

A-0980

Total Pages : 3

Roll No.

MSCCH-501

M.Sc. Chemistry (MSCCH)

Inorganic Chemistry-I

Examination February, 2026

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)

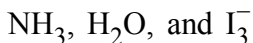
Note :- Section 'A' contains Five (05) Long-answer type questions of Nineteen (19) marks each. Learners are required to answer any *two* (02) questions only.

A-0980

(1)

P.T.O.

1. What is the Valence Shell Electron Pair Repulsion (VSEPR) theory ? Use this theory to predict the geometry and shape of the following molecules :



2. What are metal clusters ? Explain how metal clusters are classified, and describe the structure of the $[\text{Re}_2\text{X}_8]^{2-}$ metal cluster.
3. Mention any three methods used for the preparation of Iron(0) pentacarbonyl, $\text{Fe}(\text{CO})_5$. Also, explain the structure and bonding of $\text{Fe}(\text{CO})_5$.
4. What is meant by the chelate effect ? Why are chelate complexes generally more stable than normal coordination complexes ? Discuss the factors that affect the stability of a complex compound.
5. What are organometallic compounds ? Explain the preparation, structure, and applications of the Grignard reagent.

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 is the $d\pi-p\pi$ bond ? Explain the $d\pi-p\pi$ with a suitable example.
2. Discuss the structure and bonding in Zeise's salt. Give the application of Zeise's salts.
3. What is Diborane ? Discuss the bonding and structure of diborane.
4. What is the atomic inversion ? Discuss the atomic inversion by taking nitrogen and phosphorus as examples.
5. Explain stepwise and overall formation in complex formation with examples.
6. What are phosphonitrilic compounds ? Discuss the synthesis of cyclophosphazenes.
7. Discuss the general methods of preparation of transition metal alkyls.
8. Attempt any two of the following :
 - (a) Tertiary phosphine ligand
 - (b) Cyclophosphazene
 - (c) STYX number
