

Group CAnswer any *two* bits

2x8=16

13. (i) Discuss the associative and dissociative mechanism for octahedral complex. 4

(ii) Explain the mechanism of two electron transfer reactions. 4

14. (i) Write the basic principle of Ilkovic-Heyrovsky equation. Explain the significance of this equation. 2+2

(ii) Prove that $E_{1/2} = E^0 + \frac{0.0591}{n} \log \left[\frac{D_{red}}{D_{ox}} \right]^{\frac{1}{2}}$ 4

15. (i) Write down the types of electroanalytical method. (ii) Discuss the working principle of TGA and draw a flow diagram of the instrument. (iii) The presence of O₂ often gives some error in the determination of species in polarogram. Explain. 2+(2+2)+2

16. (ii) What is the role of supporting electrolyte in Cyclic Voltammetry (CV). (ii) Why Ferrocene is used as standard in CV? (iii) Write down the diagnostic criteria for Reversible, Quasi-Reversible and electrochemical Irreversible systems. 3+2+3

.....

Internal Assessment-10

2024**M.Sc.****4th Semester Examination****CHEMISTRY****PAPER – CEM-403 (Inorganic Special)****Full Marks : 50****Time : 2 Hours****(CEM 403-Advanced Inorganic Chemistry-II)****Group A**Answer any *four* bits:

2×4 = 8

1. What are the factors that affect the nucleophilicity of ligand?
2. What are inert and labile complexes? Give example.
3. What is Fick's law?
4. What is meant by liquid junction potential?
5. Write down the basic principles of Voltammetry.
6. Differentiate between DTA and TGA.

Group BAnswer any *four* bits:

4×4 = 16

7. Discuss the *cis*- and *trans*- effects in a square planar complex with suitable example.
8. Differentiate between Polarizable and Non-Polarizable electrode.
9. (i) Draw the potential energy diagram for the self-exchange reaction of $[\text{Co}(\text{NH}_3)_6]^{2+/3+}$. Point out the ΔG^\ddagger , ΔG^0 , and λ in the diagram.
(ii) Compare the rate constant of the above reaction with that of $[\text{Fe}(\text{H}_2\text{O})_6]^{2+/3+}$. Explain your answer. 2+2
10. (i) Write down advantages and disadvantages of Conductometric titration. (ii) How CV differs from Coulometric analysis. 2+2
11. Explain the nature of thermogram curve of Copper Sulphate and Silver Nitrate.
12. What is the major significance of half-wave potential in Polarography and how it depends on ionic strength (μ) of solution?

Group CAnswer any *two* bits

2x8=16

13. (i) Discuss the associative and dissociative mechanism for octahedral complex. 4

(ii) Explain the mechanism of two electron transfer reactions. 4

14. (i) Write the basic principle of Ilkovic-Heyrovsky equation. Explain the significance of this equation. 2+2

(ii) Prove that $E_{1/2} = E^0 + \frac{0.0591}{n} \log \left[\frac{D_{red}}{D_{ox}} \right]^{\frac{1}{2}}$ 4

15. (i) Write down the types of electroanalytical method. (ii) Discuss the working principle of TGA and draw a flow diagram of the instrument. (iii) The presence of O₂ often gives some error in the determination of species in polarogram. Explain. 2+(2+2)+2

16. (ii) What is the role of supporting electrolyte in Cyclic Voltammetry (CV). (ii) Why Ferrocene is used as standard in CV? (iii) Write down the diagnostic criteria for Reversible, Quasi-Reversible and electrochemical Irreversible systems. 3+2+3

Internal Assessment-10

Total Pages -02

PKC/PG/IVS/CEM-403/24

2024**M.Sc.****4th Semester Examination****CHEMISTRY****PAPER – CEM-403 (Inorganic Special)****Full Marks : 50****Time : 2 Hours****(CEM 403-Advanced Inorganic Chemistry-II)****Group A**Answer any *four* bits:

2×4 = 8

1. What are the factors that affect the nucleophilicity of ligand?
2. What are inert and labile complexes? Give example.
3. What is Fick's law?
4. What is meant by liquid junction potential?
5. Write down the basic principles of Voltammetry.
6. Differentiate between DTA and TGA.

Group BAnswer any *four* bits:

4×4 = 16

7. Discuss the *cis*- and *trans*- effects in a square planar complex with suitable example.
8. Differentiate between Polarizable and Non-Polarizable electrode.
9. (i) Draw the potential energy diagram for the self-exchange reaction of $[\text{Co}(\text{NH}_3)_6]^{2+/3+}$. Point out the ΔG^\ddagger , ΔG^0 , and λ in the diagram.
(ii) Compare the rate constant of the above reaction with that of $[\text{Fe}(\text{H}_2\text{O})_6]^{2+/3+}$. Explain your answer. 2+2
10. (i) Write down advantages and disadvantages of Conductometric titration. (ii) How CV differs from Coulometric analysis. 2+2
11. Explain the nature of thermogram curve of Copper Sulphate and Silver Nitrate.
12. What is the major significance of half-wave potential in Polarography and how it depends on ionic strength (μ) of solution?