

UP Board Class 12 Chemistry - Solutions (2026)

Section 1 (MCQs)

- Order where rate and rate constant have same units: First order.
- Mathematical form of Raoult's law: $P = P^\circ X$.
- Unpaired electrons in Cu^{2+} : 1 (3d⁹ configuration).
- Chloroform oxidizes in sunlight to form phosgene (COCl_2).
- Glucose does not react with NaHSO_3 .
- Formaldehyde with KOH gives methanol and potassium formate: Cannizzaro reaction.

Section 2

- First order reaction: $k = 2.303/t \log(a/a-x)$. Time for 1/10 concentration: $t = 2.303/k \log 10 = 2.303/k$.
- Freezing point depression: $\Delta T_f = K_f m$. Calculate molality and molar mass using given data.
- Chelate effect: Stability of complexes with multidentate ligands is higher (e.g., EDTA complex).
- Conductivity: $\kappa = \text{cell constant} / \text{resistance}$. Molar conductivity = $\kappa \times 1000 / C$.

Section 3

- Transition metals: Variable oxidation states, colored compounds, paramagnetism, catalytic activity.
- Acidic nature reactions: e.g., $\text{ZnO} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2\text{O}$.
- Aldol condensation: Reaction of aldehydes/ketones with α -H forming β -hydroxy carbonyl compounds.
- Isotonic solutions: Same osmotic pressure (e.g., 0.9% NaCl and blood plasma).

Section 4

- Uses of Freon: Refrigerant, aerosol propellant. Environmental impact: Ozone depletion.
- Electronic configurations: $\text{Cr}^{3+} = [\text{Ar}]3d^3$, $\text{Cu}^{2+} = [\text{Ar}]3d^9$.
- Chromate: CrO_4^{2-} , Dichromate: $\text{Cr}_2\text{O}_7^{2-}$.
- Henry's law: $p = KH x$. Application: Carbonated drinks.
- Reduction of nitriles: $\text{R-CN} \rightarrow \text{R-CH}_2\text{-NH}_2$ (using H_2/Ni).
- Aniline + CHCl_3 + alc. $\text{KOH} \rightarrow$ Phenyl isocyanide (Carbylamine reaction).

Section 5

- Activation energy from Arrhenius equation using $\log(k_2/k_1)$ formula.
- Bidentate ligand: Ligand with two donor atoms (e.g., ethylenediamine).
- IUPAC names:
 $[\text{Co}(\text{en})_3]\text{Cl}_3$ – Tris(ethylenediamine)cobalt(III) chloride.
 $\text{K}_3[\text{Fe}(\text{C}_2\text{O}_4)_3]$ – Potassium tris(oxalato)ferrate(III).
- Diazotization and reduction reactions as required.
- Basicity order: $(\text{CH}_3)_2\text{NH} > \text{CH}_3\text{NH}_2 > \text{NH}_3 > (\text{CH}_3)_3\text{N}$.
- Main sources of proteins: Pulses, soyabean, eggs, milk.
- Kohlrausch's law: Limiting molar conductivity equals sum of ionic conductivities.

Section 6

- $\text{S}_\text{N}1$ mechanism: Two-step via carbocation intermediate; rate depends on substrate only.
- Reagents: (a) Oxidation – $\text{KMnO}_4/\text{K}_2\text{Cr}_2\text{O}_7$; (b) Reduction – LiAlH_4 etc.
- IUPAC naming of given organic compounds as per structure.