

Chemistry
All The Best

Topics Covered

1. Solutions
2. Electrochemistry
3. P-Block
4. Haloalkane-Arene
5. Alcohols&Phenols

Time : 01:45:00 Hrs

Total Marks : 45

SECTION - A - 1 Mark

- 1) How are cell constant and specific conductance related to one another? 1
- 2) Give one chemical method for the preparation of fluorine. 1
- 3) Give an example of a solution containing a liquid solute in a solid solvent. 1
- 4) What is the relation between normality and molarity of a given solution of H_2SO_4 ? 1
- 5) Identify the products A and B formed in the following reaction: 1

**SECTION - B - 2 Mark**

- 6) Find the boiling point of a solution containing 0.520 g of glucose ($C_6H_{12}O_6$) dissolved in 80.2 g of water. [Given : K_b for water = 0.52 K/m] 2
- 7) Complete the following reaction equation: (i) $XeF_2(s) + H_2O(l) \rightarrow$ (ii) $NaOH(\text{Cold \& dilute}) + Cl_2 \rightarrow$ 2
- 8) Difference between chiral and achiral molecules. 2
- 9) 45 g of ethylene glycol ($C_2H_4O_2$) is mixed with 600 g of water. Calculate 2
 - (i) the freezing point depression and
 - (ii) the freezing point of the solution
 (Given: K_f of water = $1.86 \text{ K kg mol}^{-1}$)
- 10) (a) Calculate ΔG° for the reaction $Mg_{(s)} + Cu^{2+} \rightarrow Mg^{2+}_{(aq)} + Cu_{(s)}$ 2
 Given: $E^\circ_{cell} = +2.7V$, $1F = 96500 \text{ C mol}^{-1}$
 (b) Name the type of cell which was used in Apollo space programme for providing electrical power.

SECTION - C - 3 Mark

- 11) When a current of 0.75 A is passed through $CuSO_4$ solution for 25 min, 0.369 g of copper is deposited at the cathode. Calculate the atomic mass of copper. 3
- 12) Account for the following: (i) BiH_3 is the strongest reducing agent amongst all the hydrides of Group 15 elements. (ii) $K_{a_2} \ll K_{a_1}$ for H_2SO_4 in Water. (iii) Fluorine forms only one oxoacid, HOF. 3

- 13) Account for the following order of reactivity of alcohols with sodium metals: 3
primary>secondary>tertiary.
- 14) Calculate the boiling point of solution when 4 g of MgSO_4 ($M = 120 \text{ g mol}^{-1}$) was dissolved in 3
100 g of water, assuming MgSO_4 undergoes complete ionization. (K_b for water = $0.52 \text{ K kg mol}^{-1}$)
- 15) Compound 'A' with molecular formula $\text{C}_4\text{H}_9\text{Br}$ is treated with aq. KOH solution. The rate of 3
this reaction depends upon the concentration of the compound 'A' only. When another optically active isomer 'B' of this compound was treated with aq. KOH solution, the rate of reaction was found to be dependent on concentration of compound and KOH both. (i) Write down the structural formula of both compounds 'A' and 'B'. (ii) Out of these two compounds, which one will be converted to the product with inverted configuration.

SECTION - D - 5 Mark

- 16) (a) Draw the structures of the following: 5
(i) $\text{H}_2\text{S}_2\text{O}_8$
(ii) HClO_4
(b) How would you account for the following:
(i) NH_3 is a stronger base than PH_3 .
(ii) Sulphur has a greater tendency for catenation than oxygen.
(iii) F_2 is a stronger oxidising agent than Cl_2 .
- 17) EMF of Daniell cell was found using different concentrations of Zn^{2+} ion and Cu^{2+} ion. A graph 5
was then plotted between E_{cell} and $\log \frac{[\text{Zn}^{2+}]}{[\text{Cu}^{2+}]}$. The plot was found to be linear with intercept on E_{cell} axis equal to 1.10 V. Calculate E_{cell} for $\text{Zn} | \text{Zn}^{2+} (0.1 \text{ M}) || \text{Cu}^{2+} (0.01 \text{ M}) | \text{Cu}$
- 18) A compound A ($\text{C}_4\text{H}_{10}\text{O}$) is found to be soluble in concentrated sulphuric acid. (A) does not 5
react with sodium metal or potassium permanganate. When (A) is heated with excess of HI, it gives a single alkyl halide. Deduce the structure of compound (A) and explain all the reactions involved.
