

# C110

Total Pages : 3

Roll No. ....

## MSCCH-501

### Inorganic Chemistry-I

M.Sc. Chemistry (MSCCH-21)

1st Semester Examination, 2022 (June)

**Time : 2 Hours]**

**Max. Marks : 80**

**Note :** This paper is of Eighty (80) marks divided into two (02) Sections A and B. Attempt the questions contained in these sections according to the detailed instructions given therein.

### SECTION-A

#### (Long Answer Type Questions)

**Note :** Section 'A' contains Five (05) long answer type questions of Twenty (20) marks each. Learners are required to answer any Two (02) questions only.

(2×20=40)

1. What are metal carbonyls ? Give the classification of metal carbonyls. Suggest any four methods of preparation of metal carbonyls. Discuss structure and bonding of  $[\text{Ni}(\text{CO})_4]$ .

2. "Discuss in details about the factors affecting the stability of metal complexes with reference to the nature of metal ion and ligands.
3. Write notes on any *two* of the following :
  - (a) Bent rule and energetics of hybridization.
  - (b) Metalloborane.
  - (c) Write a note on tertiary phosphine complexes.
4. What is the Valence Shell Electron Pair repulsion (VSEPR) theory ? Write about the shape of  $\text{NH}_3$ ,  $\text{H}_2\text{O}$  and  $\text{SF}_4$  molecules with the help of VSEPR theory.
5. Write short note of the following :
  - (a) What is chelate effect ? How does the chelate effect affect the stability of complexes.
  - (b) Higher boranes.

## SECTION-B

### (Short Answer Type Questions)

**Note :** Section 'B' contains Eight (08) short answer type questions of Ten (10) marks each. Learners are required to answer any Four (04) questions only. (4×10=40)

1. Explain vibrational spectra of the metal carbonyls.
2. Give a method of preparation of any isopolymolybdate.

3. Explain stepwise and overall formation in complex formation with example.
  4. Describe the any one method for the determination of binary formation constant of the complexes.
  5. What is organocopper compounds ? Give any two uses of organocopper compounds in organic synthesis.
  6. Discuss general methods of preparation of transition metal alkyls.
  7. What are mononuclear, Dinuclear and Polynuclear carbonyl complexes ?
  8. Write short note on any two :
    - (a) Define the term Carborane with example.
    - (b) Discuss  $sp^3d$  and  $sp^3d^2$  hybridisation with suitable example.
    - (c) Phosphazenes.
-

