

**A-0553**

**Total Pages : 4**

**Roll No. ....**

**MSCCH-506**

**M.Sc. CHEMISTRY (MSCCH)**

**(Inorganic Chemistry-II)**

**2nd Semester Examination, Session December 2024**

**Time : 2:00 Hrs.**

**Max. Marks : 70**

*Note :- This paper is of Seventy (70) marks divided into Two (02) Sections 'A' and 'B'. Attempt the questions contained in these Sections according to the detailed instructions given therein. Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.*

**Section-A**

**Long Answer Type Questions      2×19=38**

*Note :- Section 'A' contains Five (05) Long-answer type questions of Nineteen (19) marks each. Learners are required to answer any two (02) questions only.*

1. What is magnetic susceptibility ? Discuss the various method for the determination of magnetic susceptibility of complexes.
2. Discuss the any two of the following :
  - (a) Discuss the Cross reaction for the electron transfer reaction with suitable example.
  - (b) Crystal Field splitting in octahedral complexes
  - (c) Laporte selection rule
3.
  - (a) Discuss the Orgel diagram and absorption spectra for a  $d^8$  ion.
  - (b) Draw combined Orgel diagram for  $d^1$  and  $d^9$  octahedral complexes .
4. Attempt all of the following :
  - (a) Discuss MO diagram for an octahedral complex .
  - (b) What is the charge transfer transition ? Classify the charge transfer transition.
5. What is the Nucleophilic Substitution reaction ? Classify the nucleophilic substitution reaction. Discuss nucleophilic substitution reactions in octahedral complexes without breaking of metal-ligand bond.

## Section-B

### Short Answer Type Questions      4×8=32

**Note :-** Section 'B' contains Eight (08) Short-answer type questions of Eight (08) marks each. Learners are required to answer any *four* (04) questions only.

1. What do you understand by  $SN^1$  CB mechanism ? Give suitable example.
2. Write short notes on the following :
  - (a) Labile and inert complexes
  - (b) Spectrochemical series and its applications.
  - (c) Bridging ligands
3. Write short notes on the following :
  - (a) Jahn-Teller distortion in  $Cu^{2+}$  complexes
  - (b) Spin multiplicity for  $Vi^{+3}$ ,  $Ni^{+2}$  ion
4. What are anation reactions ? Explain with suitable example.
5. Discuss the various limitations of crystal field theory.

6. Why some compounds shows paramagnetic behaviour while some show diamagnetic behaviour ? Explain.
7. Discuss the factor affecting the rate of ligand substitution reactions in square planar.
8. Explain why the electron transfer in  $[\text{Co}(\text{NH}_3)_6]^{+2} \rightarrow [\text{Co}(\text{NH}_3)_6]^{+3}$  slower than the electron transfer in  $[\text{Fe}(\text{CN})_6]^{4-} \rightarrow [\text{Fe}(\text{CN})_6]^{-3}$ .

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