



CHEMISTRY

BOOKS - NTA MOCK TESTS

SOLUTIONS TEST

Multiple Choice Questions

1. In a $0.2m$ aqueous solution of weak acid, HX, the degree of ionization is 0.3. Taking K_f for water as $185Kkgmole^{-1}$, the freezing point of the solution will be nearest to :

A. $-0.360^{\circ}C$

B. $-0.260^{\circ}C$

C. $+0.480^{\circ}C$

D. $272.52K$

Answer: D

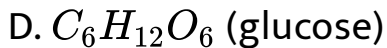
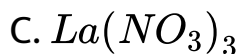


[View Text Solution](#)

2. The freezing point of equimolar aqueous solutions will be highest for :

A. $C_6H_5NH_3$ (aniline hydrochloride)

B. $Ca(NO_3)_2$



Answer: D



View Text Solution

3. The degree of dissociation (α) of a weak electrolyte, K_2SO_4 is related to Vant Hoff factor (i) by the expression

A. $I = 1 + 2 \alpha$

B. $I = 1 + 3 \alpha$

C. $I = 1 + \alpha$

$$D. I = 1 + 4 \alpha$$

Answer: A



[View Text Solution](#)

4. At $80^{\circ}C$, the vapour pressure of pure liquid A is 520 mm Hg and that of pure liquid B is 1000 mm Hg. If a mixture solution of A and B boils at $80^{\circ}C$ and 1 atm pressure, the amount of A in the mixture is:

(1 atm = 760 mm Hg)

A. 50 mol %

B. 52 mol %

C. 34 mol %

D. 48 mol %

Answer: A



View Text Solution

5. 1.00 g of a non-electrolyte solute dissolved in 50 g of benzene lowered the freezing point of benzene by 0.40

K. The freezing point depression constant of benzene is

5.12 K kg mol⁻¹. The molar mass of the solute is

A. 256 kg/mol

B. 256 g mol

C. 256 g/mol

D. 256 mg/mol

Answer: C

 [View Text Solution](#)

6. The molal freezing point depression constant for benzene (C_6H_6) is $4.90 \text{ K kg mol}^{-1}$. Selenium exists as a polymer of the type Se_x . When 3.26 g of selenium is dissolved in 226 g of benzene, the observed freezing point is 0.112°C lower than that of pure benzene. The molecular formula of selenium is:

(Atomic mass of Se = 78.8 g mol^{-1})

A. Se_4

B. Se_2

C. Se_6

D. Se_8

Answer: D



View Text Solution

7. Lowering of vapour pressure: Δp , elevation in boiling point: ΔT_b , and depression in freezing point : ΔT_f of a solvent for the same molar concentration of each of the three solutes:

A. sugar, B. NaCl and C. $BaCl_2$ follow the sequence

A. $\Delta p: A < B < C$

B. $\Delta T_b: C > B > A$

C. $\Delta T_f: A < B < C$

D. All of these

Answer: D



View Text Solution

8. The ratio of the vapour pressure of two miscible liquids A and B in pure state is 1 : 3 at a certain temperature. n_A moles of A and no moles of B are mixed to form an ideal solution. If the ratio of moles of A and B in the vapour phase was found to be 4 : 3, the ratio of moles of A and B in the phase they were mixed is:

A. $\frac{4}{5}$

B. 4

C. $\frac{2}{3}$

D. $\frac{1}{3}$

Answer: B



[View Text Solution](#)

9. 0.5 m aqueous solution of a weak acid (HX) is 20 % ionised. If K_f for water is $1.86Kkgmol^{-1}$, the following in freezing point of the solution is :

A. $0.56k$

B. $1.12K$

C. $-0.56k$

D. $-1.12K$

Answer: B



[View Text Solution](#)

10. The freezing point depression constant for water is $1.86^{\circ}Cm^{-1}$. If 5 g of Na_2SO_4 is dissolved in $45gH_2O$, the freezing point is changed by $-3.82^{\circ}C$. Calculate the Van't Hoff factor for Na_2SO_4 .

A. 205

B. 2. 63

C. 3. 11

D. 0. 381

Answer: B



View Text Solution

11. A substance will be deliquescent if its vapour pressure

:

A. is equal to the atmospheric pressure

B. is equal to that of water-vapour in air

C. is less than that of water-vapour in air

D. D is greater than that of water-vapour in air

Answer: C



View Text Solution

12. The relative lowering of vapour pressure of an aqueous solution containing a non volatile solute is 0.125. What is the molality of this solution?

A. 793

B. 6. 93

C. 5. 93

D. 4. 93

Answer: A

 [View Text Solution](#)

13. The vapour pressure of water at $20^{\circ}C$ is 17.5 mm Hg.

If 18 g of glucose ($C_6H_{12}O_6$) is added to 178.2 g of water at $20^{\circ}C$, the vapour pressure of the resulting solution will be

A. 17.675 mm Hg

B. 15.750 mm Hg

C. 16.500 mm Hg

D. 17.325 mm Hg

Answer: D



View Text Solution

14. The freezing point of water is depressed by $0.37^{\circ}C$ in 0.01 molal NaCl solution. The freezing point of 0.02 molal solution of urea is depressed by

A. $0.37^{\circ}C$

B. $0.74^{\circ}C$

C. $0.185^{\circ}C$

D. $0^{\circ}C$

Answer: A



[View Text Solution](#)

15. A solution of sucrose (Molar mass = 342 g /mol) is prepared by dissolving 68.4 g of it per litre of solution, what is its osmotic pressure ($R = 0.082 \text{ L atm } K^{-1} \text{ mol}^{-1}$) at $273K$?

A. 4.48 atm

B. 2 atm

C. 1 atm

D. 5 atm

Answer: A



[View Text Solution](#)

16. At a constant temperature, which of the following aqueous solutions will have the maximum vapour pressure ?

(Mol. Wt. $NaCl$ 58.5, $H_2SO_4 = 98.0 \text{ g mol}^{-1}$)

A. 1 molal $NaCl$ (aq)

B. 1 molar $NaCl$ (aq)

C. 1 molal H_2SO_4 (aq)

D. 1 molar H_2SO_4 (aq)

Answer: A



View Text Solution

17. The osmotic pressure of 0.4% urea solution is 1.66 atm and that of a solution of sugar of 3.42% is 2.46 atm. When equal volumes of both the solutions are mixed then the osmotic pressure of the resultant solution will be?

A. 1.02 atm

B. 2.06 atm

C. 3.04 atm

D. 0.02 atm

Answer: B



[View Text Solution](#)

18. If liquids A and B form an ideal solution then

- A. The entropy of mixing is zero
- B. The Gibbs free energy as well as the entropy of mixing are each zero
- C. The Gibbs free energy as well as the enthalpy of mixing are each zero
- D. The enthalpy of mixing is zero

Answer: D



View Text Solution

19. At 40°C , the vapour pressure (in torr) of methyl alcohol (A) and ethyl alcohol (B) solution is represented by:

$P = 120X_A + 138$, where X_A is mole fraction of methyl alcohol. The value of

$P_{\text{Limit}}^{X_A \rightarrow 0}$ & $P_{\text{limit}}^{X_B \rightarrow 0}$ are

A. 138, 258

B. 258, 138

C. 120, 138

D. 138, 125

Answer: A



[View Text Solution](#)

20. Regarding the solubility of gas which of the following is incorrect?

A. A Higher the value of Henry's law constant at a given pressure, the lower is the solubility of gas in the liquid

B. Solubility of a gas in a liquid decreases with increase in temperature and pressure

C. The dissolution of gas in a liquid is exothermic process

D. All of the above are correct

Answer: B



View Text Solution

21. Mole fraction of the toluene in the vapour phase which is in equilibrium with a solution of benzene

($p^\circ = 120$ Torr) and toluene

($p^\circ = 80$ Torr) having 2.0 moles of each, is

A. 0.50

B. 0.25

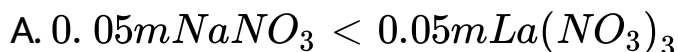
C. 0.60

D. 0.40

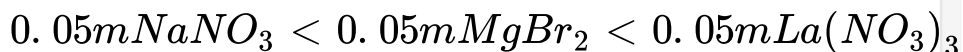
Answer: D

 [View Text Solution](#)

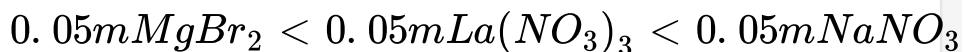
22. The correct order of increasing boiling point is



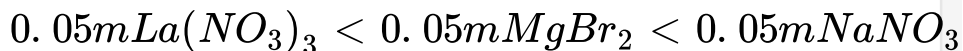
B.



C.



D.



Answer: B

 [View Text Solution](#)

23. At $35^\circ C$ the vapour pressure of CS_2 is 512 mm Hg, and of acetone, CH_3COCH_3 , is 344 mm Hg. A solution of CS_2 and acetone in which the mole fraction of CS_2 is 0.25 has a total vapour pressure of 600 mm Hg. Which of the following statements about solution of acetone CS_2 is true ?

A. A mixture of 100 ml of acetone and 100 ml of CS_2 has a total volume of 200 ml.

B. When acetone and CS_2 are mixed at $35^\circ C$, heat must be absorbed in order to produce a solution at $35^\circ C$.

C. When acetone and CS_2 are mixed at $35^\circ C$, heat is released.

D. Raoult's law is obeyed by both CS_2 and acetone for the solution in which the mole fraction of CS_2 is 0.25.

Answer: B



View Text Solution

24. The boiling point of pure water is 373.15K . If 32.5g of KCN is dissolved in 100mL of H_2O , then what is the boiling point of the solution ?

(Assume that molarity = molality)

(K_b for $\text{H}_2\text{O} = 0.52\text{Kkgmol}^{-1}$)

(Molar mass of $\text{KCN} = 65\text{gmmol}^{-1}$)

A. 105.20°C

B. 100.52°C

C. 373.67K

D. 273.67K

Answer: A



View Text Solution

25. When mercuric iodide is added to the aqueous solution of potassium iodide, the

- A. Freezing point is raised.
- B. Freezing point is lowered
- C. Freezing point does not change
- D. Boiling point does not change

Answer: A



View Text Solution

26. What will be the mass of a non-volatile solute (Molar mass = 40g mol^{-1})

Which should be dissolved in 114 g octane to reduce its vapour pressure to 80 %

A. 10 g

B. 4 g

C. 2 g

D. 16 g

Answer: A



View Text Solution

27. Assuming very dilute aqueous solution of urea, calculate the vapour pressure of solution (in mm of Hg) of 0.1 moles of urea in 180 grams of water at $25^{\circ}C$ is (The vapour pressure of water at $25^{\circ}C$ is 24 mm Hg)

A. 2.376 mm Hg

B. 20.76 mm Hg

C. 23.76 mm Hg

D. 24.76 mm Hg

Answer: C



View Text Solution

28. 0.01 M solution of KCl and $CaCl_2$ are separately prepared in water. The freezing point of KCl is found to be $-2^\circ C$. What is the freezing point of $CaCl_2$ aq. Solution if it is completely ionized ?

A. $-3^\circ C$

B. $+3^\circ C$

C. $-2^\circ C$

D. $-4^\circ C$

Answer: A



View Text Solution

29. The vapour pressures of pure benzene and toluene are 160 and 60mm Hg respectively. The mole fraction of benzene is vapour phase in contact with equimolar solution of benzene and toluene is

A. 0. 073

B. 0. 027

C. 0. 27

D. 0. 73

Answer: D



[View Text Solution](#)

30. The freezing point of benzene decreases by 0.45°C on adding 0.2g of acetic acid to 20g of benzene. If acetic acid associates to form a dimer in benzene, then what is the percentage association of acetic acid in benzene ?

(K_f for benzene = 5.12Kkgmol^{-1})

A. 80.4%

B. 74.6%

C. 94.6%

D. 64.6%

Answer: C



View Text Solution

