PHYSICAL CHEMISTRY

NEET

CRASH COURSE

## LIQUID SOLUTION

SMART ACHIEVERS

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LIQUID SOLUTION

Q.1 Colligative properties of the solution depend upon
(1) Nature of the solution
(2) Nature of the solvent
(3) Number of solute particles
(4) Number of moles of solvent

Q.2 $FeCl_3$ on reaction with $K_4[Fe(CN)_6]$ in aq. solution gives blue colour. These are separated by a semipermeable membrane PQ as shown. Due to osmosis there is-
(1) blue colour formation in side X
(2) blue colour formation in side Y
(3) blue colour formation in both of the sides X and Y
(4) no blue colour formation
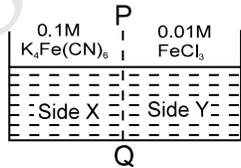
Q.3 The molarity of 0.04 N $Ba(OH)_2$ as a base is:-
(1) 0.02 M
(2) 0.08 M
(3) 0.04 M
(4) 0.06 M

Q.4 Which one of the following is the incorrect form of Raoult's law

(1) $\dfrac{P_s}{P^0} = \dfrac{N}{n+N}$
(2) $\dfrac{P^0}{P^0 - P_s} = 1 + \dfrac{N}{n}$
(3) $\dfrac{P^0 - P_s}{P_s} = \dfrac{n}{n+N}$
(4) $\dfrac{P_s}{P^o - P_s} = \dfrac{N}{n}$

Q.5 The osmotic pressure of a solution increases if :
(1) Temperature is lowered
(2) Volume is increased
(3) Number of solute molecules is increased
(4) None

Q.6 The Vant Hoff factor (i) for a dilute solution of $K_3[Fe(CN)_6]$ is :
(1) 10
(2) 4
(3) 5
(4) 0.25

Q.7 The freezing point of 1 molal NaCl solution assuming NaCl to be 100% dissociated in water is:
(K_f = 1.86 K Molality^{-1})
(1) –1.86 °C
(2) –3.72 °C
(3) +1.86 °C
(4) + 3.72 °C

Q.8 Which is the correct relation between osmotic pressure of 0.1M NaCl solution and 0.1M Na_2SO_4 solution?
(1) The osmotic pressure of Na_2SO_4 is less than NaCl solution
(2) The osmotic pressure Na_2SO_4 is more than NaCl solution
(3) Both have same osmotic pressure
(4) None of the above

Q.9 The following solutions have equal concentrations. Which one will show minimum osmotic pressure?
(1) $BaCl_2$
(2) $AgNO_3$
(3) Na_2SO_4
(4) $(NH_4)_3PO_4$

Q.10 The correct relationship between the boiling points of very dilute solutions of $AlCl_3(t_1)$ and $CaCl_2(t_2)$, having the same molar concentration is :
(1) $T_1 = T_2$
(2) $T_1 > T_2$
(3) $T_2 = T_1$
(4) $T_2 > T_1$

Q.11 The freezing point of equimolal aqueous solution will be highest for :
(1) $C_6H_5NH_3Cl$
(2) $Ca(NO_3)_2$
(3) $La(NO_3)_3$
(4) $C_6H_{12}O_6$(Glucose)

Q.12 The van't Hoff factor for 0.1 M $Ba(NO_3)_2$ solution is 2.74 . The degree of dissociation is :-
(1) 91.3%   (2) 87%   (3) 100%   (4) 74%

Q.13 For a solution of two liquids A and B, it was proved that $P = X_A(P_A^0 - P_B^0) + P_B^0$. The solution is:–
(1) Ideal   (2) Non ideal   (3) Semiideal   (4) None of the above

Q.14 Which of the following solution containing components A and B follows Raoult's law :
(1) A – B attraction force is greater then A – A and B – B
(2) A – B attraction force is less than A – A and B – B
(3) A – B attraction force remains same as A – A and B – B
(4) Volume of solution is different from sum of volume of solute and solvent

Q.15 Which of the following is less than zero for ideal solutions ?
(1) ΔH_{mix} (2) ΔV_{mix} (3) ΔG_{mix} (4) ΔS_{mix}

Q.16 Which one of the following aqueous solutions will exhibit highest boiling point ?
(1) 0.01 M Na_2SO_4 (2) 0.01 M KNO_3 (3) 0.015 M urea   (4) 0.015 M glucose

Q.17 Equimolar solutions in the same solvent have :
(1) same boiling point but different freezing point
(2) same freezing point but different boiling point
(3) same boiling and same freezing points
(4) differnet boiling and freezing points

Q.18 Two solutions of a substance (non electrolyte) are mixed in the following manner. 480 ml of 1.5 M first solution + 520 mL of 1.2 M second solution. What is the molarity of the final mixture ?
(1) 1.20 M   (2) 1.50 M   (3) 1.344 M   (4) 2.70 M

Q.19 If α is the degree of dissociation of Na_2SO_4, the vant Hoff's factor (i) used for calculating the moecular mass is :
(1) $1 + \alpha$ (2) $1 - \alpha$ (3) $1 + 2\alpha$ (4) $1 - 2\alpha$.

Q.20 A mixture of ethyl alcohol and propyl alcohol has a vapour pressure of 290 mm at 300 K. The vapour pressure of propyl alcohol is 200 mm. If the mole fraction of ethyl alcohol is 0.6, its vapour pressure (in mm) at the same temperature will be
(1) 700   (2) 360   (3) 350   (4) 300

Q.21 If sodium sulphate is considered to be completely dissociated into cations and anions in aqueous solution, the change in freezing point of water (ΔT_f), when 0.01 mole of sodium sulphate is dissolved in 1 kg of water, is ($K_f = 1.86$ K kg mol^{-1})
(1) 0.0372 K   (2) 0.0558 K   (3) 0.0744 K   (4) 0.0186 K

Q.22 Consider separate solution of 0.500 M C_2H_5OH(aq), 0.100 M $Mg_3(PO_4)_2$(aq), 0.250 M KBr(aq) and 0.125 M Na_3PO_4(aq) at 25°C. Which statement is **true** about these solution, assuming all salts to be strong electrolytes ?
(1) They all have the same osmotic pressure.
(2) 0.100 M $Mg_3(PO_4)_2$(aq) has the highest osmotic pressure.
(3) 0.125 M Na_3PO_4(aq) has the highest osmotic pressure.

(1) 103º C   (2) 101º C   (3) 100º C   (4) 102º C

Q.31   Which of the following statements about the composition of the vapour over an ideal 1 : 1 molar mixture of benzene and toluene is correct ? Assume that the temperature is constant at 25ºC. (Given, Vapour Pressure Data at 25ºC, Benzene = 12.8kPa, toluene = 3.85kPa)   **[NEET-I 2016]**

(1) Not enough information is given to make a prediction.

(2) The vapour will contain a higher percentage of benzene.

(3) The vapour will contain a higher percentage of toluene.

(4) The vapour will contain equal amounts of benzene and toluene.

Q.32   The van't Hoff factor (i) for a dilute aqueous solution of the strong electrolyte barium hydroxide is

(1) 3   (2) 0   (3) 1   (4) 2   **[NEET-II 2016]**

Q.33   Which one of the following is incorrect for ideal solution ?   **[NEET-II 2016]**

(1) $\Delta G_{mix} = 0$ (2) $\Delta H_{mix} = 0$ (3) $\Delta U_{mix} = 0$

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

Q.34   Two elements A and B form compounds of formula AB_2 and AB_4. When dissolved in 20.0 g of benzene 1.0 g of AB_2 lowers f. pt. by 2.3ºC whereas 1.0 g of AB_4 lowers f. pt. by 1.3ºC. The K_f for benzene is 5.1. The atomic masses of A and B are   **[AIIMS 2016]**

(1) 25, 42   (2) 42, 25   (3) 52, 48   (4) 48, 52

Q.35   The freezing point of a solution containing 0.2 g of acetic acid in 20.0 g benzene is lowered by 0.45ºC. The degree of association of acetic acid in benzene is (Assume acetic acid dimerises in benzene and K_f for benzene = 5.12 K kg mol.1) $M_{observed}$ of acetic acid = 113.78   **[AIIMS 2016]**

(1) 94.5%   (2) 54.9%   (3) 78.2%   (4) 100%

Q.36   **Assertion :** Acetone and aniline shows negative deviations.   **[AIIMS 2016]**

Reason : H-bonding between acetone and aniline is stronger than that between acetone-acetone and aniline-aniline.

(1) If both assertion and reason are true and reason is the correct explanation of assertion

(2) If both assertion and reason are true but reason is not the correct explanation of assertion

(3) If assertion is true but reason is false

(4) If both assertion and reason are false

Q.37   If molality of the dilute solution is doubled, the value of molal depression constant (K_f) will be :

                                                     [NEET 2017]

(1) doubled   (2) halved   (3) tripled   (4) unchanged

ANSWER KEY

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