



JAIN COLLEGE, Bangalore
Mock Paper - 1 December - 2017
II PUC – Chemistry (34)

Time: 3 Hours 15 Minutes

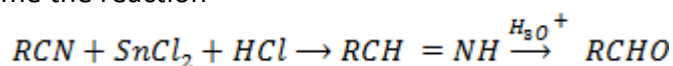
Max. Marks: 70

- INSTRUCTIONS :** 1. The question paper has four parts: A, B, C and D. All parts are compulsory.
2. Write balanced chemical equations and draw labeled diagrams wherever required.
3. Use log tables and the simple calculator if necessary. (Use of scientific calculators is not allowed)

PART-A

- I. **Answer ALL of the following. (Each question carries 1 mark)** **10 × 1 = 10**

1. CaCl_2 is used to clear snow from roads on hill stations; Explain.
2. Give an example for an ideal solution.
3. What is SI unit of molar conductivity?
4. What is collision frequency?
5. State Hardy-Schulz rule.
6. Name the method used to refine semiconducting metal.
7. Name the first noble gas compound prepared by Neil Bartlett.
8. Between propan-2-ol and butan-2-ol identify the chiral molecule.
9. Name the reaction



10. Name the deficiency disease resulting due to lack of vitamin A.

PART-B

- II. **Answer any FIVE of the following. (Each question carries 2 marks)** **5 × 2 = 20**

11. Calculate the number of particles in FCC.
12. Mention any two methods of prevention of corrosion.
13. A first order reaction is found to have a rate constant of $5.5 \times 10^{-14} \text{ s}^{-1}$, find the half life period of the reaction?
14. Give reason:
 - a) Most transition metal have high melting and boiling point.
 - b) Second ionization enthalpy of copper is exceptionally high.
15. Explain the bromination of anisole with example.
16. Explain with equation, the addition reaction of acetaldehyde with sodium bisulphate.
17. What is the therapeutic action of a) paracetamol; Brompheniramine.
18. Give one example each for, a) An antacid b) An antioxidant.

PART-C

- III. **Answer any FIVE of the following. (Each question carries 3 marks)** **5 × 3 = 15**

19. Explain with equations Van –Arkel method of refining Zirconium. **3M**
20. Explain the Manufacture of ammonia by Haber's process with a neat labelled diagram. **3M**
21. Mention the anomalous behavior of oxygen.
22. a) Complete the equation
 - (I) $6\text{NaOH} + 3\text{Cl}_2 \rightarrow$ _____
 - (II) $3\text{H}_2\text{S} + 3\text{Cl}_2 \rightarrow$ _____b) Give reason, Why BrF_2 is more reactive than Br_2 ? **(2+1)M**
23. a) Calculate the magnetic moment value of Mn^{2+} [atomic number of Mn = 25]
b) Write the structure of dichromate ion. **(2+1) M**
24. a) What happens when H_2S is passed through potassium dichromate in acidic medium?
Give equation.
b) What is the composition of 'copper matte'? **(2+1)M**
25. a) Mention any two applications of coordination compounds.

- b) When is linkage isomerism possible for a coordination compound? **(2+1)M**
26. For $[\text{Co}(\text{en})_3]\text{Cl}_3$, give
- IUPAC name
 - The coordination number of the central metal ion and
 - Type of stereoisomerism it exhibits. **(1+1+1)M**

PART-D

IV. Answer any THREE of the following. (Each question carries 5 marks) **3 × 5 = 15**

27. a) A compound crystallizes in FCC lattice, in which A occupies the corner, and B occupies the centre of each face. What is the formula of the compound?
- b) (i) Calculate the packing efficiency of CCP crystal lattice
(ii) How many particles are present per unit volume of a simple cube? **(3+2)M**
28. a) A 5% solution by mass of cane sugar in water has freezing point of 271K. Calculate the freezing point of 5% solution (by mass) of glucose in water is 273.15K (MM – $\text{C}_6\text{H}_{12}\text{O}_6=180\text{amu}$, cane sugar=342amu).
- b) For a non-ideal solution having positive deviation from Raoult's law,
- Plot a graph of vapour pressure versus mole fraction.
 - What is the type of azeotrope formed by this solution? **(3+2)M**
29. a) With a neat diagram, explain hydrogen-oxygen fuel cell.
- b) State Faraday's first law of electrolysis. **(3+2)**
30. a) Derive an integrated rate equation for the first order reaction.
- b) Draw the graph of concentration of R versus time for the zero order reaction. **(3+2)M**
31. a) Explain the preparation of gold sol by Bredig's arc method.
- b) Give any two characteristic features of enzyme catalysis.
- c) Name the theory that explains the theory of enzyme catalysis. **(2+2+1)M**

V. Answer any FOUR of the following. (Each question carries 5 marks) **4 × 5 = 20**

32. a) Discuss the SN^2 mechanism. **2M**
- b) Write the major product in the following equation.
- $$\text{C}_2\text{H}_5\text{Br} + \text{AgCN} \xrightarrow{\text{Alcohol}} \text{_____} .$$
- c) How do you convert chlorobenzene to phenol? Give equation **2M**
33. a) Explain the reaction of phenol with bromine water. Write equation.
- b) How does diethyl ether react with
- Cold concentrated HI ;
 - Hot concentrated HI ; at 373K **(3+2)M**
34. a) Explain Gattermann –Koch reaction with equation.
- b) Write the general reaction of Hell-Volhard -Zelensky reaction.
- c) Write the functional group of carbonyl compounds. **(2+2+1)M**
35. a) An organic compound 'X' with formula $\text{C}_2\text{H}_7\text{N}$ does not answer carbyl amine test, but give a product that is insoluble in an alkali, with Hinsberg reagent. Give the IUPAC name of X and which class of compound does it belong to?
- b) $\text{X} \xrightarrow[0^\circ\text{C}]{\text{NaNO}_2/\text{HCl}} \text{Y} \xrightarrow{\text{Warm}} \text{Z}$; $\text{Y}+\text{Z} \rightarrow \text{Orange dye}$ What are X,Y and Z. **(3+2)M**
36. a) Mention any two structural difference between starch and cellulose.
- b) What are non essential amino acids? Give example.
- c) Write the structure of sugar moiety present in DNA. **(2+2+1)M**
37. a) Mention the monomers present in the following polymers
- Nylon -6 ;
 - Buna-S;
 - Teflon
- b) Give an example for
- Natural polymer
 - Thermo plastic **(3+2)M**



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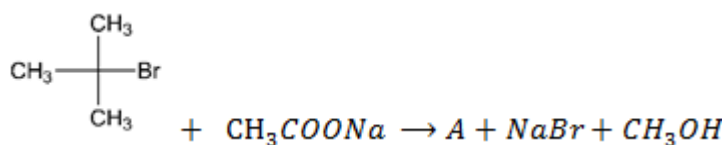
PART A

- I. Answer all of the following (each question carries 1 mark) 10 × 1 = 10**
1. What are azeotropic mixtures?
 2. As the temperature increases, Henry's law constant for a particular gas in liquid solvent. What is the inference of this statement?
 3. Define limiting molar conductivity.
 4. What is the effect of temperature on the rate of reaction?
 5. Name the enzyme which converts milk into curd.
 6. What is the role of limestone in the extraction of iron from haematite ore?
 7. How is $Xe_2^+PtF_6^-$ prepared?
 8. Between S_N^1 and S_N^2 reaction which one proceeds with complete stereochemical inversion?
 9. Complete and name the following reaction
 a. $C_6H_5COCl \xrightarrow[Pd-BaSO_4]{H_2} \text{_____}$.
 10. Which hormone regulates sugar level in the blood?

PART –B

- II. Answer any five of the following (each question carries 2 mark) 5 × 2 = 10**
11. (i) Which point defect decreases the density of a solid?
 (ii) What type of defect can arise when a solid is heated?
 12. How is standard electrode potential of zinc electrode is measured using standard hydrogen electrode?
 13. Show that half- life period of a first order reaction is independent of the initial concentration of the reactant.
 14. What is the formula of the product formed when lanthanoid (Ln) reacts with
 (i) Halogen ; (ii) Nitrogen
 15. Identify A and B in the following reactions and name them

a)



b)



16. Explain the reaction between benzaldehyde and acetophenone in presence of dilute base and identify the name of the reaction.
17. a) What are food preservatives? Give example. **2M**
18. Give an example each for a) Antiseptic b) Antifertility drug **(1+1)M**

PART –C

- III. Answer any five of the following. (Each question carries 3 marks) 5 × 3 = 15**
19. Draw the Ellingham diagram for the formation of FeO from Fe, CO from C and CO₂ from CO. Suggest a suitable reducing agent for the reduction of Fe₂O₃ below 1073K and above 1073K.
 20. a) How is phophine prepared in the lab? Give equation.
 b) Why does NO₂ dimerize? **(2+1)M**
 21. a) SO₂ is used as antichlor why?

- b) Give an example for acidic oxide. (2+1)M
22. a) Explain the action of Cl_2 on slaked lime (2+1)M
 b) What is aquaragia? (2+1)M
23. a) Transition metal and its compounds are used as catalysts. Give reasons. (2+1)M
 b) Write the general electronic configuration of 'f' block elements. (2+1)M
24. a) Give similarity in properties of lanthanoids and actinoids. (4+1)M
 b) Why actinoids show variable oxidation state than lanthanoids? (4+1)M
25. Give differences between $[\text{NiCl}_4]^{2-}$ and $[\text{Ni}(\text{CN})_4]^{2-}$ with respect to type of hybridisation, magnetic behaviour and geometry. 3M
26. a) Write any two postulates of werner's theory of coordination compounds. (2+1)M
 b) Identify the low spin and high spin complex in the following.
 $[\text{Co}(\text{F}_6)]^{3-}$; $[\text{Ni}(\text{CN})_4]^{2-}$. (2+1)M

PART -D₁

IV. Answer any three of the following (each question carries 5 marks) 3 × 5 = 15

27. a) Silver crystalizes in FCC lattice. If the edge length of a cell is $4.077 \times 10^{-8} \text{cm}$, calculate the density of silver given the atomic mass of silver = 108amu, $N_A = 6.022 \times 10^{23} \text{mol}^{-1}$. (1+1+1)M
 b) What are paramagnetic substances? Give an example.
28. a) The mole fraction of helium in a saturated solution at 20°C is 1.2×10^{-6} . Find the pressure of helium above the solution? Given Henry law constant at 20°C = 144.97bar. (1+1+1)M
 b) Give reason
- iii. NaCl dissolves in water but not in benzene.
 iv. Solution of chloroform and acetone shows a negative deviation from Raoult's law.
 v. Raisins swell in size when kept in water.
29. a) Write the symbolic representation of SHE and give its standard electrode potential. value. (1+1+1)M
 b) Corrosion is an electrochemical phenomena. Explain or Write the reactions occurring at cathode and anode during corrosion.
- c) What is the relation between ΔG° and K of a reaction? (1+1+1)M
30. a) Show that in case of a first order reaction, the time taken for completion of 99.9% reaction is 10 times faster than time required for half change of the reaction. (1+1+1)M
 b) Draw a graph of potential energy versus reaction coordinate to show the effect of catalyst on activation energy and explain.
31. a) Write the symbolic representation of SHE and give its standard electrode potential value. (1+1+1)M
 b) Corrosion is an electrochemical phenomena explain or write the reaction occurring at cathode and anode during corrosion.
- c) What is the relation between ΔG° and K? Give equation.

PART D₂

V. Answer any four of the following questions (each question carries 5 marks) 4 × 5 = 20

32. a) Discuss $\text{S}_\text{N}1$ mechanism with a suitable example and write their stereoisomerism. (3+1+1)M
 b) Give two uses of freons.
 c) Write general equation of Fittig's reaction. (3+1+1)M
33. a) Explain the mechanism of dehydration of ethanol to ethane. (3+2)M
 b) Explain Reimer Tiemann reaction with equation. (3+2)M
34. a) Name the end product of the following reaction. (2+2+1)
 $(\text{CH}_3\text{COO})_2\text{Ca} \xrightarrow{\text{dry distillation}} [\text{A}] \xrightarrow{\text{NH}_2 \text{ OH}} [\text{B}]$
 b) Explain the formation of acetals with equation.
 c) Write any two uses of formaldehyde. (2+2+1)
35. a) Give the structures of A, B with the following reactions (2+2+1)
 $\text{C}_6\text{H}_5\text{NH}_2 \xrightarrow{\text{NaNO}_2/\text{HCl}} [\text{A}] \xrightarrow{\text{C}_6\text{H}_5\text{NH}_2 / \text{OH}^-} [\text{B}]$
 b) Give equation for the following reaction:
 Benzene diazonium chloride treated with fluoroboric acid followed by heating

- c) Among CH_3NH_2 and NH_3 which is more basic? Give reason. **(2+2+1)**
36. a) Write the Haworth structure of alpha lactose
b) Give two biological functions of DNA
c) Write zwitterion form of alanine. **(2+2+1)M**
37. a) Write the partial structure of (i) neoprene and (ii) terelene
b) Name the following
(i) Catalyst used in the preparation of HDPE
(ii) Monomer used in the preparation of Bakelite
(iii) Polymer formed by the monomer caprolactum **(2+3)M**
