

Roll No.

Total Pages : 03

LMDQ/D-23

6534

INORGANIC CHEMISTRY SPECIAL-I
CHEM-304

Time : Three Hours]

[Maximum Marks : 60

Note : Attempt *Five* questions in all, selecting at least *one* question from each Section. All questions carry equal marks.

Section A

1. (a) Comments on the lability or inertness of the following complexes with justification : **6**
 - (i) $[\text{Cr}(\text{H}_2\text{O})_6]^{2+}$
 - (ii) $[\text{Cr}(\text{CN})_6]^{4-}$.
- (b) Discuss in brief about the theories of trans effect. **6**
2. (a) Discuss the stereochemical changes in the acid hydrolysis of Co(III)-ammine Complexes. **6**
- (b) Write down the mechanism of preparation of nitrito derivative of $[\text{Co}(\text{NH}_3)_5\text{Cl}]^{2+}$ with explanation. **6**

Section B

3. (a) Explain the following : **3+3**
 - (i) Mixed valance complexes and their electron transfer processes
 - (ii) Non-complimentary redox reactions.

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- (b) Discuss the mechanism of electron transfer reaction with reference to inner sphere reactions. **6**
4. (a) What are cross-reactions ? Give *two* examples of such reactions and explain the evaluation of their rate constants with good degree of accuracy. **6**
- (b) The electron transfer between $[\text{Co}(\text{CN})_6]^{4-} + [\text{IrCl}_6]^{2-}$ is relatively fast. Although both Cl^- and CN^- are good bridging ligands. **6**

Section C

5. (a) Discuss the base hydrolysis reaction of coordinated nitriles and its bonding with transition metals. **6**
- (b) Give a brief account of redistribution reactions involving exchange of ligands between two molecules of the same type. **6**
6. (a) Discuss the nucleophilic substitution reactions of coordinated hydrocarbons. **6**
- (b) What is fluxional isomerism ? Explain fluxional behaviour in allylic and cyclopentadienyl organometallic complexes. **6**

Section D

7. (a) Give preparation and properties of silicone elastomers. **6**
- (b) Discuss the structure and bonding in polyphosphazenes. Give its chemical reactions with water and ammonia. **6**

8. (a) Acetic acid is a weak acid and nitric acid is a strong acid in aqueous solution, but both behave as base in sulfuric acid. Explain. **6**
- (b) What is the aprotic solvent system concept of acids and bases ? Ferric chloride exhibits acidic behaviour in phosphoryl chloride solvent. Explain. **6**