CHAPTER – SOLUTION
ONE MARKS CARRYING MCQ'S

MULTIPLE CHOICE QUESTIONS :

1. Which of the following aqueous solutions should have the highest boiling point?
(a)1.0 M NaOH (b) 1.0M Na_2SO_4 (c) 1.0 M NH_4NO_3 (d) 1.0 M KNO_2

2. The Unit of ebulioscopic constant is……..
(a) K kg mol^{-1} (b) Mol Kg K (c) Kg $mol^{-1}K^{-1}$ (d) K mol Kg^{-1}

3. 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

4. Value of Henry's constant K_H is
(a) Greater for gases with higher solubility (c) Constant for all gases
(b) Greater for gases with higher solubility (d) not related to the solubility of gases

5. A colligative property of a solution depends on the
(a) Number of solute particles (c) Total number of solute and solvent molecules
(b) Number of atoms in solute molecules (d) mass of solute particles

6. Colligative property of a solution depends on
(a) Molarity (c) Number of moles of solvent
(b) Number of moles of solute (d) Nature of solute

7. Which of the following solutions will have the least freezing point?
(a) 0.1M Urea (b) 0.1M Acetic acid (c) 0.1M NaCl (d) 0.1 m Calcium Chloride

8. A semipermeable membrane permits the flow of
(a) Solution (b) Solvent (c) Solute (d) Neither solute nor solvent

9. The decreasing order of osmotic pressure of 10g glucose(P1) , 10g Urea(P2) and 10g sucrose(P3) at 273K, when dissolved in 400 mL of water separately is.
(a) P1> P2> P3 (b) P2> P3> P1 (c) P3> P2> P1 (d) P2> P1>P3

10. Molarity of 900g of pure water is
(a) 50M (*b*) 55.5M (*c*) 5M (*d*) None of these

11. Mole fraction of a solute in 2.5m aqueous solution is
(a) 0.43 (b) 0.043 (c) 4.3 (d) 43

12. A H_2SO_4 solution contains 80.0% by weight H_2SO_4 and has a specific gravity of 1.73, itsnormality is approximately?
(a) 18.0 (b) 1.8 (c) 28.2 (d) 36.0

13. On dissolving common salt in water, the:
(a) freezing point of H_2O increases (c) boiling point of H_2O decreases
(b) boiling point of H_2O decreases (d) boiling point of H_2O remain same

14. The unit of ebullioscopic constant is
(a) K kg mol^{-1} (b) Mol Kg K^{-1} (c) K mol Kg^{-1} (d) none of these

15. An aqueous solution of methanol in water has vapour pressure
(a) equal to that of methanol (c) more than that of water
(b) equal to that of water (d) less than that of water

16. The molality of pure water is
(a) 55.5 (b) 20 (c)18 (d)10

17. The number of moles of NaCI in 3litres of 3M solution is:
(a) 1 (b) 3 (c) 9 (d) 27

18. The amount of solute required to prepare 10 litres of decimolar solution is:
(a) 0.01mole (b) 0.2 mole (c)0.05mole (d)1.0mole

19. One kilogram of water contains 4g of NaOH. The concentration of the solution is best expressed as:
(a)0.1molal (b)0.1 molar (c)decinormal (d)about0.1mole.

20. The number of moles of NaCl in 3 litres of 3M solution is:
(a) 1 (b) 3 (c) 9 (d) 27

21. Molality is expressed in:
(a) Gram/litre (b) mole/litre (c) litre/mole (d) mole/kg

22. Which of the not affected by temperature?
(a) Normality (b) Molality (c) Molarity (d) Formality

23. Isotonic solution have equal
(a) vapour pressure (b) osmotic pressure (c) boiling point (d) freezing point

24. The molal elevation constant depends upon
(a) nature of solute (b)nature of the solvent
(c) vapour pressure of the solution (d)enthalpy change

25. Molarity is expressed as
(a)L/mol (b)mol/L (c)mol/1000g (d)g/L

26. Which of the following is a colligative property?
(*a*) vapour pressure (*b*) relative lowering in vapour pressure
(*c*) lowering in vapour pressure (*d*) all of these

27. Which one of the following binary liquid mixtures exhibits negative deviation from Raoult's law?
(*a*) *n*-Hexane-*n*-Heptane (*b*) Chloroform−Acetone
(*c*) Carbondisulphide−Acetone (*d*) Bromoethane−Chloroethene

28. Constant boiling mixtures are called
(*a*) ideal solution (*b*) Azeotropes
(*c*) isotonic solution (*d*)None of these.

29. Pressure cooker reduces cooking time because
(a) heat is more evenly distributed.
(b) the high pressure tend to rises the food
(c) the boiling point of food under pressure is elevated
(d) the boiling point of water in cooker is depressed.

30. Camphor is often used in molecular mass determination because.
(a) it has a high Cryoscopic constant (c) it is solvent for organic substance
(b) it is volatile (d) it is readily available

Answers

1.	(*b*)	**2.**	(*a*)	**3.**	(*b*)	**4.**	(*b*)	**7.**	(*a*)
6.	(*b*)	**7.**	(*d*)	**8.**	(*b*)	**9.**	(*d*)	**10.**	(*b*)
11.	(*b*)	**12.**	(*c*)	**13.**	(*c*)	**14.**	(*a*)	**15.**	(*c*)
16.	(a)	**17.**	(c)	**18.**	(d)	**19.**	(a)	**20.**	(c)
21.	(d)	**22.**	(b)	**23.**	(b)	**24.**	(b)	**25.**	(b)
26.	(*b*)	**27.**	(*b*)	**28.**	(*b*)	**29.**	(*c*)	**30.**	(*a*)

(2 OR 3 MARK Numerical QUESTIONS)

1. A commercially available sample of sulphuric acid is 15% H_2SO_4 by weight (density = 1.10 g ml^{-1}) .Calculate Molarity. [Ans. 1.68M]
2. A commercially available sample of sulphuric acid is 38% HCl by weight (density = 1.19 g ml^{-1}) .Calculate Molarity of acid. [Ans. 12.39M]
3. Calculate the mole fraction of ethanol and water in a sample which contain 95% ethanol by mass? [Ans. $X_{ethanol}$=0.88, X_{waterl}=0.12
4. 2.82 g of glucose (molar mas = 180) is dissolved in 30g of water. Calculate mole fraction of glucose and water. [Ans. $X_{glucose}$ = 0.0093, X_{water} = 0.9907]
5. A sugar syrup of weight 214.2 g contains 34.2 g of sugar ($C_{12}H_{22}O_{11}$). Calculate the mole fraction of sugar in the syrup. [Ans. X_{sugar}=0.01]
6. The osmotic pressure in pascal exerted by a solution prepared by dissolving 1.0 g of polymer of molar mass 185000 in 450 ml of water at 37° C. [Ans.1.43M]
7. Calculate the molal elevation constant of water, it is given that the 0.1molal aqueous solutions of the substance boiled at 100.052 degree celcius..[Ans. K_b=0.52 Km^{-1}]
8. Addition of 0.643 g of a compound to 50 mL of benzene (density 0.879 g/mL) lowers the freezing point from 5.51°C to 5.03°C. If K_f for benzene is 5.12, calculate the molecular mass of the compound. [Ans.M=155.87g/mol]
9. The boiling point of benzene is 353.23K. When 1.80g of a non-volatile non-ionisation solute was dissolved in 90g of benzene, the boiling point raised to 354.11K. Calculate the molar mass of the solute. [K_b for benzene =2.53K Kg mol^{-1}]. [Ans.M=57.5g/mol]
10. A 45 g of ethylene glycol ($C_2H_6O_2$) is mixed with 600 g of water. What is the freezing point of the solution? k_f=1.86 K kg mol^{-1}. [Ans.-2.25°C or 270.9K]

(2 MARK Theory QUESTIONS)

1. Define colligative properties ?

2. What is molal elevation constant or ebullioscopic constant and cryoscopic constant ?
3. What is osmosis and diffusion ?
4. What is Van't Hoff factor ?
5. Write down the factors affecting the solubility of a solid in liquid.
6. What are the factors affecting the solubility of gas in liquid ?
7. Why the vapour pressure of a solution decrease when non-volatile solute is added into it ?
8. What are the conditions to get accurate value of Molar mass from Colligative Properties ?
9. Define degree of dissociation and association ?
10. Which colligative property is preferred to measure molar mass.