

2021

**CHEMISTRY**

[ **Honours** ]

( Practical )

PAPER – VIII

*Full Marks : 150*

*Time : 4 hours*

*The figures in the right-hand margin indicate marks*

**PAPER – VIII-A**

( *Organic* )

*Marks : 50*

Answer any **two** of the following questions :

25 × 2

- Outline the procedure for the synthesis of the following :
  - p-bromo aniline from p-bromo acetanilide
  - Benzil from benzoin
  - Anthranilic acid from phthalinide
- How will you prepare benzoic acid from toluene ?
  - Suggest the method for the preparation of aspirin.
- Draw the <sup>1</sup>H-NMR and IR spectrum of glucose and assign the peaks. Also provide suitable explanation for the  $\delta$  values and the splitting pattern in <sup>1</sup>H-NMR spectrum.
- Draw the <sup>1</sup>H-NMR spectra for the following compounds and also assign the peaks with proper justification for the  $\delta$  values and splitting pattern
  - p-nitroaniline
  - Vanillin.

**PAPER – VIII-B**

( *Inorganic* )

(*Turn Over*)

( 2 )

Marks : 50

Answer any **two** questions of the following :

25 × 2

1. (a) How can  $\text{Cu}^{2+}$  and  $\text{Zn}^{2+}$  in a mixture be estimated complexometrically using EDTA ? State the principle involved.  
(b) What are metal ion indicators ? Explain their role in complexometric estimation of  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$ .  
(c) What is Reinhardt solution ? State its role in the estimation of  $\text{Fe}^{3+}$  in HCL medium permanganometrically.  
(d) What are the requisites of a redox indicator ? Explain the indicator action of BDS in a redox titration. 5 + 5 + 5 + 10
2. (a) Discuss the principles of quantitative analysis of Iron (III)-copper(II) mixture giving equations for all the chemical reaction involved.  
(b) Briefly discuss the preparation of ferric alum starting from ferrous sulphate and ammonium sulphate. 10 + 15
3. (a) Describe titrimetric method for estimation of calcium(II) permanganometrically.  
(b) What are the basic requirements of Gravimetry ?  
(c) Discuss the principle of gravimetric estimation of Cl ion. 10 + 10 + 5
4. (a) Write down the procedure for the synthesis of Mohr's salt.  
(b) 25 ml of  $\text{Fe}^{3+}$  solution is titrated with 0.98 (N/20) $\text{K}_2\text{Cr}_2\text{O}_7$ . At the end point, the titre value is 27.5 ml. Calculate the amount of Iron present in gm/litre.  
(c) Why EDTA is a very suitable reagent in complexometric titration ? 10 + 10 + 5

### PAPER – VIII-C

Marks : 50

Answer any **two** of the following :

25 × 2

1. **Write down the principles** [Statement of Lambert-Beer's law with equation and explanation of symbols; Definition of transmittance (T) and optical density (OD) and giving relation between %T and OD; Calibration curve (OD vs.  $\lambda$  plot and OD vs. concentration plot); Aim of the experiment; Limitation of

lambert-Beer's law] **and methodologies** for the Verification of the Lambert-Beer's law using  $K_2Cr_2O_7$  solutions of different concentrations and determination of the concentration of a given  $K_2Cr_2O_7$  solution of unknown strength by using Colorimeter. Explain the nature of the plot. 10 + 10 + 5

2. **Write down the principles** [Definition of formal potential and potentiometric titration; Nernst equation for the redox system; Writing the cell and its emf correctly; Nature of plots (versus number of drops of  $K_2Cr_2O_7$  solution and vs. no. of drops of  $K_2Cr_2O_7$  solution and also explanation how cell emf changes with addition of  $K_2Cr_2O_7$ ); How to find the formal potential of  $Fe^{3+}/Fe^{2+}$  redox system and the strength of the supplied Mohr's salt solution] **and methodologies** for the determination of the strength of the supplied Mohr's salt solution by titrating against a standard  $K_2Cr_2O_7$  solution potentiometrically and hence determination of the formal reduction potential of  $Fe^{3+}/Fe^{2+}$  redox system. Explain the nature of the plot. 10 + 10 + 5
  3. **Write down the principles** [Principle of conductometric titration; Minimization of dilution error; nature of curve and its brief explanation; Aim of the experiment] **and methodologies** for the determination of the strength of HCl and  $CH_3COOH$  in the given mixture by titrating the mixture against a standard solution of NaOH conductometrically. Explain the nature of the plot. 10 + 10 + 5
  4. **Write down the principles** [State the mutual solubility of phenol and water; For mentioning the number of phases, components and degrees of freedom at CST; Nature of the plot of temperature vs. wt. % of phenol with explanation; How to obtain the CST and weight % from solubility curve] **and methodologies** for the determination of the critical solution temperature (CST) of phenol-water system and mass percent of phenol at this temperature. Explain the nature of the plot. 10 + 10 + 5
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