AIPMT 2009

1. A 0.0020 m aqueous solution of an ionic compound $[Co(NH_3)_5(NO_2)]Cl$ freezes at – 0.00732°C. Number of moles of ions which 1mol of ionic compound produces on being dissolved in water will be (K_f = 1.86°C m^{-1}) :-

(1) 1 (2) 2 (3) 3 (4) 4

AIPMT 2010

2. An aqueous solution of KI is 1.00 molal. Which change will cause increase in vapour pressure of the solution ?

(1) Addition of water

(2) Addition of NaCl

(3) Addition of Na_2SO_4

(4) Addition of 100 molal KI

3. A solution of sucrose (molar mass = 342 g mol^{-1}) has been prepared by dissolving 68.5 g of sucrose in 1000 g of water. The freezing point of the solution obtained will be :-

(K_f for water = 1.86 K kg mol^{-1})

(1) –0.570°C (2) –0.372°C

(3) –0.520°C (4) +0.372°C

AIPMT Pre. 2011

4. The freezing point depression constant for water is –1.86°C m^{-1}. If 5 g Na_2SO_4 is dissolved in 45.0 g H_2O, the freezing point is changed by –3.82°C. Calculate the Van't Hoff factor for Na_2SO_4

(1) 2.05 (2) 2.63

(3) 3.11 (4) 0.381

5. The Van't Hoff factor i for a compound which undergoes dissociation in one solvent and association in other solvent is respectively :

(1) Less than one and greater than one

(2) Less than one and less than one

(3) Greater than one and less than one

(4) Greater than one and greater than one

6. Mole fraction of the solute in a 1.00 molal aqueous solution is :

(1) 0.1770 (2) 0.0177

(3) 0.0344 (4) 1.7700

AIPMT Mains 2011

7. 200 mL of an aqueous solution of a protein contain its 1.26 g. The Osmotic pressure of this solution at 300 K is found to be 2.57×10^{-3} bar. The molar mass of protein will be :-

(R = 0.083 L bar mol^{-1} K^{-1})

(1) 61038 g mol^{-1} (2) 51022 g mol^{-1}

(3) 122044 g mol^{-1} (4) 31011 g mol^{-1}

AIPMT Pre 2012

8. p_A and p_B are the vapour pressure 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 of the solution will be.

(1) $p_B + x_A (p_B - p_A)$ (2) $p_B + x_A (p_A - p_B)$

(3) $p_A + x_A (p_B - p_A)$ (4) $p_A + x_A (p_A - p_B)$

AIPMT Mains 2012

9. Which of the following compounds can be used as antifreeze in automobile radiators ?

(1) Nitrophenol (2) Ethyl alcohol

(3) Methyl alcohol (4) Glycol

10. Vapour pressure of chloroform ($CHCl_3$) and dichloromethane (CH_2Cl_2) at 25°C are 200 mmHg and 415 mmHg respectively. Vapour pressure of the solution obtained by mixing 25.5 g of $CHCl_3$ and 40g of CH_2Cl_2 at the same temperature will be: (Molecular mass of $CHCl_3$ = 119.5 u and molecular mass of CH_2Cl_2 = 85 u)

(1) 347.9 mmHg (2) 280.5 mmHg

(3) 173.9 mmHg (4) 615 mmHg

NEET-UG 2013

11. 6.02×10^{20} molecules of urea are present in 100mL of its solution. The concentration of solution is :-

(1) 0.1 M (2) 0.02 M

(3) 0.01 M (4) 0.001M

AIPMT 2014

12. Of the following 0.10m aqueous solutions, which one will exhibit the largest freezing point depression?

(1) KCl (2) $C_6H_{12}O_6$

(3) $Al_2(SO_4)_3$ (4) K_2SO_4

AIPMT 2015

13. The boiling point of 0.2 mol kg^{-1} solution of X in water is greater than equimolal solution of Y in water. Which one of the following statements is true in this case?

(1) Molecular mass of X is greater than the molecular mass of Y.

(2) Molecular mass of X is less than the molecular mass of Y.

(3) Y is undergoing dissociation in water while X undergoes no change.

(4) X is undergoing dissociation in water while Y undergoes no change.

14. Which one is not equal to zero for an ideal solution:-

(1) ΔS_{mix}

(2) ΔV_{mix}

(3) $\Delta P = P_{observed} - P_{Raoult}$

(4) ΔH_{mix}

15. Which one of the following electrolytes has the same value of van't Hoff's factor (i) as that of the $Al_2(SO_4)_3$ (if all are 100% ionised) ?

(1) $K_3[Fe(CN)_6]$ (2) $Al(NO_3)_3$

(3) $K_4[Fe(CN)_6]$ (4) K_2SO_4

Re-AIPMT 2015

16. What is the mole fraction of the solute in a 1.00 m aqueous solution ?

(1) 0.0354 (2) 0.0177

(3) 0.177 (4) 1.770

NEET-I 2016

17. Which of the following statement about the composition of the vapour over an ideal a 1 : 1 molar mixture of benzene and toluene is correct? Assume that the temperature is constant at (25°C).

(Given : Vapour Pressure Data at 25°C, benzene = 12.8 kPa, Toluene = 3.85 kPa)

(1) The vapour will contain a higher percentage of benzene

(2) The vapour will contain a higher percentage of toluene

(3) The vapour will contain equal amounts of benezene and toluene

(4) Not enough information is given to make a predication

18. At 100°C the vapour pressure of a solution of 6.5g of a solute in 100 g water is 732 mm. If K_b = 0.52 °C m^{-1}, the boiling point of this solution will be :-

(1) 101°C (2) 100°C

(3) 102°C (4) 103°C

19. Consider the following liquid - vapour equilibrium.

Liquid $\rightleftharpoons$ Vapour

Which of the following relations is **correct** ?

(1) $\frac{d\ell nG}{dT^2} = \frac{\Delta H_v}{RT^2}$ (2) $\frac{d\ell nP}{dT} = \frac{-\Delta H_v}{RT}$

(3) $\frac{d\ell nP}{dT^2} = \frac{-\Delta H_v}{T^2}$ (4) $\frac{d\ell nP}{dT} = \frac{\Delta H_v}{RT^2}$

NEET-II 2016

20. The van't Hoff factor (i) for a dilute aqueous solution of the strong electrolyte barium hydroxide is

(1) 2 (2) 3 (3) 0 (4) 1

21. Which one of the following is **incorrect** for ideal solution ?

(1) $\Delta P = P_{obs} - P_{calculated\ by\ Raoult's\ law} = 0$

(2) $\Delta G_{mix} = 0$

(3) $\Delta H_{mix} = 0$

(4) $\Delta U_{mix} = 0$

NEET(UG) 2017

22. If molality of a dilute solution is doubled, the value of molal depression constant (K_f) will be :-
(1) halved (2) tripled
(3) unchanged (4) doubled

23. Which of the following is dependent on temperature?
(1) Molarity (2) Mole fraction
(3) Weight percentage (4) Molality

NEET(UG) 2019

24. For an ideal solution, the **correct** option is :-
(1) Δ_{mix} S = 0 at constant T and P
(2) Δ_{mix} V ≠ 0 at constant T and P
(3) Δ_{mix} H = 0 at constant T and P
(4) Δ_{mix} G = 0 at constant T and P

NEET(UG)(Odisha) 2019

25. Which of the following statements is correct regarding a solution of two compounds A and B exhibiting positive deviation from ideal behaviour?
(1) Intermolecular attractive forces between A-A and B-B are stronger than those between A-B.
(2) Δ_{mix} H = 0 at constant T and P
(3) Δ_{mix} V = 0 at constant T and P
(4) Intermolecular attractive forces between A-A and B-B are equal to those between A-B.

26. The density of 2 M aqueous solution of NaOH is 1.28 g/cm^3. The molality of the solution is
[Given that molecular mass of NaOH = 40 g mol^{-1}]
(1) 1.20 m (2) 1.56 m
(3) 1.67 m (4) 1.32 m

NEET (UG) 2020

27. The freezing point depression constant (K_f) of benzene is 5.12 K kg mol^{-1}. The freezing point depression for the solution of molality 0.078 m containing a non-electrolyte solute in benzene is (rounded off upto two decimal places) :
(1) 0.60 K (2) 0.20 K (3) 0.80 K (4) 0.40 K

28. The mixture which shows positive deviation from Raoult's law is :-
(1) Chloroethane + Bromoethane
(2) Ethanol + Acetone
(3) Benzene + Toluene
(4) Acetone + Chloroform

NEET (UG) 2020 (COVID-19)

29. If 8g of a non-electrolyte solute is dissolved in 114 g of n-octane to reduce its vapour pressure to 80%, the molar mass (in g mol^{-1}) of the solute is
[Given that molar mass of n-octane is 114 g mol^{-1}]
(1) 40 (2) 60 (3) 80 (4) 20

30. Isotonic solutions have same
(1) vapour pressure
(2) freezing temperature
(3) osmotic pressure
(4) boiling temperature

NEET (UG) 2021

31. The following solutions were prepared by dissolving 10 g of glucose ($C_6H_{12}O_6$) in 250 ml of water (P_1), 10 g of urea (CH_4N_2O) in 250 ml of water (P_2) and 10 g of sucrose ($C_{12}H_{22}O_{11}$) in 250 ml of water (P_3). The right option for the decreasing order of osmotic pressure of these solutions is :
(1) $P_2 > P_1 > P_3$ (2) $P_1 > P_2 > P_3$
(3) $P_2 > P_3 > P_1$ (4) $P_3 > P_1 > P_2$

32. The correct option for the value of vapour pressure of a solution at 45°C with benzene to octane in molar ratio 3 : 2 is :
[At 45°C vapour pressure of benzene is 280 mm Hg and that of octane is 420 mm Hg. Assume Ideal gas]
(1) 160 mm of Hg (2) 168 mm of Hg
(3) 336 mm of Hg (4) 350 mm of Hg

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	**2**	**1**	**2**	**2**	**3**	**2**	**1**	**2**	**4**	**1**	**3**	**3**	**4**	**1**	**3**
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	**2**	**1**	**1**	**4**	**2**	**2**	**3**	**1**	**3**	**1**	**3**	**4**	**2**	**1**	**3**
Que.	31	32													
Ans.	**1**	**3**													