

CBSE
Class XII Chemistry
Sample Paper 2

Time: 3 Hrs

Total marks: 70

General Instructions:

- All questions are compulsory.
- Section A: Q.no. 1 to 5 are very short answer questions and carry 1 mark each.
- Section B: Q.no. 6 to 12 are short answer questions and carry 2 marks each.
- Section C: Q.no. 13 to 24 are also short answer questions and carry 3 marks each.
- Section D: Q.no. 25 to 27 are long answer questions and carry 5 marks each.
- There is no overall choice. However, an internal choice has been provided in two questions of one mark, two questions of two marks, four questions of three marks and all the three questions of five marks weightage. You have to attempt only one of the choices in such questions.
- Use log tables if necessary. Use of a calculator is not allowed.

Section A

1. Alcohols have a higher boiling point compared to isomeric ethers. Why? [1]
2. Define: Polymerisation [1]
3. What is the number of atoms in a unit cell of a cubic crystal? [1]

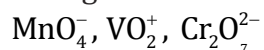
OR

What type of crystal defect is produced when sodium chloride is doped with MgCl_2 ?

4. Give one example each of 'oil in water' and 'water in oil' emulsion. [1]
5. Calculate the magnetic moment of a divalent ion in aqueous solution if its atomic number is 25. [1]

OR

Arrange the following radicals in increasing order of their oxidising power:

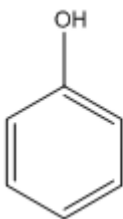
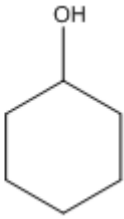
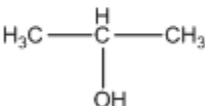
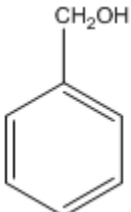


Section B

6. A solution prepared by dissolving 1.25 g of methyl salicylate in 99.0 g of benzene has a boiling point of 80.31°C . Determine the molar mass of this compound. [2]
(BP of pure benzene = 80.10°C and K_b for benzene = $2.53^\circ\text{C kg mol}^{-1}$)

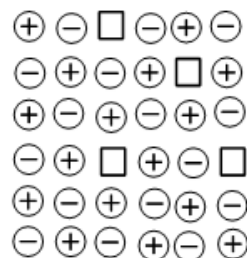
OR

Calculate the freezing point of an aqueous solution containing 10.50 g of MgBr_2 in 200 g of water. (Molar mass of MgBr_2 = 84 g) (K_f for water = $1.86^\circ\text{C kg mol}^{-1}$)

7. Give the resonating structures of NO_2 and N_2O_5 . [2]
8. How is acetone obtained from ethanol? [2]
9. Write the electrode reactions taking place in the Ni–Cd cell. [2]
10. For reaction: $\text{A} + \text{H}_2\text{O} \rightarrow \text{B}$, $\text{Rate} \propto [\text{A}]$, what is its [2]
 (a) Molecularity
 (b) Order of reaction
11. Give a chemical test to distinguish between the following pairs of compounds. [2]
 (a)
- 
and

- (b)
- 
and

12. Classify the following as addition and condensation polymers: [2]
 terylene, Bakelite, polyvinyl chloride, polyethene

Section C

13. Draw the structures of isomers, if any, and write the names of the following complexes: [3]
 (a) $[\text{Cr}(\text{NH}_3)_4\text{Cl}_2]^+$
 (b) $[\text{Co}(\text{en})_3]^{3+}$
 (c) $[\text{CoCl}_2(\text{en})_2]\text{Cl}$
14. Examine the illustration of a portion of the defective crystal and answer the following questions: [3]
- (a) What are these types of valency defects called?
 (b) How is the density of a crystal affected by these defects?
 (c) Name one ionic compound which can show this type of defect in the crystalline state.



15. What method would you suggest for the separation of metals in the following mixtures? [3]

- (a) Zinc and iron
- (b) Copper and magnesium
- (c) Rare earth

OR

Write the reactions taking place in the different zones in the blast furnace during the extraction of iron.

16. 18 g of glucose, $C_6H_{12}O_6$, is dissolved in 1 kg of water in a saucepan. At what temperature will water boil at 1.013 bar? (K_b for water is $0.52 \text{ K kg mol}^{-1}$.) [3]

OR

Why is the boiling point of a solution containing a non-volatile solute more than that of pure solvent? Explain graphically.

17. [3]

- (a) Give the mechanism of acid-catalysed dehydration of ethanol to yield ethyne.
- (b) Compound (A) $C_4H_{10}O$ is found to be soluble in sulphuric acid. (A) does not react with sodium metal or potassium permanganate. When it is heated with excess of HI, it is converted to a single alkyl halide. What is the structural formula of (A)?

18. It is observed that the rate of a chemical reaction doubles with every 10° rise in temperature. If this generalisation holds good for a reaction in the temperature range 295–305 K, what would be the volume of activation energy for this reaction? [3]
($R = 8.314 \text{ J/Kmol}$)

19. [3]

- (a) Give two reasons to support the cyclic structure of glucose.
- (b) Why are amino acids soluble in water?
- (c) Name the pyrimidine bases present in DNA and RNA.

20. Explain the following observations: [3]

- (a) Lyophilic colloid is more stable than lyophobic colloid.
- (b) Coagulation takes place when sodium chloride solution is added to a colloidal solution of ferric hydroxide.
- (c) The sky appears blue in colour.

21. [3]

- (a) Distinguish between
 - (i) Aniline and benzyl amine
 - (ii) $CH_3CH_2NH_2$ and $(CH_3)_2NH$
- (b) Write a note on the Hoffmann bromamide reaction.

22. [3]
- Why do transition metals form complex compounds?
 - What is lanthanoid contraction?
 - Why does Cr have a high melting point?

23. Arrange the following in order of increasing reactivity in S_N1 and S_N2 reactions: [3]
- $C_6H_5CH_2Br$, $C_6H_5CH(C_6H_5)Br$, $C_6H_5CH(CH_3)Br$, $C_6H_5C(CH_3)(C_6H_5)Br$

OR

What happens when

- Chloroethane is made to react with KCN.
 - 1-Bromopropane reacts with silver acetate.
- Give equations involved.

24. What are antihistamines? Give an example. Discuss their working in the human body. [3]

OR

Account for the following:

- Aspirin drug helps in the prevention of heart attack.
- Diabetic patients are advised to take artificial sweeteners instead of natural sweeteners.
- Detergents are non-biodegradable, while soaps are biodegradable.

Section D

25. Complete the equations: [5]
- $NaCl + MnO_2 + H_2SO_4 \rightarrow$
 - $Al + O_2 \rightarrow$
 - $2Pb(NO_3)_2 \xrightarrow{673K}$
 - $C + H_2SO_4 (conc.) \rightarrow$
 - $PbS + O_3 \rightarrow$

OR

Complete the equations:

- $NH_4Cl(aq) + NaNO_2(aq) \rightarrow$
- $P_4 + NaOH + H_2O \rightarrow$
- $CaF_2 + H_2SO_4 \rightarrow$
- $NaOH (conc. hot) + Cl_2 \rightarrow$
- $PCl_3 + H_2O \rightarrow$

26.

[5]

- (a) Decomposition of a compound follows first order kinetics. It takes 15 min for 20% of the starting compound to react. Calculate
- Rate constant for the reaction.
 - Time at which 10% of the reactant is left unreacted.
 - Time taken for the next 20% of the reactant to react after the first 15 min.
- (b) Derive a relationship between rate constant and half-life for a zero-order reaction.

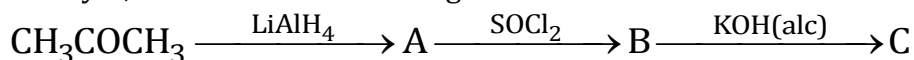
OR

- (a) The rates of a reaction starting with initial concentrations $2.0 \times 10^{-3} \text{ M}$ and $1.0 \times 10^{-3} \text{ M}$ are equal to $2.40 \times 10^{-4} \text{ M s}^{-1}$ and $0.60 \times 10^{-4} \text{ M s}^{-1}$, respectively. Calculate the order of the reaction with respect to the reactant and also the rate constant.
- (b) For a reaction $A + B \rightarrow C$, it is found that
- Rate becomes double when concentration of A is doubled.
 - Rate becomes 16 times when concentration of both A and B are doubled.
 - Write the rate expression and calculate the overall order of the reaction.

27.

[5]

- (a) Convert:
- Acetic acid to ethylamine
 - Propionic acid to lactic acid
- (b) Identify A, B and C in the following reactions:



OR

- (a) Convert:
- Acetaldehyde to crotonic acid
 - Formaldehyde to chloroethane
 - Acetic acid to propanoic acid
- (b) Identify A and B in the given equation:
- $$\text{HCHO} \xrightarrow{\text{Conc. NaOH}} \text{A} + \text{B}$$