

Sample Paper
Class – XII
Subject – Chemistry

1. All questions are compulsory.
2. Marks of each question are indicated against it.
3. Questions number 1 to 8 are very short answer questions and carry 1 mark each.
4. Questions numbers 9 to 18 are short answer questions and carry 2 marks each.
5. Question numbers 19 to 27 are also short answer questions and carry three marks each.
6. Question numbers 28 to 30 is long answer questions and carry five marks each.
7. Use log tables if necessary. Use of Calculators is not allowed.

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1. What happens to the magnetic property of Fe_3O_4 at 850K?
2. 2g. each of 2 solutes A and B (molecular mass of $A > B$) are dissolved separately in 50g. each of the same solvent. Which will show greater elevation in Boiling point? Why?
3. In an fcc arrangement of A and B atoms, where A atoms are at the corners of the unit cell and B atoms at the face centers, one of the A atoms is missing from one corner in each unit cell. What is the simplest formula of the compound?
4. Why carboxylic acids do not give the characteristic reactions of carbonyl group?
5. Osmotic pressure measurements are preferred over other colligative properties for molecular mass determination of polymers, why?
6. Write a chemical equation to illustrate Saytzev's rule
7. An α -amino acid in alkaline medium is subjected to electrolysis. Predict the outcome
8. Why do transition metals form interstitial compounds?
9. The emf of a cell corresponding to the reaction $\text{Zn}_{(s)} + 2\text{H}^+_{(aq)} \rightleftharpoons \text{Zn}^{2+}_{(0.1M)} + \text{H}_{2(g)}(1\text{atm})$ is 0.28 v at 25°C. Calculate the pH of the solution at the hydrogen electrode. ($E^0_{\text{Zn}^{2+}/\text{Zn}} = -0.76 \text{ V}$, $E^0_{\text{H}^+/\text{H}_2} = 0$).
10. A unit cell of NaCl has 4 formula units. Its edgelenh is 0.504 nm. Calculate the density. (molecular mass of NaCl=58.5).

OR

10. Describe the following
 - a) Metal excess defect
 - b) Metal deficiency defect.
11. Write short notes on
 - a) Activity and selectivity of catalysts.
 - b) Shape selective catalysis.

12. What happens when freshly prepared $\text{Fe}(\text{OH})_3$ is shaken with little amount of dilute FeCl_3 solution?
- b) Alum is added to purify water with suspended impurities. Why?
13. Give the IUPAC names of
- a) $(\text{CH}_3)_2\text{C}=\text{C}(\text{Br})\text{CH}_2\text{OH}$
- b) $\text{CH}_3\text{CH}_2\text{CH}(\text{Cl})\text{CH}(\text{OH})\text{CH}(\text{CH}_3)_2$
14. A compound A with molecular formula $\text{C}_4\text{H}_{10}\text{O}$ on oxidation form compound B which gives positive iodoform test. Compound (B) on reaction with CH_3MgBr followed by hydrolysis gives C. C when treated with HBr gives a tertiary alkylhalide D. Identify A, B, C and D
15. Convert
- a) Benzyl chloride to 2-phenyl ethanamine.
- b) Benzamide to phenyl isocyanide
16. Write short notes on
- a) Gabriel phthalimide synthesis.
- b) Hoffmann Bromamide reaction
17. Discuss briefly the following properties of transition metals
- a) variable oxidation states
- b) ability to form coloured ions
18. i) Cr^{2+} is reducing while Mn^{3+} is oxidizing when both have d^4 configuration. Why?
- ii) Write balanced chemical equations for the oxidation of

- a) Hydrogen sulphide to sulphur.
- b) Ferrous salt to ferric salt by potassium dichromate in acidic medium.

19. With the help of crystal field theory predict the number of unpaired electrons in $[\text{Fe}(\text{CN})_6]^{4-}$ and $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$ complexes.

ii) The formula $\text{Co}(\text{NH}_3)_5\text{CO}_3\text{Cl}$ could represent a carbonate and a chloride. Give IUPAC names for them.³

OR

- a) Give 2 limitations of valence bond theory.
- b) Explain the d orbital splitting in an tetrahedral crystal field with the help of a diagram.

20. 22 g. of benzoic acid ($\text{C}_6\text{H}_5\text{COOH}$) are added in 100g. acetone and 100g. benzene. Boiling point of solution in acetone increases by 0.17°C while that in benzene increases by 0.13°C . Calculate molecular weight of benzene in both the solutions and justify your result. ($K_b(\text{acetone}) = 1.7 \text{ KKgmol}^{-1}$, $K_b(\text{benzene}) = 2.6 \text{ KKgmol}^{-1}$).

21. Account for the following

- a) Haloalkanes undergo nucleophilic substitutions while haloarenes undergo electrophilic substitution.
- b) Haloalkanes react with KCN form alkylcyanides while isocyanides are formed with AgCN.
- c) Dipolemoment of chlorobenzene is lower than that of cyclohexyl chloride

22. a) Explain the thermodynamics involved in choosing a reducing agent for a particular reaction. Give one example to substantiate your answer.

b) Give an example for the extraction of an element based on oxidation

23 Big irregular shaped vessel contained water, the conductivity of which was $2.56 \times 10^{-5} \text{ S/cm}$. 500g. of NaCl was then added to the water and the conductivity after the addition of NaCl was found to be $3.10 \times 10^{-5} \text{ S/cm}$. Find the capacity of vessel if it is completely filled with water. (Consider that the dilution is infinite. Limiting molar conductivity of NaCl = $149.9 \text{ Scm}^2/\text{mol}$. Mol.mass of NaCl = 58.5)

24. (a) Illustrate the chain initiation step in the mechanism of addition polymerization.

(b) Distinguish between homopolymers and copolymers with examples.

25. a) Write short notes on primary, secondary, tertiary and quaternary structure of proteins.

(b) What happens when glucose is treated with

(i) aq. Br_2

(ii) HNO_3

26. I. Explain what is observed when:

a. an emulsion is subjected to centrifugation.

b. direct current is passed through a colloidal sol

II. Write a chemical equation showing the preparation of a positive sol

27. (a) Why does PCl_5 exist in solid state at room temperature?

(b) Deduce the structure of ClF_3 using VSEPR theory.

28. Account for the following.

(i) PH_3 is a weaker base than NH_3 .

(ii) SF_6 exists but SH_6 does not.

(iii) ClF_3 exists but FCl_3 does not.

(iv) H_3PO_3 is diprotic acid.

(v) ICl is more reactive than I_2 . 5

OR

(a) An organic compound (A) with the molecular formula $\text{C}_9\text{H}_{10}\text{O}$ forms 2,4-DNP derivative, reduces Tollen's reagent to get (B). On vigorous oxidation it gives 1,2-benzene dicarboxylic acid. Give the structures of A and B.

(b) Convert

(i) Acetophenone to 2-phenyl-2-butanol.

(ii) Propene to acetone.

(iii) Propanoic acid to prop-2-enoic acid. 5

29. An organic compound (A) of molecular weight 140.5 has 68.32% carbon, 6.4% Hydrogen and 25.26% Chlorine. Hydrolysis of (A) with dilute acid gives compound (B). Compound (B) can be oxidized under mild conditions to compound (C) C_8H_8O . Compound (C) forms phenyl hydrazone (D) and gives a positive iodoform test. Deduce the structures of (A) to (D)

OR

Assign reason for the following

i) Concentrated nitric acid turns yellow on exposure to sunlight.

ii) The negative value of electron gain enthalpy of Fluorine is less than that of Chlorine.

iii) SF_6 is used as a gaseous electrical insulator.

iv) HI is a stronger acid than HF.

v) pKa value of HOCl is higher than that of $HClO_2$.

30. a) A first order reaction has $k = 1.5 \times 10^{-6}$ per second at $240^\circ C$. If the reaction is allowed to run for 10 hours, what percentage of the initial concentration would have changed to products? What is the half life period of this reaction?

(b) A 1st order reaction is 50% complete in 30 minutes at $27^\circ C$ and in 10 min. at $47^\circ C$. Calculate

(i) Rate constant for reaction at $27^\circ C$ and $47^\circ C$.

(ii) Energy of activation for the reaction

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