SAMPLE PAPER - 2010
CLASS – XII
SUBJECT – Chemistry

Time: 3 Hrs Max Marks: 70

General Instructions:

i. All questions are compulsory.
ii. Questions 1 to 8 are very short answer type carrying 1 mark each. Answer them in one sentence each.
iii. Questions 9 to 18 are short answer type carrying 2 marks each. Answer each of them in about 30 words.
iv. Questions 19 to 27 are also short answer type carrying 3 marks each. Answer each of them in about 40 words.
v. Questions 28, 29 & 30 are long answer type carrying 5 marks each. Answer each of them in about 70 words.
vi. Calculators are not permitted. Use log tables if necessary.

1 What is hydrometallurgy? 1

2 Draw the shape of hypo phosphorus acid state why it is monoprotic? 1

3 Write IUPAC name of: C_6H_5 CH(OH) CH_2CH_2Cl 1

4 Why cannot vitamin C be stored in our body? 1

5 Write IUPAC name of the complex compound: [Co Cl_2 $(en)_2$] NO_3 1

6 What is Tyndall effect? 1

7 What happens when a crystal of NaCl is doped with $SrCl_2$? 1

8 Among the isomeric alkanes of molecular formula C_5H_{12}, identify the one that on photochemical chlorination yields three monochlorides. 1

9 The Gibbs energy of formation of Al_2O_3 and Cr_2O_3 are – 847 and -540 KJ /mol respectively. Can Al be used to reduce Cr_2O_3 to Cr? Explain. 2

10 If a solution of $CuSO_4$ is electrolyzed for 10 min with a current of 1.5 A. What is the mass of copper deposited at the cathode? At Mass of Cu = 63 g/mol 2

11 Explain the following: 2
(i) Wolf Kishner reduction (ii) Haloform reaction

12 (i) Why do transition metals form alloys? 2
(ii) Name an important alloy which contains some of the lanthanoids and mention its uses.

13 Give the formula and structure of a noble gas species which is iso-structural with: (i) ICl_4^- (ii) IBr_2^- 2
(iii) BrO_3^-

14 (i) State Raoult's law for a solution of non volatile solute in a volatile solvent. 2
(ii) The molecular mass of ethanoic acid determined in benzene is abnormally higher than normal value.

15 (i) Write mechanism for the cleavage of an unsymmetrical ether with HI. 2
(ii) Why cleavage in anisole with HI does not produce iodobenzene and methanol?

16 How do you distinguish? 2
(i) Benzyl amine and Aniline (ii) 2-propanol and 2-methyl 2-propanol

17 (i) What is crystal field splitting energy? 2
(ii) How does the magnitude of Δ_0 decide the actual configuration of d orbitals in a coordination entity?

OR

Discuss the nature of bonding and magnetic property of the complex $[CoF_6]^{3-}$ according to V.B theory. At. Number of Co = 27

18 Give Reasons: 2
(a) Aryl amines are not prepared by Gabriel Phthalimide method.
(b) Acid strength of alcohols vary in the order $1^0 > 2^0 > 3^0$ alcohol.

19 (a) How do antiseptics differ from disinfectants? Explain with examples. 3
(b) Define the term chemotherapy.

20 (i) H_2S, a toxic gas with rotten egg like smell, is used for qualitative analysis. If the solubility of H_2S in water at STP is 0.195 m, Calculate Henry's Law constant. 3
(ii) What are Azeotropes? Write example.

21 (i) Calculate the emf of the cell in which the following reaction takes place. 3

$$Ni\ (s) + 2\ Ag^{+}\ (0.002\ M) \longrightarrow Ni^{2+}\ (0.160\ M) + 2\ Ag\ (s)$$

Given that $E^0_{Cell} = 1.05V$
(ii) What are the products obtained at anode and cathode when aqueous NaCl is electrolyzed with electrodes?

22 Answer the following: 3
(i) Insulin should not be administered to diabetic patients orally. Why?
(ii) What are nucleic acids? Mention their two important functions.

23 (i) Chromium crystallizes in bcc structure. Its atomic diameter is 245 pm, find density. Atomic masses of: Cr = 52u , $N_A = 6.022 \times 10^{23} mol^{-1}$ 3
(ii) Atoms of element B form hcp lattice and those of A occupy 2/3 of tetrahedral voids. What is the formula of the compound b/w A and B?

24 Account for the following: 3
(i) Chlorobenzene is less reactive towards Nucleophilic substitution.
(ii) Ethyl amine has lower boiling point than ethyl alcohol.
(iii) pKa of ethanoic acid is greater than that of chloroethanoic acid.

25 (i) Draw isobars for physisorption and chemisorption. Justify the difference. 3
(ii) Why chemisorption is monolayered?

26 (a) Name the chain initiator used in free radical polymerization. Indicate the chain initiation step for polymerization of ethene. 3
(b) Write preparation of: (i) Novolac (ii) Teflon

27 (i) Which metal in the 1st transition series exhibits +1 oxidation state most frequently and why? 3
(ii) Write down the number of 3d electrons in each of the following ions:
Ti^{2+}, V^{2+}, Cr^{3+}, Mn^{2+}, Fe^{2+}, Co^{3+}, Co^{2+}, Ni^{2+} and Cu^{2+}
Indicate how the five d orbitals to be occupied for these hydrated ions (Octahedral)

OR

(a) What are disproportionation reactions? Write two examples.

(b) Account for the following:
(i) Zr and Hf exhibit similar physical and chemical properties.
(ii) Transition elements exhibit highest oxidation states only in oxides and fluorides.
(iii) Actinoids exhibit more number of oxidation states than lanthanoids.

28 (a) Complete the following chemical equations and balance them. 5
(i) NH_3(excess) + Cl_2 ➔
(ii) P_4 + NaOH + H_2O ➔
(iii) XeF_4 + SbF_5 ➔
(b) Explain the catenation property exhibited by Sulphur.
(c) Why HBr is not prepared by reaction of a bromide salt with Conc Sulphuric acid?

OR

(a) Write reactions representing Ostwald process for the manufacture of nitric acid. Why is HNO_3 a strong oxidizing agent?
(b) Write balanced chemical equations for the reactions of conc. HNO_3 with:
(i) Iodine (ii) Copper
(c) What are Interhalogen compounds? IF_7 is possible while ICl_7 is not possible. Why?

29 (i) A reaction is 1st order in A and second order in B 5

(a) Write differential rate equation.

(b) How is the rate affected when concentration of B is tripled?

(c) How is the rate affected when concentration of both A & B is doubled?

(ii) The rate of a reaction triples when temperature changes from 50^0C to 100 ^{0}C. Calculate the activation energy of the reaction. R = 8.314 $JK^{-1}mol^{-1}$.

OR

(a) The rate of reaction, $2NO + Cl_2 \longrightarrow 2NOCl$,
is doubled when concentration of Cl_2 is doubled and it becomes eight times when concentration of both NO and Cl_2 are doubled. Deduce the order of the reaction.

(b) At 380^0C, the half life period for the first order decomposition of H_2O_2 is 360 min.. Calculate the time required for 75% decomposition at 380^0C.

(c) Derive integrated rate equation for a zero order reaction.

30 (a) How do you convert the following? 5

(i) Aniline to N-methyl aniline

(ii) Benzaldehyde to α –hydroxy phenyl ethanoic acid

(iii) 2-bromopropane to 1-bromopropane

(b) Arrange the following in the increasing order of property indicated:

(a) CHF_2COOH, $CHCl_2COOH$, CH_3COOH ---------- Acid strength

(b) CH_3NH_2, $(CH_3)_2NH$, $(CH_3)_3N$, NH_3 ---- Basic strength in solution

OR

(i) An unknown aldehyde A, C_7H_6O on reaction with KOH gives B and C. A reacts with Zn-Hg and conc HCl to give D which changes to A by CrO_2Cl_2. B on heating with soda lime gives E. identify A to E and write all reactions.

(ii) Write equations for:

(a) Cross aldol condensation between propanal and ethanal in the presence of dil NaOH.

(b) Disproportionation of Benzaldehyde in conc NaOH.