

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  $\text{Cl}^-$  and  $\text{CN}^-$  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