

M.Sc. 4th Semester, (CBCS Scheme)

Examination, May-2023

**CHEMISTRY**

**Paper - 17CHE24GA2**

**Inorganic Special-V**

*Time allowed : 3 hours]*

*[Maximum marks : 80*

*Note: Question No. 1 is compulsory and all questions carry equal marks. Attempt five questions in all, selecting at least one question from each section.*

1. **Compulsory Question :** 8×2=16
- What is supporting electrolyte current.
  - Write Ilkovic equation.
  - What is beauty of amperometry?
  - Give principle of chronopotentiometry?
  - What is cathodic redissolution?
  - Write effect of complexation of value of  $E_{1/2}$  of a metal ion.
  - Define voltammetry.
  - Draw diagram of SCE.?

**Section - A**

- What is the working principle of polarography? Also discuss the types of currents in polarography. 16
- What are palaeographical waves? Also give mathematical derivations for the cathodic and anodic waves. 16

**Section - B**

- How will you determination the stability constants of complexes (reversible systems only) by D.C. Polarography. 8
  - Explain construction and working of following electrodes : 8
    - Rotating platinum electrode
    - Glassy carbon electrode
- Explain the term Amperometry. Also discuss the types of amperometric titrations with suitable examples of titrant and titrate with plots. 16

or

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$E_{1/2}$  for simple  $\text{Cd}^{2+}$  ion is  $-0.57$  Volt Vs SCE in  $0.1$  M  $\text{KNO}_3$  soln. In presence of  $1$  M  $\text{NH}_3$  soln.  $E_{1/2}$  is  $-0.784$  V Vs SCE. Where the ratio of  $\frac{K_c}{K_s} = 1.09$ . Calculate the value of stability constant and prove the complexation occurred on addition of  $\text{NH}_3$  from given data.

16

## Section - C

6. (a) Discuss the principle and applications of chronoamperometry. 6
- (b) Write short notes on square wave polarography.  
<https://www.mdustudy.com> 10
7. (a) Discuss voltammetry in quiet and stirred and solution with electrode other than mercury. 8
- (b) Discuss NPP and DPP in brief with graphical expression. 8

## Section - D

8. (a) Discuss the experimental and applications of anodic deposition. 8

or

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For the complex  $[\text{Cd}(\text{NH}_3)_4]^{2+}$ , a graph is plotted b/w H.W. potential and conc. change of the ligand. Thus, slope of line is  $-0.118$  V. 8

- (b) Explain the concentration process and rest period in voltammetry technique. 8
9. Discuss the experimental and theory of stripping process and cathodic stripping voltammetry. 16

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