CBSE NCERT Based Chapterwise Questions (2025-2026)
Class-XII
Subject: Chemistry
Chapter Name : *Solution* (Chap : 1)
Total : 7 Marks (expected) [MCQ-1 Mark, A/R-1 Marks, VSQ-2 Mark, SQ-3 Marks]
Level - 1

I. MCQ Type (One correct Answer)

1. Colligative properties are used for the determination of:

Ⓐ Molar mass of solute   Ⓑ Equivalent weight of solute

Ⓒ Parking efficiency of molecules   Ⓓ Melting point and boiling point

[Hints : NCERT, Vol-1, Pg-17]

2. Two liquids x and y on mixing gives a warm solution. The solution is:

Ⓐ Ideal solution

Ⓑ Non-ideal and shows (+ve) deviation from Raoult's law

Ⓒ Ideal and shows (–ve) deviation from Raoult's law

Ⓓ Non-ideal and shows (–ve) deviation from Raoult's law

[Hints : NCERT, Vol-1, Pg-14]

3. The Van't Hoff's factor for $0.1M\ Ba(NO_3)_2$ solution is 2.74. The degree of dissociation is:

Ⓐ 91.3%   Ⓑ 87%   Ⓒ 100%   Ⓓ 74%

[Hints : NCERT, Vol-1, Pg-26]

4. The unit of ebullioscopic constant is_____

Ⓐ $KKg(mol)^{-1}$ or $K(molality)^{-1}$ Ⓑ $(mol)\ kg\ K^{-1}$ or $K^{-1}(molality)$

Ⓒ $Kg\ (mol)^{-1}$ or $K^{-1}\ (molality)^{-1}$ Ⓓ $K\ (mol)Kg^{-1}$ or $K(molality)$

[Hints : NCERT, Vol-1, Pg-17]

5. For a dilute solution, Raoult's law states that:

Ⓐ The lowering of vapour pressure is equal to the molefraction of solute

Ⓑ The relative lowering of vapour pressure is equal to the molefraction of solute

Ⓒ The relative lowering of vapour pressure is propotional to the amount of solute in solution

Ⓓ The vapour pressure of the solution is equal to the mole fraction of the solute

[Hints : NCERT, Vol-1, Pg-10 $\dfrac{P_A^o - P_A}{P_A^o} = X_B$**]**

6. Maximum amount of a solid solute that can be dissolved in a specified amount of a given liquid_____.

Ⓐ Temperature   Ⓑ Nature of solute   Ⓒ Pressure   Ⓓ Nature of solvent

[Hints : NCERT, Vol-1, Pg-6]

7. Low concentration of oxygen is the blood and tissues of people living at high altitude is due to_____.

Ⓐ Low temperature

Ⓑ low atmospheric pressure

ⓒ high atmospheric pressure

ⓓ both low temperature and high atmospheric pressure

[Hints : NCERT, Vol-1, Pg-7]

II. Assertion (A) and Reason (R). Of the two statements, mark the correct answer from the options given below:

A) Both A and R are true and R is the correct explanation of A.

B) Both A and R are true but R is not the correct explanation of A.

C) A is true but R is false.

D) A is false but R is true.

8. **Assertion (A) :** 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.

   Reason (R) : Diffusion of solvent occurs from a region of high concentration solution to a region of low concentration solution.

   Ⓐ A   Ⓑ B   Ⓒ C   Ⓓ D

[Hints : NCERT, Vol-1, Pg-21]

9. **Assertion (A) :** Depression in freezing point is a colligative property.

   Reason (R) : Depressing in freezing point is directly promotional to molarity.

   Ⓐ A   Ⓑ B   Ⓒ C   Ⓓ D

[Hints : NCERT, Vol-1, Pg-19]

10. **Assertion (A) :** Molarity of a solution in liquid state changes with temperature.

    Reason (R) : The volume of a solution changes with change in temperature.

    Ⓐ A   Ⓑ B   Ⓒ C   Ⓓ D

[Hints : NCERT, Vol-1, Pg-4]

11. **Assertion (A) :** When a volatile solute is added to water, boiling point of water increases.

    Reason (R) : When a volatile solute is added to volatile solvent elevation in boiling point is observed.

    Ⓐ A   Ⓑ B   Ⓒ C   Ⓓ D

[Hints : NCERT, Vol-1, Pg-17]

12. **Assertion (A) :** When NaCl is added to water a depression in freezing point is observed.

    Reason (R) : The lowering of vapour pressure of a solution causes depression in the freezing point.

    Ⓐ A   Ⓑ B   Ⓒ C   Ⓓ D

[Hints : NCERT, Vol-1, Pg-18]

13. **Assertion (A) :** Reverse osmosis is the process used in desalination of sea water.

    Reason (R) : The direction osmosis can be reversed of a pressure higher than the osmotic pressure is applied to the solution side.

    Ⓐ A   Ⓑ B   Ⓒ C   Ⓓ D

[Hints : NCERT, Vol-1, Pg-23]

14. **Assertion (A) :** An ideal solution obeys Raoult's law.

    Reason (R) : In an ideal solution, solvent-solvent as well as solute -solute interactions are similar to solute-solvent interaction.

    Ⓐ A   Ⓑ B   Ⓒ C   Ⓓ D

[Hints : NCERT, Vol-1, Pg-10]

III. Very Short Answer Questions carrying 2 marks each Question.

15. Calculate the mass percentage of benzene (C_6H_6) and Carbon tetrachloride (CCl_4) if 22g of benzene is dissolved in 122g of carbon tetrachloride.

[Hints : NCERT, Vol-1, Pg-5, Q. 1.1]

16. Calculate the mole fraction of benzene in solution containing 30% by mass in carbon tetrachloride.

[Hints : NCERT, Vol-1, Pg-5, Q. 1.2]

17. A sample of drinking water was formed to be severally contaminated with chloroform ($CHCl_3$) supposed to be carcinogent. The level of contamination was 15 ppm (by mass)

    Ⓐ express in percent by mass

    Ⓑ determination the molarity of chloroform in the water sample.

[Hints : NCERT, Vol-1, Pg-2, and Pg-5]

18. Explain the solubility rule "like dissolves like" in term of intermolecular forces, that exist in solutions.

[Hints : NCERT, Vol-1, Pg-6]

19. What is the significance of Henry's law constant, K_H?

[Hints : NCERT, Vol-1, Pg-7]

20. How does sprinkling salt help in clearing the snow covered roads in hilly area?

[Hints : NCERT, Vol-1, Pg-18]

21. Give an example of a material used for making semipermeable membrane for carrying out reverse osmosis.

[Hints : NCERT, Vol-1, Pg-22]

IV. Short Answer Type Question

22. Calculate the mass of ascorbic acid (molar mass = $176 \, g \, (mol)^{-1}$) to be dissolved in 75g of acetic acid, to lower its freezing point by 1.5°C ($K_f = 3.9 \, kg(mol)^{-1}$]

[Hints : CBSE 2020, NCERT-vol-1, ΔT_f]

23. 300K, 30g of glucose, $C_6H_{12}O_6$ present per litre in its solution has an osmotic pressure of 4.98 bar. If the osmotic pressure of snother solution is 1.52 bar at the same temperature, calculate the concentration of other solution.

[Hints : CBSE 2019, (56/4/2), NCERT vol-1, Osmotic pressure, $\pi = CRT$]

24. A 4% solution [W/W of sucrose ($M = 342 \, g(mol)^{-1}$)] in water has a freezing point of 271.15K. Calculate the freezing point of 5% glucose ($M = 180g \, (mol)^{-1}$) in water given, freezing point of pure water $T_f^0 = 273K$)

[Hints : ΔT_f ; NCERT, Vol-1, CBSE-2019]

Developed by AEP

25. Calculate the freezing point of an aqueous solution containing 10.5g of $MgBr_2$ in 200g of water, assuming complete dissociation of $MgBr_2$ [Molar Mass = 184 $(mol)^{-1}$, K_f for water = 1.86 $KKg\,(mol)^{-1}$]

[Hints : NCERT, Vol-1, $\Delta T_f = iK_p \times m'$ CBSE 2018]]

26. Calculate the mass of non-volatile solute (molar mass 40) which should be dissolved in 114g octane to reduce the vapour pressure to 80%

[Hints : NCERT, Vol-1, Relative lowering of vapour pressure]

27. Calculate the boiling point of solution when 4g of $MgSO_4$ [M = 120g $(molg)^{-1}$] was dissolved in 100g of water, ??? $MgSO_4$ undergoes complete ionization. [K_b for water = 0.52 $KKg\,(mole)^{-1}$]

[Hints : NCERT, Vol-1, $\Delta Tb = iK_b \times m'$]

28. 45g of ethylene glycol $(C_2H_6O_2)$ in mixed with 600 g of water. Calculate:

(a) The depression in freezing point

(b) The freezing point of the solution

[K_f for water = 1.86 $K.Kg\,(mol)^{-1}$]

[Hints : NCERT, Vol-1, $\Delta T_f = K_f \times m'$ & $\Delta T_f = T_f^0 - T_f$]

A N S W E R

1. Ⓐ	5. Ⓑ	9. Ⓐ	12. Ⓐ
2. Ⓓ	6. Ⓒ	10. Ⓐ	13. Ⓑ
3. Ⓑ	7. Ⓑ	11. Ⓓ	14. Ⓐ
4. Ⓐ	8. Ⓑ		

For ideal solution A-A, B-B and A - B interaction are equal

15. 84.72%		22. 5.08g	
16. 0.45g		23. 0.051m	
17. (a) 1.5×10^{-3} (b) 1.25×10^{-4} m		24. $T_f = 268.35K$	
18. —		25. $T_f = 272.99 \approx 273K$	
19. —		26. 10g	
20. —		27. 273.496K	
21. —		28. (a) 2.25K (b) 270.90K	