

Episode No –34

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Faculty: Dr. Ashraf Khan

## Theory of Dilute Solutions

- \* 5.5mg of  $N_2$  gas dissolves in 180g water at 273K and 1 atm pressure due to  $N_2$ . The mole fraction of  $N_2$  in 180g water at 5 atm  $N_2$  pressure is approx.
  - a)  $1 \times 10^{-5}$
  - b)  $1 \times 10^{-4}$
  - c)  $1 \times 10^{-6}$
  - d)  $1 \times 10^{-3}$Ans: b)
- \* The vapour pressure of two liquids P and Q are 80 and 60 torr respectively. The total vapour pressure of solution obtained by mixing 3 mole P and 2 mole Q would be
  - a) 72 torr
  - b) 140 torr
  - c) 68 torr
  - d) 20 torrAns : a)
- \* The Boiling point of an azeotropic mixture of water and ethanol is less than that of water and ethanol the mixture shows
  - a) No deviation from Raoult's law
  - b) Positive deviation from Raoult's law
  - c) Negative deviation from Raoult's law
  - d) That solution is unsaturatedAns : b)
- \* The Osmotic pressure of solution of 3.42g sugar (molar mass 342) in 500mL at 300K will be ( $R = 0.0821 \text{ L atm K}^{-1}\text{mol}^{-1}$ )
  - a) 0.246 atm
  - b) 0.492 atm
  - c) 2.46 atm
  - d) 4.92 atmAns : b)
- \* 3% aqueous solution of urea is isotonic with 9% aqueous solution of an organic solute(B). The molar mass of B is
  - a) 90
  - b) 45
  - c) 342
  - d) 180Ans : d)

- \* The Osmotic pressure of blood is 821 atm at 37<sup>0</sup>c. How much glucose should be used per litre for an intravenous injection that is isotonic with blood?
- 58 g
  - 180 g
  - 54 g
  - 8.21 g
- Ans : 58g
- \* Solution S<sub>1</sub> contains 3g urea per litre and solution S<sub>2</sub> contains 9g glucose per litre at 298K the osmotic pressure of
- S<sub>1</sub> > S<sub>2</sub>
  - S<sub>1</sub> < S<sub>2</sub>
  - Both the solution is same
  - Unpredictable
- Ans : c)
- \* The relative lowering of vapour pressure produced by a solution of 18g urea in 100g water is apporox
- 0.5
  - 0.05
  - 0.25
  - 0.025
- Ans : b)
- \* At room temperature the mole fraction of solute is 0.25 and vapour pressure of a solvent is 0.80 atm. The lowering in vapour pressure is
- 0.20
  - 0.80
  - 0.96
  - 0.65
- Ans: a)
- \* 10g of solute (molar mass = 100) is dissolved in 100g solvent to show 0.3<sup>0</sup> elevation in boiling point. The value of molal ebullioscopic constant will be
- 10
  - 3
  - 0.3
  - Unpredictable
- Ans: c)

- \* A Solution of urea boils at  $100.18^{\circ}\text{C}$  at atmospheric pressure. If  $K_f$  and  $K_b$  for water are  $1.86$  and  $0.512\text{Kkgmol}^{-1}$  respectively. The above solution will freeze at
- $0.654^{\circ}\text{C}$
  - $-0.654^{\circ}\text{C}$
  - $6.54^{\circ}\text{C}$
  - $-6.54^{\circ}\text{C}$
- Ans: b)
- \* In certain solvent, phenol dimerizes to extent of 60%. Its observed molecular mass in that solvent should be
- $>94$
  - $=94$
  - $<94$
  - Unpredictable
- Ans: a)
- \* The molecular mass of NaCl as determined by osmotic pressure measurement is
- 58.5
  - Less than 58.5
  - More than 58.5
  - Unpredictable
- Ans: b)
- \* Lowering in Vapour pressure is highest for
- 0.1 M urea
  - 0.1 M NaCl
  - 0.1 M  $\text{MgCl}_2$
  - 0.1 M  $\text{K}_4[\text{Fe}(\text{CN})_6]$
- Ans: d)
- \* For which of the following solutes van't Hoff factor (i) is equal to one
- HCl
  - Urea
  - NaCl
  - $\text{BaCl}_2$
- Ans: b)
- \* Which has minimum osmotic pressure?
- 2M NaCl sol<sup>n</sup>
  - 3M glucose sol<sup>n</sup>
  - 2M Urea sol<sup>n</sup>
  - All have same Osmotic pressure

Ans: c)