RAVI MATHS TUITION CENTER , CHENNAI- 82. WHATSAPP - 8056206308

Solution

12th Standard

Chemistry

189 x 1 = 189

1) Brass is

(a) Solid solution (b) Liquid solution (c) Gas solution (d) All of these

2) 200 mL of water is added to 500mL of 0.2 M solution. What is the molarity of the dilluted solution ?

(a) 0.5010 M (b) 0.2897 M (c) 0.7093 M (d) 0.1428 M

3) In which mode of expression, the concentration of solution remains independent of temperature ?

(a) Molarity (b) Normality (c) Formality (d) Molality

4) Increasing the temperature of an aqueous solution will cause

(a) Decrease in molality (b) decrease in molarity (c) decrease in mole fraction

(d) decrease in % w/w

5) Molarity of the liquid HCL if density of the solution is 1.17 g/cc is

(a) 36.5 (b) 18.25 (c) 32.05 (d) 42.10

6) 5ml of 1 N HCI, 20ml of N/2 H_2SO_4 and 30ml of N/3 HNO_3 are mixed together and the volume made to one litre. The normality of the resulting solution is

(a) N/5 (b) N/10 (c) N/20 (d) N/40

7) Which one of the following gases has the lowest value of the Henry's law constant ?

(a) N_2 (b) He (c) H_2 (d) CO_2

8) An aqueous solution of methanol in water has vapour pressure

(a) equal to that of water (b) equal to that of methanol (c) more than that of water

(d) less than that of water

9) 12.0g of urea is dissolved in 1 litre of water and 68.4g sucrose is dissolved in 1 litre of water. The relative lowering of vapour pressure of urea solution is

(a) greater than sucrose solution (b) less than sucrose solution (c) double that of sucrose solution

(d) equal to that of sucrose solution

10) Formation of a solution from two components can be considered as

(i) pure solvent $\longrightarrow$ seperated solvent molecules, ΔH_1

(ii) pure solute $\longrightarrow$ seperated solute molecules, ΔH_2

(iii) separated solvent and solute molecules $\longrightarrow$ solution, ΔH_3

Solution so formed will be ideal if.

(a) $\Delta H_{soln} = \Delta H_1 + \Delta H_2 + \Delta H_3$ (b) $\Delta H_{soln} = \Delta H_1 + \Delta H_2 - \Delta H_3$ (c) $\Delta H_{soln} = \Delta H_1 - \Delta H_2 - \Delta H_3$

(d) $\Delta H_{soln} = \Delta H_3 - \Delta H_1 - \Delta H_2$

11) The system that forms maximum boiling azeotrope is

(a) carbon disulphide-acetone (b) benzene-tolune (c) acetone-chloroform (d) n-hexane-n-heptane

12) The molal freezing point constant of water is 1.86° C/M. Therefore the freezing point of 0.1 M NaCl solution in water is expected to be

(a) - 1.86°C (b) - 0.186°C (c) - 0.372°C (d) + 0.372°C

13) What is the osmotic pressure of a 0.0020 mol dm^{-3} sucrose ($C_{12}H_{22}O_{11}$) solution at 20°C ? (Molar gas constant, R = 8.314 $JK^{-1}mol^{-1}$)

(a) 4870 Pa (b) 4.87 Pa (c) 0.00487 Pa (d) 0.33 Pa

14) Camphor is often used in molecular mass determination because

(a) it is readily available (b) it has a very high cryoscopic constant (c) it is volatile

(d) it is solvent for organic substances

15) A 5% solution of cane sugar (molar mass 342) is Isotonic with 1% of a solution of an unknown solute. The molar mass of unknown solute in g/mol is

(a) 136.2 (b) 171.2 (c) 68.4 (d) 34.2

16) The osmotic pressure of 0.1 M aqueous solution of NaCl is ..... Osmotic pressure of 0.1 M aqueous solution of glucose

(a) equal to (b) less than (c) half of (d) nearly double

17) Ethylene glycol is used as an antifreeze in a cold clomate. Mass of ethylene glycol which should be added to 4 kg of water to prevent it form freezing at 60°C will be : [K_f for water = 1.86 K kg mol^{-1}, and molar mass of ethylene glycol = 62g mol^{-1}]

(a) 204.30g (b) 400.00g (c) 304.60g (d) 804.32g

18) If an aqueous solution of glucose is allowed to freeze, then crystals of which will be separated out first ?

(a) glucose (b) water (c) both of these (d) none of these

19) 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 mol of sodium sulphate is dissolved in 1 kg of water, is (K_f=1.86 K kg mol^{-1}).

(a) 0.0744K (b) 0.0186K (c) 0.0372K (d) 0.0558K

20) Which of the following 0.1 M aqueous solution is likely to have tha highest boilling point ?

(a) Na_2SO_4 (b) KCI (c) Glucose (d) Urea

21) Four solutions of K_2SO_4 with the concentrations 0.1 m, 0.01 m, 0.001 m and 0.0001 m are available. The maximum value of van't Hoff factor, i, correaponds to.

(a) 0.0001 m solution (b) 0.001 m solution (c) 0.01 m solution (d) 0.1 m solution

22) Van't Hoff factor for 0.1 M ideal solution is

(a) 0.1 (b) 1 (c) -0.01 (d) none of these

23) The depression in freezing point for 1 M urea, 1 M glucose and 1 M NaCI are in the ratio

(a) 1:2:3 (b) 3:2:2 (c) 1:1:2 (d) None of these.

24) The van't Hoff factor i for a compound which undergoes dissociation in one solvent and association in other solvent is respectively

(a) Greater than one and greater than one (b) Less than one and greter than one

(c) Less than one and less than one (d) Greater than one and less than one

25) The solubility of a substance in ether is 2.0×10^{-3} M. The distribution coefficient of the substance in ether - water mixture is 4. The solubility of the substance in ether is.

(a) $3.0 \times 10^{-4} M$ (b) $5.0 \times 10^{-4} M$ (c) $6.0 \times 10^{-4} M$ (d) $8.0 \times 10^{-4} M$

26) Which of the following units is useful in relating concentration of solution with its vapour pressure ?

(a) mole fraction (b) parts per million (c) mass percentage (d) molality

27) On dissolving sugar in water at room temperature, solution feels cool to touch. Under which of the following cases dissolution of sugar will be most rapid ?

(a) Sugar crystals in cold water (b) Sugar crystals in hot water (c) Powdered sugar in cold water

(d) Powdered sugar in hot water

28) At equilibrium the rate of dissolution of a solid solute in a volatile liquid solvent is ..... .

(a) less than the rate of crystalisation (b) greater than the rate of crystallisation

(c) equal to the rate of crystalisation (d) zero

29) A breaker contains a solution of substance 'A'. Precipitation of substance 'A' takes place when small amount of 'A' is added to the solution. The solution is ..... .

(a) saturated (b) supersaturated (c) unsaturated (d) concentrated

30) Maximum amount of a solid solute that can be dissolved in a specified amount of a given liquid solvent does not depend upon _____.

(a) Temperature (b) Nature of solute (c) Pressure (d) Nature of solvent

31) Low concentration of oxygen in the blood and tissues of people living at high altitude is due to _____.

(a) low temperature (b) low atmospheric pressure (c) high atmospheric pressure

(d) both low temperature and high atmospheric pressure

32) Considering the formation, breaking and strength of hydrogen bond, predict which of the following mixtures will show a positive deviation from Raoult's law?

(a) Methanol and acetone (b) Chloroform and acetone (c) Nitric acid and water

(d) Phenol and aniline

33) Colligative properties depend on ..... .

(a) the nature of the solute particles dissolved in solution

(b) the number of solute particles in solution

(c) the physical properties of the solute particles dissolved in solution

(d) the nature of solvent particles

34) The unit of ebullioscopic constant is _____.

(a) K kg mol^{-1} or K $(molality)^{-1}$ (b) mol kg K^{-1} or K^{-1} (molality) (c) kg mol^{-1} K^{-1} or K^{-1} $(molality)^{-1}$

(d) K mol kg^{-1} or K (molality)

35) In comparison to a 0.01 M solution of glucose, the depression in freezing point of a 0.01 M $MgCl_2$ solution is _____.

(a) the same (b) about twice (c) about three times (d) about six times

36) 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

37) At a given temperature, osmotic pressure of a concentrated solution of a substance ..... .

(a) is higher than that at a dilute solution (b) is lower than that of a dilute solution

(c) is same as that of a dilute solution

(d) can not be compared with osmotic pressure of dilute solution.

38) Which of the following statements is false ?

(a) Two different solutions of sucrose of same molality prepared in different solvents will have the same depression in freezing point.

(b) The osmotic pressure of a soltion is given by the equation II = CRT (where C is the molarity of the solution)

(c) Decreasing order of osmotic pressure for 0.01 M aqueous solutions of barium chloride, potassium chloride, acetic acid and sucrose is $BaCl_2$ > KCl > CH_3COOH > sucrose.

(d) According to Raoult's law, the vapour pressure exerted by a volatile component of a solution is directly proportional to its mole fraction in the solution.

39) The values of van't Hoff factors for KCl, NaCl and K_2SO_4, respectively, are ..... .

(a) 2,2 and 2 (b) 2,2 and 3 (c) 1,1, and 2 (d) 1,1 and 1

40) Value of Henry's constant K_H _____.

(a) increases with increase in temperature (b) decreases with increase in temperature

(c) remains constant (d) first increases, then decreases

41) The value of Henry's constant K_H is _____.

(a) greater for gases with higher solubility (b) greater for gases with lower solubility

(c) constant for all gases (d) not related to the solubility of gases

42) We have three aqueous solutions of NaCI labelled as 'A', 'B' and 'C' with concentrations 0.1 M, 0.01 M, respectively. The value of van't Hoff factor for these solutions will be in the order ..... .

(a) $i_A < i_B < i_C$ (b) $i_A > i_B > i_C$ (c) $i_A = i_B = i_C$ (d) $i_A < B > i_C$

43) On the basis of information given below mark the correct option.

Information :

(A) In bromoethane and chloroethane mixture, intermolecular interactions of A - A and B - B type are nearly same as A - B type interactions.

(B) In ethanol and acetone mixture, A - A or B - B type intermolecular interactions are stronger than A - B type interactions.

(C) In chloroform and acetone mixture, A - A or B - B type intermolecular interactions are weaker than A - B type interactions.

(a) Solution (B) and (C) will follow Raoult's law (b) Solution (A) will follow Raoult's law

(c) Solution (B) will show negative deviation from Raoult's law

(d) Solution (C) will show positive deviation from Raoult's law

44) If two liquids A and B form minimum boiling azeotrope at some specific composition, then ..... .

(a) A - B interactions are stronger than those between A - A or B - B

(b) vapour of solution increases because more number of molecules of liquids A and B can escape from the solution.

(c) vapour pressure of solution decreases because less number of molecules of only one of the liquids escape from the solution.

(d) A - B interactions are weaker than those between A - A or B - B.

45) On the basis of the information given below mark the correct option.

Information: On adding acetone to methanol some of the hydrogen bonds between methanol molecules break.

(a) At specific composition, methanol - acetone mixture will form minimum boiling azeotrope and will show positive deviation from Raoult's law.

(b) At specific composition, methanol - acetone mixture forms maximum boiling azeotrope and will show positive deviation from Raoult's law

(c) At specific composition methanol - acetone mixture will form minimum boiling azeotrope and will show negative deviation from Raoult's law

(d) At specific composition methanol - acetone mixture will form maximum boiling azeotrope and will show negative deviation from Raoult's law

46) K_H value for Ar(g), CO_2(g), HCHO (g) and CH_4 (g) are 4.39,1.67,1.83 x 10^{-5} and 0.413 respectively. Arrange these gases in the order of their increasing solubility.

(a) HCHO42 (b) HCHO24 (c) Ar24 (d) Ar42

47) Which following factor (s) affect the solubility of a gaseous solute in the fixed volume of liquid solvent ?

(i) nature of solute

(ii) temperature

(iii) pressure

(a) (i) and (iii) at constant T (b) (i) and (ii) at constant P (c) (ii) and (iii) only (d) (iii) only

48) A 5.5 molal aqueous solution of methyl alcohol, CH_3OH, is supplied. What is the mole fraction of methyl alcohol in the solution ?

(a) 0.190 (b) 0.086 (c) 0.050 (d) 0.100

49) What is the mole fraction of the solute in a 1.00 m aqueous solution ?

(a) 0.0354 (b) 0.0177 (c) 0.177 (d) 1.770

50) The molarity of a solution obtained by mixing 750 mL of 0.5 M HCI with 250 mL of 2 M HCI will be

(a) 0.975 M (b) 0.875 M (c) 1.00 M (d) 1.175 M

51) The density (in g mL^{-1}) of a 3.60 M sulphuric acid solution that is 29% H_2SO_4 (Molar mass = 98 g mol^{-1}) by mass will be

(a) 1.45 (b) 1.64 (c) 1.88 (d) 1.22

52) Concentrated aqueous sulphuric acid is 98% H_2SO_4 by mass and has a density of 1.80 g mL^{-1}. Volume of the acid required to make one litre of 0.1 M H_2SO_4 solution is

(a) 5.55 mL (b) 11.10 mL (c) 16.65 mL (d) 22.20 mL

53) How many grams of concentrated nitric acid solution should be used to prepare 250 mL of 2.0 M HNO_3 ? The concentrated nitric acid is 70% HNO_3

(a) 45.0 g conc HNO_3 (b) 90.0 g conc HNO_3 (c) 70.0 g conc HNO_3 (d) 54.0 g conc HNO_3

54) 6.02×10^{20} molecules of urea are present in 100 mL of its solution. The concentration of the solution is

(a) 0.02 M (b) 0.01 M (c) 0.001 M (d) 0.1 M

55) To neutralise completely 20 mL of 0.1 M aqueous solution of phosphorous acid (H_3PO_3), the volume of 0.1 M aqueous KOH solution required is

(a) 10 mL (b) 20 mL (c) 40 mL (d) 60 mL

56) The volumes of 4 N HCI and 10 N HCI required to make 1 litre of 6 N HCI are

(a) 0.75 litre of 4 N HCI and 0.25 litre of 10 N HCI (b) 0.25 litre of 4 N HCI and 0.75 litre of 10 N HCI

(c) 0.67 litre of 4 N HCI and 0.33 litre of 10 N HCI (d) 0.80 litre of a N HCI and 0.20 litre of 10 N HCI

(e) 0.50 litre of 4 N HCI and 0.50 litre of 10 N HCI

57) A person is considered to be suffering from lead poisoning if its concentration in him is more than 15 micrograms of lead per decilitre of blood. Concentration in parts per billion parts is

(a) 1 (b) 10 (c) 100 (d) 1000

58) The molarity of 900 g of water is

(a) 50 M (b) 55.5 M (c) 5 M (d) cannot be calculated

59) Which one of the following statements is not true ?

(a) Dissolution of all solid solutes in water is exothermic.

(b) Common salt is more soluble in water than canesugar at the same temperature.

(c) Solubility of sodium sulphate decahydrate crystals first increases upto a certain temperature and then decreases

(d) Enthalphy of solution can be found using Clausius - Clapeyron equation

60) The mole fraction of a gas dissolved in a solvent is giving by Henry's law. If the Henry's law constant for a gas in water at 298 K is 5.55×10^7 Torr and the partial pressure of the gas is 200 Torr, then what is the amount of the gas dissolved in 1.0 kg of water ?

(a) $2.0 \times 10^{-4} mol$ (b) $2.5 \times 10^{-5} mol$ (c) $3.7 \times 10^{-6} mol$ (d) $1.2 \times 10^{-8} mol$

61) The solubility of a gas in water at 300 K under a pressure of 100 atmospheres is $4 \times 10^{-3} kg\ L^{-1}$. Therefore, the mass of the gas in kg dissolved in 250 mL of water under a pressure of 250 atmospheres at 300 K is

(a) 2.5×10^{-3} (b) 2.0×10^{-3} (c) 1.25×10^{-3} (d) 5.0×10^{-3} (e) 3×10^{-3}

62) The amount of solute (molar mass 60 g mol^{-1}) that must be added to 180 g of water so that the vapour pressure of water is lowered by 10% is

(a) 30 g (b) 60 g (c) 120 g (d) 12 g (e) 24 g

63) At 80°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°C and 1 atm pressure, then amount of 'A' in the mixture is (1 atm = 760 mm Hg)

(a) 48 mol percent (b) 50 mol percent (c) 52 mol percent (d) 34 mol percent

64) Two liquids X and Y form an ideal solution. The mixture has a vapour pressure of 400 mm at 300 K when mixed in the molar ratio of 1:1 and a vapour pressure of 350 mm when mixed in the molar ratio of 1:2 at the same temperature. The vapour pressures of the pure liquids X and Y respectively are

(a) 250 mm, 550 mm (b) 350 mm, 450 mm (c) 350 mm, 700 mm (d) 500 mm, 500 mm

(e) 550 mm, 250 mm

65) Two liquids X and Y form an ideal solution. At 300 K, vapour pressure of the solution containing 1 mol of X and 3 mol of Y is 550 mm Hg. At the same temperature if 1 mol of Y is furthur added to this solution, vapour pressure of the solution increases by 10 mm Hg. Vapour pressure (in mm Hg) of X and Y in their pure states will be respectively.

(a) 200 and 300 (b) 300 and 400 (c) 400 and 600 (d) 500 and 600

66) If two substances A and B have $p_A^o : p_B^o = 1 : 2$ and have mole fraction in solution 1 : 2, then mole fraction of A in vapours is

(a) 0.33 (b) 0.25 (c) 0.52 (d) 0.2

67) The relative lowering of vapour pressure of an aqueous solution containing non - volatile solute is 0.0125. The molality of the solution is

(a) 0.70 (b) 0.50 (c) 0.60 (d) 0.80 (e) 0.40

68) If x_1 and x_2 represent the mole fraction of a component A in the vapour phase and liquid mixture respectively and p_A^o and p_B^o represent vapours pressures of pure A and B, then total vapour pressure of the liquid mixture is

(a) $\frac{p_A^o x_1}{x_2}$ (b) $\frac{p_A^o x_2}{x_1}$ (c) $\frac{p_B^o x_1}{x_2}$ (d) $\frac{p_B^o x_2}{x_1}$

69) An ideal solution is formed by mixing two volatile liquids A and B. X_A and X_B are the mole fractions of A and B respectively in the solution and Y_A and Y_B are the are the mole fractions of A and B respectively in the vapour phase. A plot of $1/Y_A$ along y - axis against $1/X_A$ along x - axis gives a straight line. What is the slope of the straight line ?

(a) p_B^o/p_A^o (b) p_A^o/p_B^o (c) $p_B^o - p_A^o$ (d) $p_A^o - p_B^o$

70) One component of a solution follows Raoult's law over the entire range $0 \leq x_1 \leq 1$. The second component must follow Raoult's law in the range when x_2 is

(a) close to zero (b) close to 1 (c) $0 \leq x_2 \leq 0.5$ (d) $0 \leq x_2 \leq 1$

71) The vapour pressure of a solvent decreases by 10mm of mercury when a non - volatile solute was added to the solvent. The mole fraction of the solute in the solution is 0.2. What should be the mole fraction of the solvent if the decrease in vapour pressure is to be 20 mm of mercury ?

(a) 0.8 (b) 0.6 (c) 0.4 (d) 0.4

72) Which of them is not equal to zero for an ideal solution ?

(a) ΔV_{mix} (b) $\Delta P = P_{observed} - P_{Raoult}$ (c) ΔH_{mix} (d) ΔS_{mix}

73) The vapour pressure of acetone at 20°C is 185 torr. When 1.2 g of non - volatile was dissolved in 100 g of acetone at 20°C, its vapour pressure was 183 torr. The molar mass (g mol^{-1}) of the substance is

(a) 128 (b) 488 (c) 32 (d) 64

74) Dry air is passed through a solution containing 10 g of the solute in 90 g of water and then through pure water. The loss in weight of solution is 2.5 g and that of pure solvent is 0.05 g. Calculate the molecular weight of the solute.

(a) 50 (b) 180 (c) 100 (d) 25 (e) 51

75) The mass of glucose that should be dissolved in 50 g of water in order to produce the same lowering of vapour pressure as produced by dissolving 1 g of urea in the same quantity of water is

(a) 1 g (b) 3g (c) 6 g (d) 8 g

76) The vapour pressure of a solution of a non - volatile electrolyte (A) in solvent (B) is 95% of the vapour pressure of the solvent at the same temperature. If molar mass of B is 30% of molar mass of A, the mass ratio of the solvent and solute are

(a) 0.15 (b) 0.20 (c) 4.0 (d) 5.7

77) A a certain temperature, the value of the slope of the plot of osmotic pressure (π) against concentration (C in mol L^{-1}) of a certain polymer solution is 291 R. The temperature at which osmotic pressure is measured is (R is gas constant)

(a) 271°C (b) 18°C (c) 564 K (d) 18 K

78) The empirical formula of a non - electrolyte is CH_2O. A solution containing 3 g L^{-1} of the compound exerts the same osmotic pressure as that of 0.05 M glucose solution. The molecular formula of the compound is

(a) CH_2O (b) $C_2H_4O_2$ (c) $C_4H_8O_4$ (d) $C_3H_6O_3$

79) A 5.25% solution of a substance is isotonic with a 1.5% solution of urea (molar mass = 60g mol^{-1}) in the same solvent. If the densities of both the solutions are assumed to be equal to 1.0 g cm^{-3}, molar mass of the substance will be

(a) 210.0 g mol^{-1} (b) 90.0 g mol^{-1} (c) 115.0 g mol^{-1} (d) 105.0 g mol^{-1}

80) Insulin $(C_2H_{10}O_5)_n$ is dissolved in a suitable solvent and the osmotic pressure (π)of solutions of various concentrations (c) is measured at 20°C. The slope of the plot of π (atm) versus C (in g/cm^3) is found to be 4.65×10^{-3}. The molecular weight of insulin is

(a) 3.17×10^6 (b) 4.17×10^6 (c) 5.17×10^6 (d) 6.17×10^6

81) Osmotic pressure of insulin solution at 298 K is found to be 0.0072 atm. Hence, height of the water column due to this pressure will be (Given density of Hg = 13.6g mL^{-1})

(a) 7.4 mm (b) 7.4 cm (c) 74 cm (d) 760 mm

82) A solution of protein (extracted from crabs) was prepared by dissolving 0.75 g in 125 cm^3 of an aqueous solution. At 4°C, an osmotic pressure rise of 2.6 mm of the solution was observed. Then molecular weight of protein is (Assume density of solution is 1.00 g/cm^3 .

(a) 9.4×10^5 (b) 5.4×10^5 (c) 5.4×10^{10} (d) 9.4×10^{10}

83) An aqueous solution of urea is found to boil at 100.52°C. Give K_b for water is 0.52 K kg mol^{-1} , the mole fraction of urea in the solution is

(a) 1 (b) 0.5 (c) 0.018 (d) 0.25

84) For a dilute solution containing 2.5 g of a non - volatile, non - electrolytic solute in 100 g of water, the elevation in boiling point at 1 atm pressure is 2°C. Assuming concentration of the solute is much lower than the concentration of the solvent, the vapour pressure (mm of Hg) of the solution is (take K_b = 0.76 K kg mol^{-1})

(a) 724 (b) 740 (c) 736 (d) 718

85) A solution containing 1.8 g of a compound (empirical formula CH_2O) in 40 g of water is observed to freeze at -0.465°C. The molecular formula of the compound is (K_f of water = 1.86 kg K mol^{-1})

(a) $C_2H_4O_2$ (b) C_3H_6 (c) $C_4H_8O_4$ (d) $C_5H_{10}O_5$ (e) $C_6H_{12}O_6$

86) A solution containing 0.10 g of non - volatile solute X (molar mass : 100) in 200 g of benzene depresses the freezing point of benzene by 0.25°C while 0.50g of another non - volatile solute Y in 100 g of benzene also depresses by 0.25°C. What is the molecular mass of Y ?

(a) 50 (b) 100 (c) 150 (d) 1000

87) A solution of urea (mol.mass 56 g mol^{-1}) boils at 100.18°C at the atmospheric pressure. If K_f and K_b for water are 1.86 and 0.512 K kg mol^{-1} respectively, the above solution will freeze at

(a) - 6.54°C (b) - 0.654°C (c) 6.54°C (d) 0.654°C

88) In 100 g of naphthalene, 2.423 g of S was dissolved. Melting point of naphthalene = 80.1°C. $\Delta T_f = 0.661^oC. L_f = 35.7 \quad cal/g$ of naphthalene. Molecular formula of sulphur added is

(a) S_2 (b) S_4 (c) S_6 (d) S_8

89) K_f for water is 1.86 K kg mol^{-1} . If your automobile radiator holds 1.0 kg of water, how many grams of ethylene glycol ($C_2H_6O_2$) must you add to get the freezing point of the solution lowered to - 2.8°C ?

(a) 27 g (b) 72 g (c) 93 g (d) 39 g

90) When mercuric iodide is added to the aqueous solution of potassium iodide

(a) freezing point is raised (b) freezing point is lowered (c) freezing point does not change

(d) boiling point does not change

91) A solution containing 50 g of ethylene glycol in 200 g water is cooled to - 9.3°C. The amount of ice that will seperate out will be (K_f = 1086 Km^{-1})

(a) 18.71 g (b) 28.71 g (c) 38.71 g (d) 48.71 g

92) An element X of atomic mass 25.0 exists as X_4 in benzene to the extent of 100%. When 10.30 g of saturated solution of X in benzene is added to 20.0 g of benzene, the depression in freezing point of the resulting solution is 0.51 K. If K_f for benzene is 5.1 K kg mol^{-1}, the solubility of X in 100 g of benzene will be

(a) 3.0 g (b) 2.7 g (c) 0.30 g (d) 0.27 g

93) Which one of the following electrolytes has the same value of van't Hoff factor (i) as that of $AI(SO_4)_3$ (if all are 100% ionized)

(a) K_2SO_4 (b) $K_3[Fe(CN)_6]$ (c) $AI(NO_3)_3$ (d) $K_4[Fe(CN)_6]$

94) The correct equation for the degree of association 'α'of an associating solute,'n' molecules of which undergo association in solution is

(a) $\alpha = \frac{n(i-1)}{1-n}$ (b) $\alpha = \frac{i(n+1)}{1-n}$ (c) $\alpha = \frac{i(n+1)}{1-n}$ (d) $\alpha = \frac{i(n+1)}{n-1}$ (e) $\alpha = \frac{n(1-i)}{1-n}$

95) The molar mass of the solute sodium hydroxide obtained from the measurement of osmotic pressure of its aqueous solution at 27°C is 25 g mol^{-1}. Therefore, its ionization percentage in the solution is

(a) 75 (b) 60 (c) 80 (d) 70

96) 1 g of a monobasic acid in 100 g of water lowers the freezing point by 0.168°. If 0.2 g of the same acid requires 15 mL of N/10 alkali for complete neutralisation, the degree of dissolution of the acid is (K_f for water = 1.86 K kg mol^{-1})

(a) 9.8% (b) 19.6% (c) 4.9% (d) 1.68%

97) 0.6 mL of acetic acid is dissolved in 1 litre of water. The value of van't Hoff factor is 1.04. What will be the degree of dissociation of the acetic acid ?

(a) 0.01 (b) 0.02 (c) 0.03 (d) 0.04

98) 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 ?

(a) Molecular mass of X is less than molecular mass of Y

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

(c) X is undergoing dissociation in water

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

99) The freezing point (in °C) of a solution containing 0.1 g of $K_3[Fe(CN)_6]$ (Mol. Wt. 329) in 100 g of water (K_f = 1.86 K kg mol^{-1}) is

(a) -2.3×10^{-2} (b) -5.7×10^{-2} (c) -5.7×10^{-3} (d) -1.2×10^{-2}

100) The van't Hoff factor for $BaCI_2$ at 0.01 M concentration is 1.98. The percentage dissociation of $BaCI_2$ at this concentration is

(a) 49 (b) 69 (c) 89 (d) 98 (e) 100

101) The freezing point depression constant for water is - 1.86°Cm^{-1}. If 5.00 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

(a) 0.381 (b) 2.05 (c) 2.63 (d) 3.11

102) A 0.1 molal aqueous solution of a weak acid is 30% ionized. If K_f for water is 1.86° C/m, the freezing point of the solution will be

(a) - 0.18°C (b) - 0.54°C (c) - 0.36°C (d) - 0.24°C

103) Benzoic acid undergoes dimerisation in benzene solution. The van't Hoff factor (i) is related to the degree of association 'x' of the acid as

(a) i = (1 - x) (b) i = (1 + x) (c) i = (1 - x/2) (d) 1 = (1 + x/2)

104) A 0.004 M solution of Na_2SO_4 is isotonic with a 0.010 M solution of glucose at the temperature. The apparent degree of dissociation of Na_2SO_4 is

(a) 25% (b) 50% (c) 75% (d) 85%

105) van't Hoff factors x,y and z for association, dissociation and no change of solute in the solution respectively are in the order :

(a) x< y< z (b) x > z > y (c) x< z< y (d) x > y > z

106) For a weak monobasic acid, if $pK_a = 4$, then at a concentration of 0.01 M of the acib solution, the van't Hoff factor is

(a) 1.01 (b) 1.02 (c) 1.10 (d) 1.20

107) The pH of 1 M solution of a weak monobasic acid (HA) is 2. Then, the van't Hoff factor is

(a) 1.01 (b) 1.02 (c) 1.10 (d) 1.20

108) At a certain Hill station, water boils at 96°C. The amount of NaCI that should be added to one litre of water so that it boils at 100°C will be (K_b for H_2O = 0.52 K/m)

(a) $[Co(NH_3)_6]CI_3$ (b) $[Co(NH_3)_5CI]CI_2$ (c) $[Co(NH_3)_4CI_2]CI$ (d) None of these

109) Depression in freezing point of 0.01 m aqueous acetic acid solution is found to be .02046K. One molal urea solution freezes at -1.86° C. Assuming molarity equal to molality, pH of acetic acid solution is

(a) 2 (b) 3 (c) 3.2 (d) 4.2

110) The average osmotic pressure of human blood is 7.8 bar at 37° C. What is the concentration of an aqueous NaCI solution that could be used in the bloos stream ?

(a) 0.15 mol/L (b) 0.30 mol/L (c) 0.60 mol/L (d) 0.45 mol/L

111) Solution A contains 7 g/L $MgCI_2$ and solution B contains 7 g/L of NaCI. At room temperature, the osmotic pressure of

(a) solution A is greater than B (b) both have same osmotic pressure (c) solutin B is greater than A

(d) can't determine.

112) Solution (A) containing $FeCI_3$ is seperated from solution (B) containing $K_4Fe(CN)_6$ by a semipermeable membrane as shown below :

Solution (A)	Solution (B)
$FeCI_3$	$K_4Fe(CN)_6$

If $FeCI_3$ on reaction with $K_4[Fe(CN)_6]$ produces blue colour of $Fe_4[Fe(CN)_6]_3$, the blue colour will apear in

(a) A (b) B (c) In both A and B (d) Neither in A nor in B

113) Pure benzene freezes at 5.3°C. A solution or 0.223 g of phenylacetic acid ($C_6H_5CH_2COOH$) in 4.4 g of benzene (K_f = 5.12 K kg mol^{-1}) freezes at 4.47°C. From this observation, one can conclude that

(a) phenylacetic acid exists as such in benzene

(b) phenylacetic acid undergoes partial ionization in benzene

(c) phenylacetic acid undergoes complete ionization in benzene

(d) phenylacetic acid dimerizes in benzene

114) Consider seperate solutions of 0.500 M C_2H_5OH (aq), 0.100 M $Mg_3(SO_4)_2$ (aq), 0.250 M KBr (aq) and 0.125 M Na_3PO_4 (aq) at 25°C. Which statement is true about these solutions, assuming all salts to be strong electrolytes ?

(a) 0.500 M C_2H_5OH (aq) has the heighest osmotic pressure

(b) They all have the same osmotic pressure (c) 0.100 M $Mg_3(PO_4)_2$ has the highest osmotic pressure

(d) 0.125 M Na_3PO_4 (aq) has the highest osmotic pressure

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

(a) KCI (b) $C_6H_{12}O_6$ (c) $AI_2(SO_4)_3$ (d) K_2SO_4

116) An azeotropic solution of two liquids has boiling point lower than either of the two liquids when it

(a) shows no deviations from Raoult's law (b) shows a positive deviation from Raoult's law

(c) shows a negative deviation from Raoult's law (d) is saturated.

117) A solution has a 1:4 mole ratio of pentane to hexane. The vapour pressures of the pure hydrocarbons at 20° C are 440 mm of Hg for pentane and 120 mm of Hg for hexane. The mole fraction of pentane in the vapour phase would would be

(a) 0.200 (b) 0.478 (c) 0.549 (d) 0.786

118) The van't Hoff factor for 0.1 M $Ba(NO_3)_2$ solution is 2.74. The degree of dissociation is

(a) 91.3% (b) 87% (c) 100% (d) 74%

119) Which one of the following aqueous solutions will have the lower freezing point?

(a) 0.1 molal solution of urea (b) 0.1 molal solution of acetic acid

(c) 0.1 molal solution of sodium chloride (d) 0.1 molal solution of calcium chloride

120) The vapour pressure of the solution at 298 K will be

(a) 0.230 atm (b) 0.233 atm (c) 0.236 atm (d) 0.0239 atm

121) The osmotic pressure of the solution at 298 K will be

(a) 4.29 atm (b) 4.49 atm (c) 4.69 atm (d) 4.89 atm

122) The freezing point of the solution will be

(a) $-0.684°C$ (b) $-0.342°C$ (c) $-0.372°C$ (d) $-0.186°C$

123) The mass of sodium chloride that should be dissolved in the same amount of water to get the same freezing point will be

(a) 136.8 g (b) 32.2 g (c) 5.58 g (d) 11.60 g

124) If on dissolving the above amount of NaCl in 1 kg of water, the freezing point is found to be $-0.344°C$, the percentage dissociation of NaCl in the solution is

(a) 75% (b) 80% (c) 85% (d) 90%

125) The freezing point of solution M is

(a) 268.7 K (b) 268.5 K (c) 234.2 K (d) 150.9 K

126) The vapour pressure of the solution M is

(a) 39.3 mm Hg (b) 36.0 mm Hg (c) 29.5 mm Hg (d) 28.8 mm Hg

127) Water is added to the solution M such that the mole fraction of water in the solution becomes 0.9. The boiling point of the solution is

(a) 380.4 K (b) 376.2 K (c) 375.5 K (d) 354.7 K

128) One gram of silver gets distributed between 10 cm^3 of molten zinc and 100 cm^3 of molten lead at 800°C. The percentage of silver still left in the lead layer is approximately

(a) 2 (b) 5 (c) 3 (d) 1

129) The ionic strength of a solution containing 0.1 mole/kg of KCI and 0.2 mole/kg of $CuSO_4$ is

(a) 0.3 (b) 0.6 (c) 0.9 (d) 0.2

130) The correct relationship between molarity (M) and molality (m) is (d = density of the solution, in kg L^{-1}, M_2 = molar mass of the solute is kg mol^{-1})

(a) $M = \frac{md}{1+mM_2}$ (b) $M = \frac{m}{1+mM_2d}$ (c) $M = \frac{1+mM_2}{md}$ (d) $M = \frac{1+md}{mM_2}$

131) If P^o and P_s are the vapour pressures of the solvent and its solution respectively and N_1 and N_2 are the mole fractions of the solvent and solute respectively, then

(a) $P_S = P^oN_2$ (b) $P^o - P_S = P^oN_2$ (c) $P_S = P^oN_1$ (d) $(P^o - P_S)/P_S = N_1/(N_1 + N_2)$.

132) The vapour pressure of a dilute solution of a solute is not influenced by

(a) nature of the solute if it is non - electrolyte (b) mole fraction of the solute

(c) melting point of the solute (d) degree of dissociation of the solute

133) Which statements are true about osmotic pressure (π)volume (V) and temperature (T) ?

(a) $\pi\alpha\frac{1}{V} if\ T\ is\ constant$ (b) $\pi\alpha T \quad if\ V\ is\ constant$ (c) $\pi\alpha V\ if\ T\ is\ costant$

(d) $\pi V\ is\ constant\ if\ T\ is\ constant$

134) The colligative properties of a solution are

(a) α *molality* (b) $\alpha \frac{1}{molecular\ mass\ of\ the\ solute}$ (c) proportional to each other

(d) independent of the nature of the solute, i.e., electrolyte or non - electrolyte

135) In the depression of freezing point experiment, it is found that

(a) The vapour pressure of the solution is less than that of pure solvent

(b) The vapour pressure of the solution is more than that of pure solvent

(c) Only solute molecules solidity at the freezing point

(d) Only solvent molecules solidity at the freezing point.

136) Which of the following mixture do you expect will not show positive deviation from Raoult's law ?

(a) Benzene - Chloroform (b) Benzene - Acetone (c) Benzene - Ethanol

(d) Benzene - Carbon tetrachloride

137) Identify the phase of solute and solvent among the options are given below, for a solution as amalgam of mercury with sodium.

(a)

Solute	Solvent
Solid	Liquid

(b)

Solute	Solvent
Solid	Solid

(c)

Solute	Solvent
Liquid	Solid

(d)

Solute	Solvent
Solid	Gas

138) Which of the following is the correct example of solid solution in which the solute is in gas phase?

(a) Copper dissolved in gold (b) Camphor in nitrogen gas (c) Hydrogen in palladium (d) All of these

139) 18 g of sucrose is dissolved in 162 g of water. Calculate the mass percentage of solution.

(a) 18 % (b) 10% (c) 20% (d) 15%

140) 184g ethyl alcohol is mixed with 72g of water. The ratio of mole fraction of alcohol to water is

(a) 3: 4 (b) 1: 2 (c) 1: 4 (d) 1: 1

141) Molarity (in mol/L) of distilled or pure water is

(a) 55.56 (b) 18 (c) 49.87 (d) 81

142) If 0.1M $AgNO_3$ and 0.1M NaCl solutions are mixed in same volume, then what will be the concentration of nitrate ions?

(a) 0.1 M (b) 0.2 M (c) 0.05 M (d) 0.025 M

143) What will be the concentration of 0.2M H_2SO_4 solution in g/L.

(a) 21.4 (b) 39.2 (c) 9.8 (d) 19.6

144) 4 L of 0.02 M aqueous solution of NaCl was diluted by adding 1L of water. The molarity of the resultant solution is.....

(a) 0.004 (b) 0.008 (c) 0.012 (d) 0.016

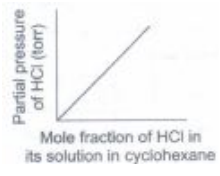
145) The molality of a-urea solution in which 0.0100 g of urea, $[(NH_2)_2CO]$ is added to 0.3000 dm^3 of water at STP is

(a) 0.555 m (b) 5.55×10^{-4} m (c) 33.3 m (d) 3.33×10^{-2} m

146) Molality of an aqueous solution of urea is 4.44 mol/kg. In solution mole fraction of urea is

(a) 0.074 (b) 0.00133 (c) 0.008 (d) 0.0044

147) In the graph given below, what does the slope of the line represent?



(a) Partial pressure of the gas in vapour phase (ρ) (b) Mole fraction of gas in the solution (χ)

(c) Henry's law constant (K_H) (d) All of the above

148) Vapour pressure of two liquids P and Q is 80 mm and 60 mm respectively. What will be the vapour pressure of solution obtained by mixing 3 moles of P and 2 moles of Q.

(a) 140 mm (b) 20 mm (c) 68 mm (d) 72 mm

149) 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

(a) $\rho_A + x_A(\rho_B - \rho_A)$ (b) $\rho_A + x_A(\rho_A - \rho_B)$ (c) $\rho_B + x_A(\rho_B - \rho_A)$ (d) $\rho_B + x_A(\rho_A - \rho_B)$

150) Vapour pressure of pure A is 70 mm of Hg at 25°C. It forms an ideal solution with 'B' in which mole fraction of A is 0.8. If the vapour pressure of the solution is 84 mm of Hg at 25°C, the vapour pressure of pure B at 25°C is

(a) 56mm (b) 70mm (c) 140mm (d) 28mm

151) At 40°C the vapour pressure of pure liquids, benzene and toluene, are 160 mmHg and 60 mmHg respectively. At the same temperature, the vapour pressure of an equimolar solution of the two liquids, assuming the ideal solution should be

(a) 140 mmHg (b) 110 mmHg (c) 220 mmHg (d) 100 mmHg

152) Solution of bromoethane and chloroethane

(a) obeys Raoult's law over the entire range of concentration (b) is a non-ideal solution

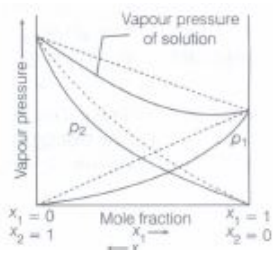
(c) has $\triangle_{mix} V \neq 0$ (d) All of the above

153) Which of the following azeotropic solutions has the boiling point less than the boiling point of its constituents molecules?

(a) $CHCl_3$ and CH_3COCH_3 (b) CS_2 and CH_3COCH_3 (c) CH_3CH_2OH and CH_3COCH_3

(d) CH_3CHO and CS_2

154) Which of the following statements is/are true for the diagram?



(a) The escaping tendency of molecule decreases for each component

(b) Vapour pressure of the solution decreases (c) Solution shows negative deviation from Raoult's law

(d) All of the above

155) 12 g urea was dissolved in 1L water and 68.4 g sucrose was dissolved in 1 L of water. Expected depression in vapour pressure of urea will be

(a) more than that of sucrose solution (b) less than that of sucrose solution

(c) double than that of sucrose solution (d) equal to sucrose solution

156) Which of the following aqueous solutions should have the highest boiling point?

(a) 1.0M NaOH (b) 1.0M Na_2SO_4 (c) 1.0M NH_4NO_3 (d) 1.0M KNO_3

157) What happens to freezing point of benzene when naphthalene is added?

(a) Increases (b) Decreases (c) Remains unchanged (d) First decreases and then increases

158) The order of boiling points of four equimolar aqueous solutions is C < B < A < D. The correct order of their freezing points is

(a) D< C< B< A (b) D > C< B< A (c) D< B > A< C (d) D > A > B > C

159) 29.2% (w/W) HCI stock solution has density of 1.25g mL^{-1}. The molecular weight of HCI is 36.5 mol^{-1}. The volume (mL) of stock solution required to prepare a 200 mL solution of 0.4 M HCI is

(a) 5.0 mL (b) 6.0 mL (c) 8.0 mL (d) 15.0 mL

160) Ratio of O_2 and N_2 in the air is 1: 4. Find out the ratio of their solubilities in terms of mole fractions of O, and N, dissolved in water at atmospheric pressure and room temperature.
[K_H (O_2) = 3.30x 10^7 torr
K_H (N_2) = 6.60.x10^7 torr]

(a) 1:2 (b) 2:1 (c) 1:1 (d) None of these

161) Which one of the following is not correct for an ideal solution?

(a) It must obey Raoult's law (b) $\triangle H = 0$ (c) $\triangle V = 0$ (d) $\triangle H = \triangle V \neq 0$

162) 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 semi permeable 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

163) The molality of pure water is

(a) 55.5 (b) 50.5 (c) 18 (d) 60.5

164) The number of mules of NaCI in 3 litres of 3M solution is

(a) 1 (b) 3 (c) 9 (d) 27

165) 4L of 0.02 M aqueous solution of NaCI was diluted by adding one litre of water. The molality of the resultant solution is _____.

(a) 0.004 (b) 0.008 (c) 0.012 (d) 0.016

166) Which of the following statements is false?

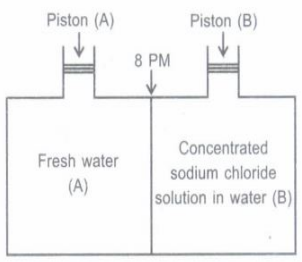
(a) Two different solutions of sucrose of same molality prepared in different solvents will have the same depression in freezing point.

(b) The osmotic pressure of a solution is given by the equation IT = CRT (where C is the molarity of the solution).

(c) Decreasing order of osmotic pressure for 0.01 M aqueous solutions of barium chloride, potassium chloride, acetic acid and sucrose is $BaCI_2$ > KCI > CH_3COOH > sucrose

(d) According to Raoult's law, the vapour pressure exerted by a volatile component of a solution is directly proportional to its mole fraction in the solution

167) Consider the figure and mark the correct option.



(a) water will move from side (A) to side (B) if a pressure lower than osmotic pressure is applied on piston (B)

(b) water will move from side (B) to side (A) if a pressure greater than osmotic pressure is applied on piston (B).

(c) water will move from side (B) to side (A) if a pressure equal to osmotic pressure is applied on piston (B).

(d) water will move from side (A) to side (B) if pressure equal to osmotic pressure is applied on piston (A).

168) A solution containing 10 g per dm^3 of urea (molar mass 60 g mol^{-1}) is isotonic with 5% solution of non-volatile solute, M_B of solute is

(a) 300 g mol^{-1} (b) 350 g mol^{-1} (c) 200 g mol^{-1} (d) 250 g mol^{-1}

169) Cone. H_2 SO_4 is 98 % H2 S04 by mass has d= 1.84 g cm_3. Volume of acid required to make one litre of 0.1 M H_2SO_4 is

(a) 5.55 mL (b) 10 mL (c) 20 mL (d) 30 mL

170) What is mole fraction of solute in 1.00 m aqueous solution?

(a) 0.0354 (b) 0.0177 (c) 0.177 (d) 1.770

171) When 1 mole of benzene is mixed with 1 mole of toluene (vapour pressure of benzene = 12.8 kPa, Toluene = 3.85 kPa)

(a) The vapour will contain equal amount of benzene and toluene.

(b) Not enough information is given for prediction

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

(d) The vapour will contain higher percentage of toluene.

172) At 100°C, the vapour pressure of a solution of 6.5 g of solute in 100 g of water is 732 mm. If K_b is 0.52 K/m, the boiling point of solution will be

(a) 102°C (b) 103°C (c) 101°C (d) 100°C

173) Which of the following is incorrect for an ideal solution?

(a) $\Delta H_{mix} = 0$ (b) $\Delta V_{mix} = 0$ (c) $\Delta P = P_{obs} - P_{calculated} = 0$ (d) $\Delta G_{mix} = 0$

174) If molality of a dilute solution is doubled, the value of molal depression constant (K_f) will be

(a) halved (b) tripled (c) unchanged (d) doubled

175) The temperature at which 10% aqueous solution of (W N) of glucose will show the osmotic pressure of 16.4 atom is (R = 0.082 L atom K^{-1} mol^{-1})

(a) 360°C (b) 180 K (c) 300 K (d) 360 K

176) Which has the highest freezing point?

(a) 1 M glucose (b) 1 M NaCI (c) 1 M $CaCl_2$ (d) 1 M AlF_3

177) Which of the following is correct.

(a) K_H increases with increase in temperature (KH is Henry's law constant).

(b) Solubility of gas in liquid decreases with increases in temperature.

(c) K_H decreases with increase in temperature.

(d) Solubility of gas in liquid increases with increase in temperature.

178) Benzoic acid, when dissolved in benzene, which of the following is correct.

(a) The benzoic acid will undergo dissociation. (b) The benzoic acid will undergo association.

(c) Observed molar mass of benzoic acid in benzene will less than normal molar mass.

(d) Observed molar mass of benzoic acid in benzene is more than normal molar mass.

179) Relative lowering of vapour pressure is a colligative property because _____.

(a) It depends on the concentration of a non electrolyte solute in solution and does not depend on the nature of the solute molecules.

(b) It depends on number of particles of electrolyte solute in solution and does not depend on the nature of the solute particles.

(c) It depends on the concentration of a non electrolyte solute in solution as well as on the nature of the solute molecules.

(d) It depends on the concentration of an electrolyte or nonelectrolyte solute in solution as well as on the nature of solute molecules.

180) If P_A° = 100 mm P_B° = 200 mm and mole fraction xA = 0.4. what will be Y_A (mole fraction) in vapour phase?

(a) 0.25 (b) 0.30 (c) 0.75 (d) 0.50

181) Which of the following is maximum boiling azeotropic?

(a) $CH_3COOH + C_5H_5N$ (pyridine) (b) H_2O + ethanol (c) cyclohexane + ethanol (d) H_2O + methanol

182) K_b (molal elevation constant) is inversely proportional to

(a) boiling point of solvent (b) Δ_{vap} H of solvent (c) Molar mas of solvent (d) all of these

183) Out of 1m solution of following dissolved in water. Which one will have lowest freezing point (assuming all are fuel, ionised)

(a) Urea (b) NaCl (c) Na_2SO_4 (d) $AI_2(SO_4)_3$

184) Which of the following will have lowest vapour pressure? (Boiling points are given in brackets)

(a) H_2O(373 K) (b) $CHCl_3$ (334 K) (c) Anilines (457 K) (d) Benzene (353 K)

185) The P_{gas} dissolved a liquid is directly proportion to its

(a) mole fraction (b) molar mass (c) boiling point of liquid (d) molar mass of solvent

186) Henry's law constant of oxygen is 1.4×10^{-3} mol L^{-1} atm^{-1} at 298 K. How much oxygen will be dissolved in 100 ml at 298 K when its partial pressure is 0.5 atm?

(a) 1.4 g (b) 3.2 g (c) 22.4 mg (d) 2.24 mg

187) In isotonic solutions _____.

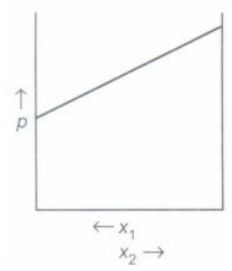
(a) solute and solvent both are same (b) osmotic pressure is same.

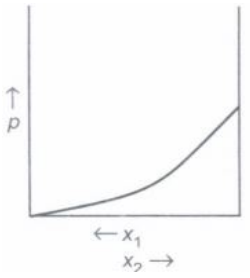
(c) solute and solvent mayor may not be same. (d) solute is always same solvent may be different.

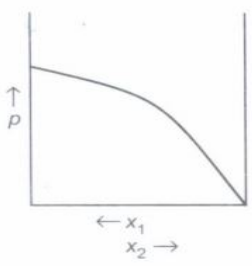
188) Which of the following binary mixtures will have same composition in liquid and vapour phase?

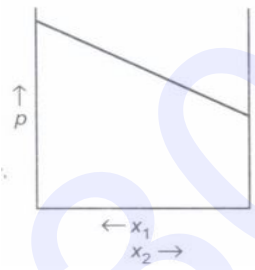
(a) Benzene-Toluene (b) Water-Nitric acid (c) Water-Ethanol (d) n-Hexane - n-Heptane

189) For a binary ideal liquid solution, the variation in total vapour pressure versus composition of solution is given by which of the curves?

(a) 

(b) 

(c) 

(d) 

30 x 1 = 30

190) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.

Assertion (A) Polar solute dissolves in polar solvents and non-polar solute dissolves in non-polar solvents.

Reason (R) Like dissolves like.

(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).

(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).

(c) (A) is correct; (R) is incorrect.

(d) (A) is incorrect; (R) is correct.

191) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.

Assertion (A) When scuba divers come towards surface, their capillaries get blocked which is painful and dangerous to life.

Reason (R) There occurred release of dissolved gases as the pressure decreases and leads to the formation of bubbles of nitrogen in the blood.

(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).

(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).

(c) (A) is correct; (R) is incorrect.

(d) (A) is incorrect; (R) is correct.

192) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.

Assertion (A) Freezing point of solvent is more than that of solution.

Reason (R) When non-volatile solid is added to the solvent, its vapour pressure increases and become equal to solid solvent at the lower temperature.

(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).

(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).

(c) (A) is correct; (R) is incorrect.

(d) (A) is incorrect; (R) is correct.

193) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) Experimentally determined molar mass is always higher than the true value.
Reason (R) Lower molar mass is due to dissociation of solute into ions.
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

194) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) Ethanol and acetone show positive deviation from Raoult's law.
Reason (R) Pure ethanol molecule show hydrogen bond and on adding acetone hydrogen bond between ethanol molecules breaks
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

195) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) The vapour pressure of 0.1M sugar solution is less than that of 0.1M potassium chloride solution.
Reason (R) Lowering of vapour pressure is directly proportional to the number of species present in the solution.
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

196) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) One molar aqueous solution has always higher concentration than one molal.
Reason (R) The molality of a solution depends upon the density of the solution whereas molarity does not.
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

197) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) NaCI in water and organic acids in benzene show abnormal molecular mass.
Reason (R) Abnormal molecular mass is obtained when the substance in the solution undergoes dissociation or association.
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

198) **Assertion:** A solution is a homogeneous mixture of two or more chemically non-reacting substances.
Reason: Solutions can be made between any two states of matter.
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are corr.ect statements but reason is not correct explanation for assertion .
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

199) **Assertion:** Amalgam is a homogeneous solution.
Reason: Amalgam is a solution in which mercury is solute and zinc is solvent.
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are corr.ect statements but reason is not correct explanation for assertion .
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

200) **Assertion:** One molal aqueous solution of urea contains 60 g of urea in 1 kg of water.
Reason: Solution containing one mole of solute in 1000 g solvent is called one molal solution.
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are corr.ect statements but reason is not correct explanation for assertion .
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

201) **Assertion:** The molality of the solution does not change with change in temperature.
Reason: The molality is expressed in units of moles per 1000 g of solvent.
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are corr.ect statements but reason is not correct explanation for assertion .
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

202) **Assertion:** Dilute solution of benzene and toluene is an ideal solution.
Reason: Benzene and toluene form H-bonding with each other.
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are corr.ect statements but reason is not correct explanation for assertion .
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

203) **Assertion:** The pressure exerted by the vapour in equilibrium with a liquid at a given temperature is called its vapour pressure. ,
Reason: If a non-volatile solute is added to a solvent to give a solution, the vapour pressure of the solution is found to be greater than the vapour pressure of the pure solvent.
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are corr.ect statements but reason is not correct explanation for assertion .
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

204) **Assertion**: Sodium chloride used to clear snow on the roads.
Reason: Sodium chloride depresses the freezing point of water.
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are corr.ect statements but reason is not correct explanation for assertion .
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

205) **Assertion:** Solutions show deviations from Raoult's law.
Reason: The cause for these deviations lies in the nature of interactions at the molecular level.
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are corr.ect statements but reason is not correct explanation for assertion .
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

206) **Assertion**: The vapour pressure of a liquid decreases if some non-volatile solute is dissolved in it.
Reason: The relative lowering of vapour pressure of a solution containing a non-volatile solute is equal to the mole fraction of thesolute in the solution.
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are corr.ect statements but reason is not correct explanation for assertion .
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

207) **Assertion:** Osmotic pressure is a colligative property.
Reason: Osmotic pressure depends only on the number of particles dissolved in solution.
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are corr.ect statements but reason is not correct explanation for assertion .
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

208) **Assertion:** Water boils at 373 K as the vapour pressure at this temperature becomes equal to atmospheric pressure.
Reason: Vapour pressure of water is less than 1.013 bar at 373 K.
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are corr.ect statements but reason is not correct explanation for assertion .
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

209) **Assertion:** If a liquid solute, more volatile than the solvent, is added to the solvent, the vapour pressure of the solution may increase i.e., $P_s > p^o$.
Reason: In the presence of a more volatile liquid solute, only the solute will form the vapours and solvent will not.
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are corr.ect statements but reason is not correct explanation for assertion .
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

210) **Assertion:** Ifblood cells are placed in pure water, they swell and burst.
Reason: Due to osmosis, the movement of water molecules into the cell, dilutes the salt content.
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are corr.ect statements but reason is not correct explanation for assertion .
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

211) **Assertion:** Solutions having the same osmotic pressure are called isotonic solutions.
Reason: Ca^{2+} and K^+ ions are responsible for maintaining proper osmotic pressure balance in the cells of organism.
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are corr.ect statements but reason is not correct explanation for assertion .
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

212) **Assertion:** If more and more non-volatile solute is added to a solvent, the freezing point of the solution keeps on becoming higher and higher.
Reason: Presence of large am~unt of the solid solute allow the solution to freeze more rapidly.
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are corr.ect statements but reason is not correct explanation for assertion .
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

213) **Assertion:** When a concentrated solution is diluted by adding more water, the number of moles of solute in the solution remains unchanged.
Reason: Number of moles of a solute is equal to the product of molarity and volume of solution in litres.
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are corr.ect statements but reason is not correct explanation for assertion .
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

214) **Assertion:** The boiling point of 200 mL of 1 M urea solution is less than that of 200 mL of 2 M glucose solution.
Reason: Elevation of boiling point is directly proportional to the number of species present in the solution.
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are corr.ect statements but reason is not correct explanation for assertion .
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

215) **Assertion:** Elevation in boiling point and depression in freezing point are colligative properties.
Reason: All colligative properties are used for the calculation of molecular masses.
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are corr.ect statements but reason is not correct explanation for assertion .
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

216) **Assertion:** Reverse osmosis is used in the desalination of sea water.
Reason: When pressure more than osmotic pressure is applied, pure water is squeezed out of the sea water through the membrane.
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are corr.ect statements but reason is not correct explanation for assertion .
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

217) **Assertion :** Camphor is used as a solvent in the determination of molecular masses of naphthalene, anthracene, etc.
Reason: Camphor has high molal elevation constant.
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are corr.ect statements but reason is not correct explanation for assertion .
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

218) In the following question a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.
Assertion: When methyl alcohol is added to water, boiling point of water increases.
Reason: When a volatile solute is added to a volatile solvent elevation in boiling point is observed.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion and reason both are incorrect statements.
(e) Assertion is wrong statement but reason is correct statement.

219) In the following question a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.
Assertion: When a solution is separated from the pure solvent by a semipermeable membrane, the solvent molecules pass through it from pure solvent side to the solution side.
Reason: Diffusion of solvent occurs from a region of high concentration solution to a region of low concentration solution.
Codes:
(0) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion and reason both are incorrect statements.
(e) Assertion is wrong statement but reason is correct statement.

14 x 4 = 56

220) **Read the passage given below and answer the following questions:**

The concentration of a solute is very important in studying chemical reactions because it determines how often molecules collide in solution and thus indirectly determine the rate of reactions and the conditions at equilibrium.

There are several ways to express the amount of solute present in a solution. The concentration of a solution is a measure of the amount of solute that has been dissolved in a given amount of solvent or solution. Concentration can be expressed in terms of molarity, molality, parts per million, mass percentage, volume percentage, etc.

The following questions are multiple choice questions. Choose the most appropriate answer:

(i) The molarity (in mol L^{-1}) of the given solution will be

(a) 1.56 (b) 1.89 (c) 0.263 (d) 1.44

(ii) Which of the following is correct relationship between mole fraction and molality?

(a) $x_2 = \frac{mM_1}{1+mM_1}$ (b) $x_2 = \frac{mM_1}{1-mM_1}$

(c) $x_2 = \frac{1+mM_1}{mM_1}$ (d) $x_2 = \frac{1-mM_1}{mM_1}$

(iii) Which of the following is temperature dependent?

(a) Molarity (b) Molality

(c) Mole fraction (d) Mass percentage

(iv) Which of the following is true for an aqueous solution of the solute in terms of concentration?

(a) 1 M = 1 m(b) 1M > 1m

(c) 1M < 1 m (d) Cannot be predicted

221) **Read the passage given below and answer the following questions:**

At 298 K, the vapour pressure of pure benzene, C_6H_6 is 0.256 bar and the vapour pressure of pure toluene

$C_6H_5CH_3$ is 0.0925 bar. Two mixtures were prepared as follows:

(i) 7.8 g of C_6H_6 + 9.2 g of toluene

(ii) 3.9 g of C_6H_6 + 13.8 g of toluene

The following questions are multiple choice questions. Choose the most appropriate answer:

(i) The total vapour pressure (bar) of solution 1 is

(a) 0.128 (b) 0.174 (c) 0.198 (d) 0.258

(ii) Which of the given solutions have higher vapour pressure?

(a) I (b) II

(c) Both have equal vapour pressure (d) Cannot be predicted

(iii) Mole fraction of benzene in vapour phase in solution 1 is

(a) 0.128 (b) 0.174 (c) 0.734 (d) 0.266

(iv) Solution I is an example of a/an

(a) ideal solution

(b) non-ideal solution with positive deviation

(c) non-ideal solution with negative deviation

(d) can't be predicted

222) **Read the passage given below and answer the following questions:**

An ideal solution may be defined as the solution which obeys Raoult's law exactly over the entire range of concentration. The solutions for which vapour pressure is either higher or lower than that predicted by Raoult's law are called non-ideal solutions.

Non-ideal solutions can show either positive or negative deviations from Raoult's law depending on whether the A-B interactions in solution are stronger or weaker than A - A and B - B interactions.

The following questions are multiple choice questions. Choose the most appropriate answer:

(i) Which of the following solutions is/are ideal solution(s)?

(i) Bromoethane and iodoethane (ii) Acetone and chloroform

(iii) Benzene and acetone (iv)n-heptane and n-hexane

(a) only 1 **(b) I and II** **(c) II and III** **(d) I and IV**

(ii) Which of the following is not true for positive deviations?

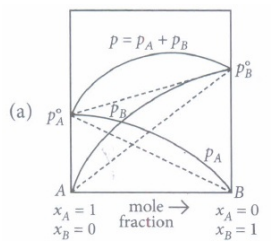
(a) The A-B interactions in solution are weaker than the A -A and B -B interactions.

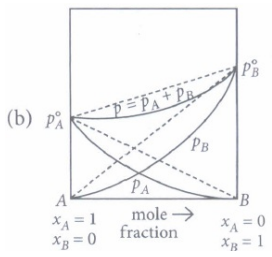
(b) $P_A < P_A^\circ x_A$ and $P_B < P_B^\circ x_B$

(c) Carbon tetrachloride and chloroform mixture is an example of positive deviations.

(d) All of these

(iii) For water and nitric acid mixture which of the given graph is correct?





(C) Both of these **(d) None of these**

(iv) Water- HCl mixture

I. shows positive deviations II. forms minimum boiling azeotrope

III. shows negative deviations IV. forms maximum boiling azeotrope

(a) I and II **(b) II and III**

(c) I and IV **(d) III and IV**

223) **Read the passage given below and answer the following questions:**

The properties of the solutions which depend only on the number of solute particles but not on the nature of the solute are called colligative properties. Relative lowering in vapour pressure is also an example of colligative properties.

For an experiment, sugar solution is prepared for which lowering in vapour pressure was found to be 0.061 mm of Hg. (Vapour pressure of water at 20°C is 17.5 mm of Hg.)

The following questions are multiple choice questions. Choose the most appropriate answer:

(i) Relative lowering of vapour pressure for the given solution is

(a) 0.00348(b) 0.061(c) 0.122(d) 1.75

(ii) The vapour pressure (mm of Hg) of solution will be

(a) 17.5(b) 0.61(c) 17.439(d) 0.00348

(iii) Mole fraction of sugar in the solution is

(a) 0.00348 **(b) 0.9965** **(c) 0.061** **(d) 1.75**

(iv) The vapour pressure (mm of Hg) of water at 293 K when 25 g of glucose is dissolved in 450 g of water is

(a) 17.2 (b) 17.4 (c) 17.120 (d) 17.02

224) **Read the passage given below and answer the following questions:**

Few colligative properties are:

(a) relative lowering of vapour pressure: depends only on molar concentration of solute (mole fraction) and independent of its nature.

(b) depression in freezing point: it is proportional to the molal concentration of solution.

(c) elevation of boiling point: it is proportional to the molal concentration of solute.

(d) osmotic pressure: it is proportional to the molar concentration of solute.

A solution of glucose is prepared with 0.052 g at glucose in 80.2 g of water. (K_f = 1.86 K kg mol^{-1} and K_b = 5.2 K kg mol^{-1})

The following questions are multiple choice questions. Choose the most appropriate answer:

(i) Molality of the given solution is

(a)	**(b)**	**(c)**	**(d)**
0.0052 m	**0.0036 m**	**0.0006 m**	**1.29 m**

(ii) Boiling point for the solution will be

(a)	**(b)**	**(c)**	**(d)**
373.05 K	**373.15 K**	**373.02 K**	**372.98 K**

(iii) The depression in freezing point of solution will be

(a)	**(b)**	**(c)**	**(d)**
0.0187 K	**0.035 K**	**0.082 K**	**0.067 K**

(iv) Mole fraction of glucose in the given solution is

(a)	**(b)**	**(c)**	**(b)**
6.28 x 10^{-5}	**1.23 x 10^{-4}**	**0.00625**	**0.00028**

225) **Read the passage given below and answer the following questions:**

The solubility of gases increases with increase of pressure. William Henry made a systematic investigation of the solubility of a gas in a liquid. According to Henry's law "the mass of a gas dissolved per unit volume of the solvent at constant temperature is directly proportional to the pressure of the gas in equilibrium with the solution".

Dalton during the same period also concluded independently that the solubility of a gas in a liquid solution depends upon the partial pressure of the gas. If we use the mole fraction of gas in the solution as a measure of its solubility, then Henry's law can be modified as "the partial pressure of the gas in the vapour phase is directly proportional to the mole fraction of the gas in the solution':

(i) Henry's law constant for the solubility of methane in benzene at 298 K is 4.27 X 10^5 mm Hg. The solubility of methane in benzene at 298 K under 760 mm Hg is

(a) 4.27 x 10^{-5} **(b) 1.78 x 10^{-3}**

(c) 4.27 X 10^{-3} **(d) 1.78 x 10^{-5}**

(ii) The partial pressure of ethane over a saturated solution containing 6.56 x 10^{-2} g of ethane is 1 bar. If the solution contains 5.00 x 10^{-2} g of ethane then what will be the partial pressure (in bar) of the gas?

(a) 0.762 (b) 1.312 (c) 3.81 (d) 5.0

(iii) K_H (K bar) values for $Ar_{(g)}$' $CO_{2(g)}$' $HCHO_{(g)}$ and $CH_{4(g)}$ are 40.39, 1.67, 1.83 x 10^{-5} and 0.413 respectively.

Arrange these gases in the order of their increasing solubility.

(a) $HCHO < CH_4 < CO_2 < Ar$ (b) $HCHO < CO_2 < CH_4 < Ar$

(c) $Ar < CO_2 < CH_4 < HCHO$ (d) $Ar < CH_4 < CO_2 < HCHO$

(iv) Which of the following statements is correct

(a) K_H increases with increase of temperature

(b) K_H decreases with increase of temperature

(c) K_H remains constant with increase oftemperature

(d) K_H first increases then decreases, with increase of temperature.

226) **Read the passage given below and answer the following questions:**

At the freezing point of a solvent, the solid and the liquid are in equilibrium. Therefore, a solution will freeze when its vapour pressure becomes equal to the vapour pressure of the pure solid solvent.
It has been observed that when a non-volatile solute is added to a solvent, the freezing point of the solution is
always lower than that of the pure solvent. Depression in freezing point can be given as, $\Delta T_f = K_f m$
Where, K_f = Molal freezing point depression constant
or we can write, $\Delta T_f = \frac{K_f \times W_B \times 1000}{W_A^1 \times M_B}$

In these questions (i-iv), a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

(i) Assertion: 0.1 M solution of glucose has same depression in the freezing point as 0.1 M solution of urea.
Reason: K_f for both has same value.

(ii) Assertion: Larger the value of cryoscopic constant of the solvent, lesser will be the freezing point of the solution.
Reason: Extent of depression in the freezing point depends on the nature of the solvent.

(iii) Assertion: The water pouch of instant cold pack for treating athletic injuries breaks when squeezed and NH_4NO_3 dissolves thus lowering the temperature.
Reason: Addition of non-volatile solute into solvent results into depression of freezing point of solvent.

(iv) Assertion: If a non-volatile solute is mixed in a solution then elevation in boiling point and depression in freezing point both will be same.
Reason: Elevation in boiling point and depression in freezing point both depend on number of particles of solute.

227) **Read the passage given below and answer the following questions:**

According to Raoult's law, the partial pressure of two components of the solution may be given as:
$p_A = p_A^\circ x_A$ and $p_B = p_B^\circ x_B$
For an ideal solution (obeys Raoult's law always)
$\Delta H_{\text{mix}} = 0, \Delta V_{\text{mix}} = 0$
All solutions do not obey Raoult's law over entire range of concentration. These are known as non-ideal solutions.
For non-ideal solutions, $p_A \neq p_A^\circ x_A$ or $p_B \neq p_B^\circ x_B$
Positive deviation $\Rightarrow p_A > p_A^\circ x_A$ and $p_B > p_A^\circ x_B$
Negative deviation $\Rightarrow p_A < p_A^\circ x_A$ and $p_B < p_B^\circ x_B$

In these questions (i-iv), a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statemeht but reason is correct statement.

(i) Assertion: An ideal solution obeys Raoults law.
Regson : In an ideal solution, solute-solute as well as solvent-solvent interactions are similar to solutesolvent interactions.

(ii) Assertion: Acetone and aniline show negative deviations.
Reason: H-bonding between acetone and aniline is stronger than that between acetone-acetone and aniline-aniline.

(iii) Assertion: The solutions which show negative deviations from Raoult's law are called maximum boiling azeotropes.
Reason: 68% nitric acid and 32% water by mass form maximum boiling azeotrope.

(iv) Assertion: ΔH_{mix} and ΔV_{mix} are positive for an ideal solution.
Reason: The interactions between the particles of the components of an ideal solution are almost identical as between particles in the liquids.