HALF YEARLY EXAMINATION – December 2025

STD: 12 **CHEMISTRY**

Marks :70 Time: 3 Hours

I. Answer All the Questions. **15 x 1 =15**

1. Equal volumes of three acid solutions of pH 1,2 and 3 are mixed in a vessel. What will be the H^+ ion concentration in the mixuture?
   a) 10^{-6} b) 0.111 c) 3.7×10^{-2} d) 3.2×10^{-8}
2. The ionic radii of A^+ and B^- are 0.98×10^{-10}m and 1.81×10^{-10}m. The coordination number of each ion in AB is
   a) 8 b) 2 c) 6 d) 4
3. Zinc can be coated on iron to produce galvanized iron but the reverse is not possible. It is because
   a) Zinc is lighter than iron b) Zinc has lower melting point than iron
   c) Zinc has lower negative electrode potential than iron
   d) Zinc has higher negative electrode potential than iron
4. Which one of the following will react with phenol to give salicyladehyde after hydrolysis?
   a) dichloromethane b) trichloroethane c) trichloro methane d) CO_2
5. Which of the following reduction is not thermodynamically feasible?
   a) $Cr_2O_3 + 2Al \longrightarrow Al_2O_3 + 2Cr$ b) $Al_2O_3 + 2Cr \longrightarrow Cr_2O_3 + 2Al$
   c) $3TiO_2 + 4Al \longrightarrow 2Al_2O_3 + 3Ti$ d) none of these
6. What is the overall order of the reaction $CH_3CHO_{(g)} \xrightarrow{\Delta} CH_{4(g)} + CO_{(g)}$ with experimental rate law rate = $k[CH_3CHO]^{3/2}$ is
   a) 0.5 b) 1 c) 2 d) 1.5
7. Which one of the following element is essential for the cell walls of plants?
   a) P b) N c) B d) C
8. Which one of the following is not produced by body?
   a) DNA b) Enzymes c) Harmones d) Vitamins
9. When copper is heated with conc HNO_3 it produces
   a) $Cu(NO_3)_2$, NO and NO_2 b) $Cu(NO_3)_2$ and N_2O c) $Cu(NO_3)_2$ and NO_2 d) $Cu(NO_3)_2$ and NO
10. An example for negative catalyst is
    a) Anhy $AlCl_3$ b) Ethanol c) Glycerol d) Both b and c
11. Ammonium salt of benzoic acid is heated strongly with P_2O_5 and the product so formed is reduced and then treated with $NaNO_2$/HCl at low temperature. The final compound formed is
    a) Benzene diazonium chloride b) Benzyl alcohol c) Phenol d) Nitrosobenzene
12. The catalytic behaviour of transition metals and their compounds is ascribed mainly due to
    a) their magnetic behaviour b) their unfilled d orbitals
    c) their ability to adopt variable oxidation states d) their chemical reactivity
13. Phenyl methanal is reacted with concentrated NaOH to give two products X and Y. X reacts with metallic sodium to liberate hydrogen. X and Y are
    a) Sodiumbenzoate and phenol b) Sodium benzoate and phenyl methanol
    c) Phenyl methanol and sodium benzoate d) none of these
14. Which of the following is paramagnetic in nature?
    a) $[Zn(NH_3)_4]^{2+}$ b) $[Co(NH_3)_6]^{3+}$ c) $[Ni(H_2O)_6]^{2+}$ d) $[Ni(CN)_4]^{2-}$
15. The polymers used in making artificial wool is
    a) polystyrene b) PAN c) polyester d) polythene

II. Answer Any Six Questions (Question No.24 is Compulsory) **6 x 2 = 12**

16. What is calcination?
17. In what way fluorine differ from the rest of the elements of group 17?
18. Write a short note on Frenkel defect.
19. Derive the relation between pH and pOH.
20. Define electrophoresis
21. How will you convert ethyl alcohol to diethyl ether?
22. Write Clemenson reduction reaction.
23. What are biodegradable polymers? Give examples.
24. In the complex $[Co(NH_3)_5Cl]^{2+}$, identify the following(i) IUPAC name(ii) Central metal ion (iii) Coordination number (iv) Oxidation number of the central metal ion

III. Answer Any Six Questions (Question No.33 is Compulsory) **6 x 3 = 18**

25. Write a note on Van-Arkel method for refining of titanium.
26. What type of hybridization is found in the following i) BrF_3 ii) BrF iii) BrF_5
27. What are the properties of interstitial compound?
28. Explain pseudo first order reaction with example.
29. Write the galvanic cell notation for Daniel cell.
30. Write a note on catalyst poison.
31. Write mustard oil reaction.
32. What are hormones? Give examples.
33. How will you convert i) Benzaldehyde → Benzoin ii) Ethyl acetate → Propyl acetate

IV. Answer All the Questions. **5 x 5= 25**

34. (a) (i) Explain the principle of electrolytic refining with an example
    (ii) What are the uses of boric acid
    (OR)
    (b)(i) Write a note on hydroboration.
    (ii) Sulphuric acid is a dibasic acid. Prove it.
35. (a) Give the difference between lanthanoids and actinoids
    (OR)
    (b) (i) What is linkage isomerism? Explain with an example.
    (ii) What are the limitations of VB theory?
36. (a) (i) Calculate the percentage efficiency of packing in case of simple cubic crystal.
    (ii) Define half-life of a reaction.
    (OR)
    (b) Derive Henderson equation.
37. (a) Explain the factors that affect electrolytic conductance.
    (OR)
    (b) Write short notes on the the following i) Coupling reaction ii) Dow's Process
38. (a) (i) Explain Popoff's rule with an example.
    (ii) Mention the advantages of food additives.
    (OR)
    (b) (i) Write short notes on Gabriel phthalimide synthesis .
    (ii) Give any three differences between DNA and RNA.