

A-0549

Total Pages : 4

Roll No.

MSCCH-501

M.Sc. Chemistry (MSCCH)

(Inorganic Chemistry-I)

1st 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.

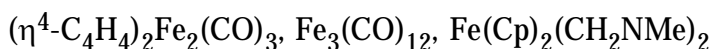
1. What are metal carbonyls ? Give the classification of metal carbonyls. Suggest any four methods of preparation of metal carbonyls. Discuss the structure and bonding of $[\text{Ni}(\text{CO})_4]$.
2. Define the chelate effect and discuss why metal complexes formed with chelating ligands, are more stable than those formed with monodentate ligands. How does the chelate effect affect the stability of complexes ?
3. (a) Use the VSEPR theory to describe the structure of a triatomic and penta-atomic molecule.
(b) Discuss the method of Job's plot and how it can be used to determine the stoichiometry of the complex and its formation constant.
4. Explain the structure and bonding of higher boranes and carboranes. How are these compounds prepared, and what are their properties ?
5. What are the sulfur nitrogen compounds ? Discuss the structure and bonding in Sulfur Nitrogen Compounds.

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. Give a method of preparation of any isopolymolybdate.
2. What is the Walsh diagram ? Draw and discuss the Walsh diagram.
3. What is the 18-electron rule ? Find out the 18-electron for the complexes :



4. Explain the Insertion reaction. What is the difference between insertion and migratory insertion ?
5. What is the $d\pi\text{-}p\pi$ bond ? explain the $d\pi\text{-}p\pi$ with a suitable example.
6. Attempt any *two* of the following :
 - (a) What are the nitrosyl compounds
 - (b) Hapticity of the ligand
 - (c) Dinitrogen compounds

7. Explain back-bonding in transition metal complexes of triphenyl phosphenes.
8. Discuss the bonding and structure in the Diborane.
