

**K-385**

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## **MSCCH-506**

### **Inorganic Chemistry-II**

M.Sc. Chemistry (MSCCH)

2nd Semester Examination, 2023 (Dec.)

**Time : 2 Hours]**

**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)**

**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.

(2×19=38)

1. Describe the crystal field stabilization energy (CFSE) in the octahedral and tetrahedral complexes. Discuss the various factor which affect the crystal field stabilization energy.
2. What are Inner sphere electron transfer reactions? Explain inner sphere reactions with suitable example.
3. What is the Orgel diagram? Gives its limitations. Draw and explain Orgel diagram for  $d^2$  and  $d^9$  electronic configurations.
4. Discuss the any *two* of the following :
  - (a) Base hydrolysis of octahedral complex.
  - (b) Discuss the Cross reaction for the electron transfer reaction with suitable example.
  - (c) What are labile and inert complexes? Explain with the suitable example.
5. Define the term magnetic susceptibility? Give Guoy's method to determine the magnetic susceptibility.

**SECTION-B**  
**(Short Answer Type Questions)**

**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. (4×8=32)

1. What the factors that influences the rate of acid hydrolysis of octahedral complexes?

2. What is the trans effect? Discuss the Pi bonding theory of the trans effect.
  3. What are the charge transfer complexes?
  4. Explain why :
    - (a) Explain the why micro cyclic complexes is more stable than chelate complexes.
    - (b) Why  $[\text{Co}(\text{en})]^{+3}$  more stable than  $[\text{CoF}_6]^{-3}$  while both complexes have same central metal ions.
  5. What are the factors that affect the rates of electron transfer reactions?
  6. Attempt any *two* of the following :
    - (a) Hydration energy.
    - (b) Lattice energy.
    - (c) Microstate.
  7. Discuss briefly  $S_N^1$ CB) mechanism for the reaction :  
$$[\text{Co}(\text{en})_2\text{NH}_3\text{Cl}]^{+2} + \text{OH}^- \rightarrow [\text{Co}(\text{en})_2\text{NH}_3(\text{OH})]^{+2} + \text{Cl}^-$$
  8. Discuss the contribution of orbital magnetic moment.
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