

**K-381**

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Roll No. ....

# **MSCCH-501**

## **Inorganic Chemistry-I**

M.Sc. Chemistry (MSCCH)

1st 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. What is the Valence Shell Electron Pair repulsion (VSEPR) theory ? What is the limitation of the VSEPR theory? Predict the geometry of the  $\text{SF}_4$ ,  $\text{NH}_3$  and  $\text{H}_2\text{O}$  molecules with the help of VSEPR theory.
2. Attempt any *two* :
  - (a) Atomic inversion.
  - (b) What is the reductive elimination?
  - (c) Transition metal allyl complexes.
3. What are the carbonyl compounds? Give the method of preparation and general reactions of carbonyl compounds.
4.
  - (a) Discuss the synthesis, structure and reactions of Grignard reagents.
  - (b) Discuss the sulphur nitrogen compounds.
5. What is the chelate effect? Explain why chelate complexes are more stable than the normal coordination complexes. Discuss the various factors which affect the stability of the complex.

## 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 is the bent rule? Give the various application of the bent rule.
2. Write short note on any *two* :
  - (a) Walse Diagram.
  - (b) Oxidative addition reaction.
  - (c) Gilman Reagent.
3. Discuss the structure and bonding in Zeise's salt. Give the application of the Zeise's salts.
4. What are the heteropoly and isopoly acid? Discuss the structure of heteropoly and isopoly acid.
5. Explain the vibration spectra of the metal carbonyl. Discuss the factors which affects the Vibration spectra of the Metal carbonyls.

6. Attempt any *two* :
- (a) Tertiary phosphine ligand.
  - (b) Cyclophosphazene.
  - (c) What is the Metallaborane?
7. What is the Diborane? Discuss the bonding and structure in the Diborane.
8. Discuss the general methods of preparation of transition metal alkyls.
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