

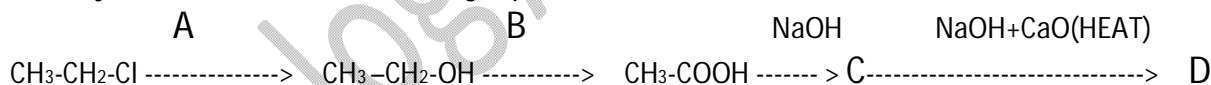
Second PUC Question Paper –March 2009
CHEMISTRY

PART-A**Answer all the questions. 10x1=10**

1. What is the role of limestone in the extraction of iron from haemetite?
2. Hydrogen sulphide gas cannot be dried using conc. H₂SO₄. Give reason.
3. Which one among Cu⁺¹ and Cu²⁺ salts is coloured?
4. What is the limiting value of degree of dissociation of an electrolyte at infinite dilution?
5. Sea-water freezes below 273 K. Why?
6. Define electrophoresis.
7. The coordination number of a crystal is 6. What is the geometry of the crystal?
8. Name the gas liberated when bromo ethane is heated with alcoholic potash.
9. Phenol does not react with sodium bicarbonate. Why?
10. Name the protein present in hair.

PART-B**Answer any ten questions. 10x2=20**

11. Draw Ellingham diagram for the formation of oxides of aluminium and magnesium. Which one of these metals acts as better reducing agent above 1500C?
12. How does potassium dichromate solution react with potassium hydroxide.
13. Calculate the EAN value of the central metal ion in tetramine copper (II) sulphate.
14. Sketch the shapes of bonding and antibonding molecular orbital formed when two S orbitals undergo LCAO.
15. A first order reaction is 50% completed in 80 min. calculate the rate constant of the reaction.
16. Mention any two characteristics of an ideal solution.
17. PH value of a sample of mango juice is 4.54. Calculate the [H⁺]
18. Identify A,B,C and D in the following equation.



19. What is Wurtz-Fittig reaction? Write the general equation.
20. Write the equations for the following reactions:
 - I) Dry distillation of calcium acetate. II) Reaction of phosphorous pentachloride with acetic acid.
21. Write the Haworth structure of α -D-maltose.
22. What happens when tristearin is heated with potassium hydroxide solution? Give the reason.

PART-C**I. Answer any two of the following: 2x5=10**

23. a) Describe the manufacture of ammonia by Haber's process.
b) Sketch the shapes of nickel tetra carbonyl. Which type of hybridization is involved in the formation of this compound?
24. a) How a mixture of noble gas is separated by Dewar's charcoal method?
b) Write the electronic configuration of lithium molecule. Comment on its magnetic property with reason.
25. a) State any three postulates of Werner's theory of co-ordination compounds.
b) On the basis of electron gas theory, explain bright lusture of metals.

II. Answer any three of the following: 3x5=15

26. a) What is mesomeric effect? What type of mesomeric effect is shown by $-\text{CHO}$ group in benzaldehyde.
b) Explain the mechanism of nitration of benzene.
27. a) How is phenol isolated from coal tar?
b) What is dipeptide? How many peptide linkages are present in a tetrapeptide?
28. a) What is optical activity? Which one of the following compounds shows optical isomerism?
 $\text{CH}(\text{Br})_2 - \text{CH}_3$ **And** $\text{C}(\text{Br})(\text{OH})(\text{CH}_3)\text{COOH}$
b) How is ethyl bromide converted into ethyl isocyanide? Write the equation.
c) Give a chemical reaction to show that a molecule of glucose contains a carbonyl group.
29. a) Calculate angle strain in cyclobutane.
b) Explain carbylamine reaction for a primary amine. Write general equation.
c) One mole of a given amine consumes two moles of methyl iodide for exhaustive methylation. What type of amine is this?

III. Answer any three of the following: 3 x 5 =15

30. a) Derive an expression for the rate constant of a first order reaction.
b) State Schultz- Hardy rule.
31. a) Explain buffer action in acidic buffer containing mixture of acetic acid and sodium acetate.
b) When the same amount of electricity passed through solutions of copper sulphate and hydrochloric acid, 64 mg of copper is deposited on the cathode in the first case. Calculate the volume of hydrogen obtained in the second case of S.T.P. [Equivalent weight of $\text{Cu}=32$]
32. a) Mention two limitations of standard hydrogen electrode.
b) Write Nernst equation for single electrode potential. Explain any two terms in the equation.
c) Mention the dispersed phase and dispersion medium in a gel.
33. a) Define entropy. What happens to entropy when a liquid vaporizes?
b) What is Brownian movement? How is it caused?
c) Define unit cell.
34. a) Calculate the change in free energy for the cell $\text{Mg} / \text{Mg}^{2+} (1\text{M}) // \text{Ag}^+ (1\text{M}) / \text{Ag}$.
 $E^{\circ}\text{Ag}=0.80\text{V}$ & $E^{\circ}\text{Mg} = -2.37\text{V}$
b) State any three postulates of Arrhenius theory of electrolytic dissociation.

PART-D**D1****IV. Answer any one of the following: 1 x10 =10**

35. a) Describe Parke's process for the desilverisation of Argentiferous lead.
b) Why are transition elements and their compounds good catalysts? Explain.
c) For a reaction, the graph of rate of the reaction against molar concentration of the reactant is a straight line parallel to the concentration axis. What is the order of this reaction? Give an example for such a reaction.
d) The value of standard free energy of formation of ammonia at 298 K is $-16.6 \text{ kJ mol}^{-1}$. Calculate the equilibrium constant K_p of the reaction.
e) What is iodine value?
36. a) Give the mechanism of Cannizzaro's reaction.

- b) A current of dry air was passed through a solution containing 5.4g of an aromatic compound in 61.2 g of diethyl ether and then through the solvent. The loss in mass of solution bulb was 0.708 g and that in the solvent bulb was 0.035 g. Calculate molecular weight of the aromatic compound. (Given molecular weight of diethyl ether=74)
- c) When NH_4Cl and NH_4OH are added to a solution containing Al^{3+} and Zn^{2+} ions, only $\text{Al}(\text{OH})_3$ precipitates. Give reason.
- d) i) Write the IUPAC name of (i) $\text{CH}_3\text{-CH}(\text{Cl})\text{-CH}_2\text{-COOH}$ (ii) Out of $\text{CH}_3\text{-CH}(\text{Cl})\text{-CH}_2\text{-COOH}$ and $\text{CH}_3\text{-CH}_2\text{-CH}(\text{Cl})\text{-COOH}$ which one has higher P_ka value?
- e) How many lattice points are present in a unit cell of CsCl ?

D2**V. Answer any two of the following: 2 x 5 =10**

37. a) How is m-nitrobenzene prepared in the laboratory from nitrobenzene? Write the equation.
b) Mention the general test for i) Protein ii) Carbohydrates.
38. Describe an experiment to show that acid hydrolysis of methyl acetate follows first order kinetics.
39. For the estimation of potassium permanganate (KMnO_4) using standard ferrous ammonium sulphate,
- Write the chemical equation for the reaction involved.
 - Give the equivalent weight of potassium permanganate.
 - Name the indicator used.
 - What is the colour change at the end point?
 - Write the equation for calculating mass/ dm^3 of potassium permanganate in a given solution from its normality.