

QUICK DRILL · CBSE CLASS 12

Solutions

Chemistry · Chapter 1 · 15 MCQs · 20 minutes · PYQ-tagged with time budgets

DATE	TOTAL MARKS	DURATION	MARKING	TARGET
_____	15	20 min	+1/0	≥ 12/15

OBJECTIVES

Reinforce the four core topics of Solutions via 15 PYQ-derived MCQs. Identify weak sub-topics via concept-node IDs (see answer key). Build per-question time budget habit.

INSTRUCTIONS

 Attempt all 15. Time budget shown per Q (use it as pacing guide). Mark answers (A/B/C/D) in the margin. Answer key + explanations on the last page. **Don't peek — score yourself honestly.**
SECTION · QUICK DRILL

Q 1-15 · 20 MIN

Q1. Molarity of a solution depends on temperature because:

(A) Mass changes with T

(C) Number of moles changes with T

PYQ 2018 · Outside Delhi · 1m · ⌚ 30s

(B) Volume of solution changes with T

(D) Mole fraction changes with T

Q2. Which is temperature-INdependent?

(A) Molarity

(C) Normality

PYQ 2019 · Delhi · 1m · ⌚ 25s

(B) Molality

(D) Formality

Q3. Raoult's law: $P_A = x_A \cdot P_A^\circ$. When solute is added, P_A :

(A) Increases

(C) Stays same

PYQ 2022 · All India · 1m · ⌚ 30s

(B) Decreases

(D) Becomes zero

Q4. Relative lowering of vapour pressure ($\Delta P/P_A^\circ$) equals:

(A) x_{solvent}
(C) Molarity

PYQ 2020 · Delhi · 1m · ⌚ 30s

(B) x_{solute}
(D) Molality

Q5. Example of a solution showing POSITIVE deviation from Raoult's law:

(A) n-hexane + n-heptane

(C) HNO_3 + water

PYQ 2018 · All India · 1m · ⌚ 30s

(B) Ethanol + water

(D) Benzene + toluene

Q6. An ideal solution has:

(A) $\Delta H_{\text{mix}} > 0$
(C) $\Delta H_{\text{mix}} = 0$ only

PYQ 2019 · Delhi · 1m · ⌚ 30s

(B) $\Delta H_{\text{mix}} < 0$
(D) $\Delta H_{\text{mix}} = 0$ AND $\Delta V_{\text{mix}} = 0$
Q7. Boiling-point elevation:

(A) $\Delta T_b = K_b \cdot M$
(C) $\Delta T_b = K_b / m$

PYQ 2022 · Outside Delhi · 1m · ⌚ 25s

(B) $\Delta T_b = K_b \cdot m$
(D) $\Delta T_b = K_f \cdot m$
Q8. Salt sprinkled on icy roads works by:

(A) Raising freezing point

(C) Increasing vapour pressure

PYQ 2020 · All India · 1m · ⌚ 30s

(B) Lowering freezing point

(D) No effect

Q9. Osmotic pressure formula:

(A) $\pi = MRT$
(C) $\pi = nRT$

PYQ 2018 · All India · 1m · ⌚ 25s

(B) $\pi = mRT$
(D) $\pi = xRT$
Q10. For NaCl dissolving as $\text{Na}^+ + \text{Cl}^-$, van't Hoff factor i is approximately:

(A) 0.5

(C) 2

PYQ 2022 · Delhi · 1m · ⌚ 25s

(B) 1

(D) 3

Q11. For benzoic acid dimerising in benzene (2 → 1):

(A) $i = 2$

(C) $i = 1$

PYQ 2019 · All India · 1m · ⌚ 30s

(B) $i \approx 0.5$

(D) $i = 0$

Q12. Henry's law constant K_H , with rising temperature:

(A) Increases

(C) Constant

PYQ 2023 · Delhi · 1m · ⌚ 30s

(B) Decreases

(D) Becomes zero

Q13. A solution boils 0.512 °C above pure solvent. $K_b = 0.512$ °C·kg/mol. The molality is:

(A) 0.5 m

(C) 2.0 m

PYQ 2018 · Outside Delhi · 1m · ⌚ 45s

(B) 1.0 m

(D) 0.1 m

Q14. Osmosis is the movement of:

(A) Solute from low to high concentration

(C) Solute from high to low concentration

PYQ 2024 · All India · 1m · ⌚ 30s

(B) Solvent from low to high concentration

(D) Both solute and solvent randomly

Q15. An ethanol-water azeotrope is:

(A) Minimum-boiling, +ve deviation

(C) Minimum-boiling, -ve deviation

PYQ 2023 · All India · 1m · ⌚ 35s

(B) Maximum-boiling, +ve deviation

(D) Maximum-boiling, -ve deviation

ANSWER KEY & EXPLANATIONS

Q 1-15 · MARK YOUR SCORE

Q1. Answer: B

Volume expands with $T \rightarrow M$ decreases (slightly).

Q2. Answer: B

Molality uses mass (mol/kg), which doesn't change with T .

Q3. Answer: B

x_A drops (more solute means less solvent fraction), so P_A drops.

Q4. Answer: B

$\Delta P/P_A^\circ = 1 - x_A = x_B$ (mole fraction of solute).

Q5. Answer: B

Ethanol + water: H-bonding broken on mixing \Rightarrow +ve deviation \Rightarrow min-boiling azeotrope.

Q6. Answer: D

Ideal requires BOTH thermodynamic conditions + Raoult over full range.

Q7. Answer: B

Use molality (m), not molarity. K_b is solvent-specific.

Q8. Answer: B

NaCl depresses freezing point of water below ambient $T \Rightarrow$ ice melts.

Q9. Answer: A

$\pi = MRT$ where M is molarity, $R = 0.0821$ L·atm/(mol·K), T in K.

Q10. Answer: C

Two ions per formula unit (complete dissociation in dilute solution).

Q11. Answer: B

Association halves the particle count.

Q12. Answer: A

K_H increases \Rightarrow gas solubility decreases with T (most gases).

Q13. Answer: B

$m = \Delta T_b/K_b = 0.512/0.512 = 1.0$ m.

Q14. Answer: B

Solvent (not solute) moves from lower-conc to higher-conc through semi-permeable membrane.

Q15. Answer: A

+ve deviation \Rightarrow min-boiling azeotrope (95.6% ethanol, b.p. 78.2°C).