_2 gas ?
- A. 286 torr
- B. 117 torr
- C. 228 torr
- D. 415 torr

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17. Which of the following condition(s) is/are valid for an ideal solution?

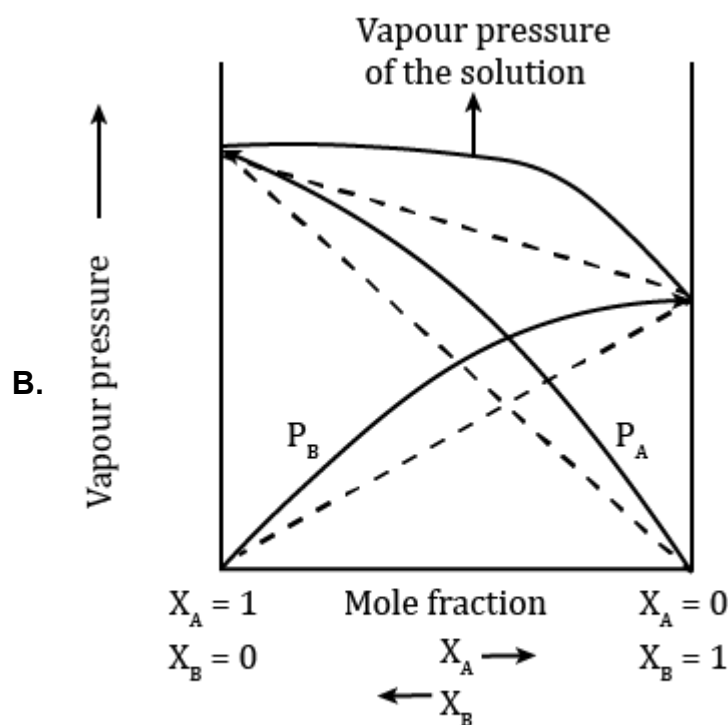
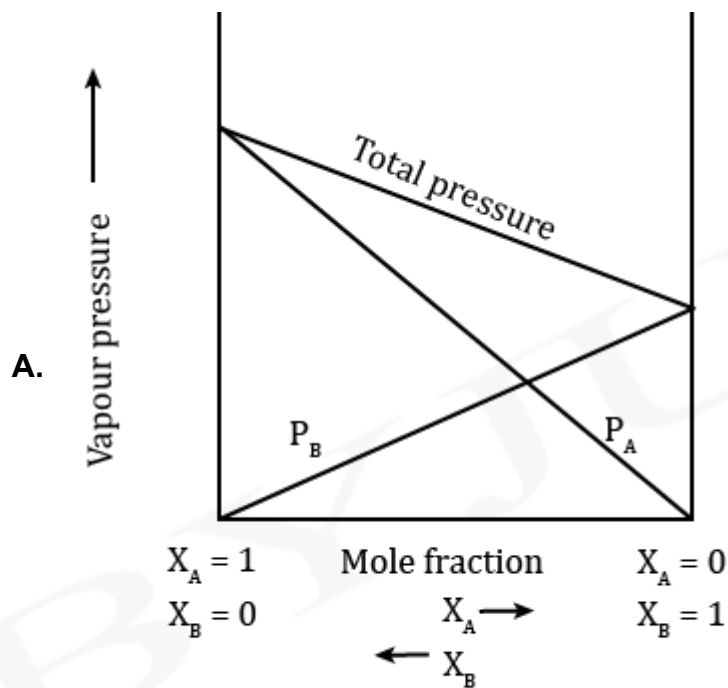
- A.** No change in volume on mixing. $\Delta V_{mix} = 0$
- B.** No change in enthalpy on mixing. $\Delta H_{mix} = 0$
- C.** Entropy on mixing $\Delta S_{mix} > 0$
- D.** All of the above.

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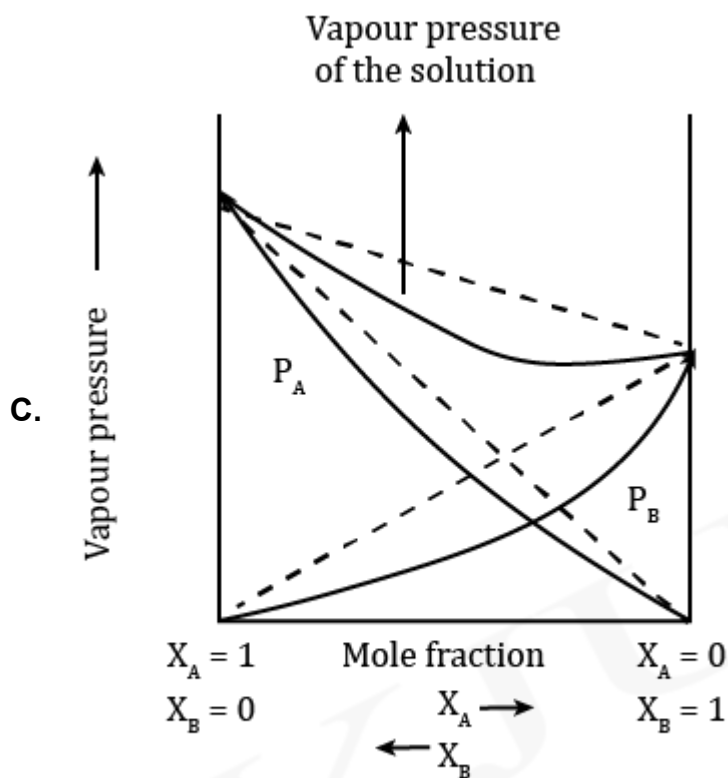
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18. Which of the following graph is valid for a solution containing phenol and aniline?

Assume that at the given constant temperature of solution, vapour pressure of phenol (A) in pure state is more than that of aniline (B) in pure state.



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D. None of the above

19. Calculate the (V/V)% of a solution of 15 mL of alcohol in 60 mL of water.

- A.** 10
- B.** 20
- C.** 30
- D.** 40

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20. Given that vapour pressure of water vapour at 29°C is 30 torr and relative humidity is 0.9 . Calculate the partial pressure of water vapour at the same temperature
- A. 9 torr
 - B. 30 torr
 - C. 87 torr
 - D. 27 torr