



CBSE NCERT Based Chapter wise 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 - 2 [Higher Oder]

I. MCQ (One correct Answer)

1. Isotonic solutions have the same :

- (A) density (B) refraction index (C) osmotic pressure (D) volume

[Hints : CBSE Delhi 2024, Set-1, NCERT Vol-1, pg 21, $\pi_1 = \pi_2$]

2. Vant's Hoff factor for $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$ solution. Assuming complete ionisation is

- (A) 1 (B) 3 (C) 13 (D) 2

[Hints : NCERT, Vol-1, Pg-24, CBSE 2024 Delhi, Set-I]

3. Van't Hoff's factor for KCl Solution assuming the complete dissociation is

- (A) 1 (B) 2 (C) 0.5 (D) 1.5

[Hints : NCERT, Vol-1, Pg-24, CBSE 2024, Delhi Set-II]

4. Which of the following formula represent Raoult's law for a solution containing non-volatile solute?

- (A) $P_{\text{solute}} = P_{\text{solute}}^0 \times X_{\text{solute}}$ (B) $P = K_H \cdot X$
(C) $P_{\text{total}} = P_{\text{solute}}$ (D) $\frac{(P_A^0 - P_A)}{P_A^0} = X_{\text{solute}}$

[Hints : NCERT, Vol-1, Pg-10, CBSE = 2022; Term-1]

5. An unknown gas 'x' is dissolved in water at 2.5 bar pressure and has mole fraction 0.04 in solution. The mole fraction of 'x' gas when the pressure of gas is doubled at the same temperature:

- (A) 0.08 (B) 0.04 (C) 0.02 (D) 0.92

[Hints : NCERT, Vol-1, Pg-17; CBSE 2022, Term-1]

6. The boiling point of a 0.2m solution of a non-electrolyte in water is [K_b for water = $0.52 \text{ K Kg}(\text{mole})^{-1}$]

- (A) 100°C (B) 100.52°C (C) 100.14°C (D) 10.26°C

[Hints : NCERT, Vol-1, Pg-17; (CBSE 2022 Term-1)]

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.

7. **Assertion (A) :** A raw mango placed in a saline solution loses water and shrivels into a pickle.

Reason (R) : Through the process of reverse osmosis:

- (A) A (B) B (C) C (D) D

[Hints : NCERT, Vol-1, Pg-21; CBSE-2022]

8. **Assertion (A)** : Cryoscopic constant depends on nature of solvent.

Reason (R) : Cryoscopic constant is a universal constant.

(A) A

(B) B

(C) C

(D) D

[Hints : NCERT, Vol-1, Pg-19; CBSE SQP-2022]

9. **Assertion (A)** : Aquatic species are more comfortable in cold water rather than in warm water:

Reason (R) : Different gases have different K_H values at the same temperature

(A) A

(B) B

(C) C

(D) D

[Hints : CBSE SQP 2021]

10. **Assertion (A)** : 0.1M solution of NaCl has greater pressure than 0.1(M) solution of glucose at same temperature.

Reason (R) : In solution NaCl dissociates to produce more number of particles.

(A) A

(B) B

(C) C

(D) D

[Hints : Colligative properties]

11. **Assertion (A)** : When ethyl alcohol is added to water boiling point of water decrease.

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

(A) A

(B) B

(C) C

(D) D

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

12. **Assertion (A)** : A molar solution is more concentrated than molal solution.

Reason (R) : A molar solution contains one mole of solute in 1000 ml of solution

(A) A

(B) B

(C) C

(D) D

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

13. For a 5% solution of urea (Molar mass = 60). Calculate the osmotic pressure at 300K. [$R = 0.082 \text{ L atm K}^{-1} (\text{mol})^{-1}$]

[Hints : $\pi = CRT$; CBSE 2020]

14. Why is an increase in temperature observed on mixing chloroform and acetone?

[Hints : Non-ideal solution; CBSE 2019]

15. Give reasons for the following "At higher altitude people suffer from a disease called anoxia. In this disease they become weak and can not think clearly."

[Hints : CBSE 2019; Partial pressure of O_2 is less at higher altitude]

16. State Raoult's law for a solution containing volatile components. Write two characteristics of the solution which obeys Raoult's law at all concentration.

[Hints : WCERT; Vol-1, Pg-10]

17. Why a mixture of carbon disulphide and acetone shows positive deviation from Raoult's Law? What type of azeotrope is formed by this mixture?

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

18. Calculate the freezing point of a solution containing 60g of glucose [Molar mass = 180g (mol)^{-1}] in 250g of water. [K_f of water = $1.86\text{ K Kg (mol)}^{-1}$]

[Hints : NCRT; Vol-1, Pg-18]

IV. Short Answer Type Question

19. (i) Boiling point of water at 750 mm Hg pressure is 99.68°C . How much sucrose (Molar mass = 342g (mol)^{-1}) is to be added to 500g of water such that it boils at 100°C

[Hints : K_b for water = $0.52\text{ K Kg (mol)}^{-1}$]

(ii) State Henry's law and write its any one application.

[Hints : CBSE 2024]

20. Ishan's automobile radiator is filled with 1.0 Kg of water. How many grams of ethylene glycol [Molar mass = 62g (mol)^{-1}] must Ishan add to get the freezing point of the solution lowered to -2.8°C . K_f for water is $1.86\text{ K Kg (mol)}^{-1}$.

[Hints : CBSE 2024]

21. When 19.5g of $\text{F} - \text{CH}_2 - \text{COOH}$ [molar mass = 77g (mol)^{-1}] is dissolved in 500g of water, the depression in freezing point is observed to be 1°C .

Calculate the degree of dissociation of $\text{F} - \text{CH}_2\text{COOH}$. (Given: K_f for water = $1.86\text{ K Kg (mol)}^{-1}$).

[Hints : CBSE 2023]

22. If benzoic acid [$M = 122\text{ g (mol)}^{-1}$] is associated into a dimer when dissolved in benzene and the osmotic pressure of a solution of 6.19 of benzoic acid in 100 ml benzene is 6.5 atm at 27°C , then what is the percentage association of benzoic acid?

[Given : $R = 0.0821\text{ L atm K}^{-1} (\text{mol})^{-1}$]

[Hints : CBSE 2023]

23. 0.3mL of acetic acid ($m = 60\text{g mol}^{-1}$) dissolved in 30g of benzene shows a depression in freezing point equal to 0.45°C . Calculate the percentage association of acid if it forms a dimer in the solution.

(Given : K_f for benzene = $5.12\text{ K Kg (mol)}^{-1}$)

[Hints : CBSE 2023]

ANSWER

- | | | |
|--------|--|----------------------------|
| 1. (C) | 9. (B) | 17. — |
| 2. (B) | 10. (A) | 18. $T_f = 270.53\text{K}$ |
| 3. (B) | 11. (C) | 19. (i) 105.23g |
| 4. (D) | 12. (A) | 20. 93g |
| 5. (A) | 13. 342 g mol | 21. 3.07×10^{-3} |
| 6. (C) | 14. — | 22. 94.6% |
| 7. (D) | 15. — | 23. 94.5% |
| 8. (C) | 16. $\Delta H_{\text{mm}} = 0, \Delta V_{\text{mm}} = 0$ | |