

CHEMISTRY ASSIGNMENT

CLASS - XII

- Please read Solution (Chapter II) with the help of NCERT book as well as the videos that I have sent you.
- Go through all the intext questions as well as exercise questions from NCERT book.
- After reading the chapter thoroughly, go through the extra questions given below.

PRACTICE QUESTIONS

Very Short Answer/Objective Type Questions [1 Mark]

1. 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
2. On the basis of information given below mark the correct option. [NCERT Exemplar Problem]
- 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.
3. K_H value for Ar(g), CO₂(g), HCHO(g) and CH₄(g) are 40.39, 1.67, 1.83×10^{-5} and 0.413 respectively. Arrange these gases in the order of their increasing solubility. [NCERT Exemplar Problem]
- (a) HCHO < CH₄ < CO₂ < Ar
(b) HCHO < CO₂ < CH₄ < Ar
(c) Ar < CO₂ < CH₄ < HCHO
(d) Ar < CH₄ < CO₂ < HCHO
4. If $P_A^\circ = 100$ mm, $P_B^\circ = 200$ mm and mole fraction $x_A = 0.4$, what will be y_A (mole fraction) in vapour phase? [NCERT Exemplar Problem]
- (a) 0.25 (b) 0.30
(c) 0.75 (d) 0.50
5. Which of the following is maximum boiling azeotropic? [NCERT Exemplar Problem]
- (a) CH₃COOH + C₅H₅N (pyridine)
(b) H₂O + ethanol
(c) cyclohexane + ethanol
(d) H₂O + methanol

6. K_b (molal elevation constant) is inversely proportional to **[NCERT Exemplar Problem]**
- (a) boiling point of solvent
 - (b) $\Delta_{\text{vap}}H$ of solvent
 - (c) Molar mass of solvent
 - (d) all of these
7. Out of 1m solution of following dissolved in water. Which one will have lowest freezing point (assuming all are fully ionised) **[NCERT Exemplar Problem]**
- (a) Urea
 - (b) NaCl
 - (c) Na_2SO_4
 - (d) $\text{Al}_2(\text{SO}_4)_3$
8. Which of the following will have lowest vapour pressure? (Boiling points are given in brackets) **[NCERT Exemplar Problem]**
- (a) H_2O (373 K)
 - (b) CHCl_3 (334 K)
 - (c) Anilines (457 K)
 - (d) Benzene (353 K)
9. The p_{gas} dissolved a liquid is directly proportion to its **[NCERT Exemplar Problem]**
- (a) mole fraction
 - (b) molar mass
 - (c) boiling point of liquid
 - (d) molar mass of solvent
10. Henry's law constant of oxygen is $1.4 \times 10^{-3} \text{ mol L}^{-1} \text{ atm}^{-1}$ 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

Short Answer Type Questions [2 Marks]

11. Define the following terms:
(i) Mole fraction. (ii) Cryoscopic constant.
12. Find out the molar mass of X when 100 g of ' X ' is dissolved in 500 mL of solution if molarity of solution is 0.5.
13. What is meant by positive deviations from Raoult's law? Give an example. What is the sign of $\Delta_{\text{mix}}H$ for positive deviation? [Delhi 2015]
14. Define azeotropes. What type of azeotrope is formed by positive deviation from Raoult's law? Give an example. [Delhi 2015]
15. (i) On mixing liquid X and liquid Y , volume of the resulting solution decreases. What type of deviation from Raoult's law is shown by the resulting solution? What change in temperature would you observe after mixing liquids X and Y ?
(ii) What happens when we place the blood cell in water (hypotonic solution)? Give reason. [AI 2015]
16. What is meant by negative deviation from Raoult's law? Give an example. What is the sign of $\Delta_{\text{mix}}H$ for negative deviation? [Foreign 2015]

Long Answer Type [I] Questions [3 Marks]

17. A 5% solution by mass of cane sugar, $C_{12}H_{22}O_{11}$ (molecular weight 342) is isotonic with 0.877% solution of substance 'X'. Find the molecular weight of substance X. [AI 2015(C)]
18. 6.90 M solution of KOH in water contains 30% by mass of KOH. Calculate density and molality of KOH solution. [K = 39, O = 16, H = 1]
19. What is the molality of ammonia in a solution containing 0.85 g of NH_3 in 100 mL of a liquid of density 0.85 g cm^{-3} ?
20. What is the mass of precipitate formed when 50 mL of 16.9% solution of $AgNO_3$ is mixed with 50 mL of 5.8% solution of NaCl?
[Ag = 108.0, N = 14, O = 16, Na = 23, Cl = 35.5]
21. State Henry's Law. What is the effect of temperature on the solubility of gas in a liquid? [Delhi 2014]
22. The Henry's Law constant for oxygen dissolved in water is $4.34 \times 10^4 \text{ atm}$ at 25°C . If the partial pressure of oxygen in air is 0.2 atm, calculate the solubility of oxygen in water at 25°C .
23. How does mole fraction of HCl gas in its solution in cyclohexane varies with partial pressure of HCl(g)? Show with the help of graph? How can we calculate K_H with the help of graph? Name two factors which affect the value of K_H ?

24. Vapour pressure of water at 20 °C is 17.5 mm Hg, Calculate the vapour pressure of water at 20 °C when 15 g glucose (molecular weight 180 g mol⁻¹) is dissolved in 150 g of water. [AI 2015 Ajmer]
25. A solution is prepared by dissolving 5 g non-volatile solute in 95 g of water. It has vapour pressure of 23.375 mm of Hg at 25 °C. Calculate the molar mass of solute. (Vapour pressure of pure water at 25 °C = 23.75 mm of Hg). [AI 2015 Bhubaneswar]
26. Calculate the normal boiling point of a sample of sea water containing 3.5% of NaCl and 0.13% of MgCl₂ by mass.
[Given K_b (water) = 0.52 K kg mol⁻¹, Mol. Wt. of NaCl = 58.5 g mol⁻¹, MgCl₂ = 95 g mol⁻¹]. [HOTS]
27. An aqueous solution of 3.12 g of BaCl₂ in 250 g of water is found to boil at 100.0832 °C. Calculate the degree of dissociation of BaCl₂.
[K_b (H₂O) = 0.52 K/m.] [HOTS]
28. Calculate the freezing point of a 1 molar aqueous solution of KCl.
(Density of solution = 1.04 g cm⁻³, K_f = 1.86 K kg mol⁻¹, At. Wt. of K = 39 and Cl = 35.5)

Long Answer Type [II] Questions [5 Marks]

29. (a) Differentiate between molarity and molality of a solution. How can we change molality value to a solution into molarity value. [Delhi 2014(C)]
- (b) What is the mole fraction of the solute in a 1.00 m aqueous solution?
- (a) Assuming complete ionisation, calculate the expected freezing point of solution prepared by dissolving 6.00 g of Glauber's salt, Na₂SO₄·10H₂O in 0.1 kg of H₂O. (K_f for H₂O = 1.86 K kg mol⁻¹) [At. mass of Na = 23, S = 32, O = 16, H = 1 u]. [AI 2014(C)]
- (b) Two liquids X and Y boil at 110 °C and 130 °C respectively. Which of them has higher vapour pressure at 50 °C ?
30. (a) How is it that measurement of osmotic pressure is more widely used for determining molar masses of macromolecules than the elevation in boiling point or depression in freezing point of their solutions?
- (b) Discuss biological and industrial significance of osmosis.