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Roll No.

MSCCH-501

Inorganic Chemistry-I

M.Sc. Chemistry (MSCCH)

1st Semester Examination, 2023 (June)

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 answer 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. Give the any three method of preparation for the Iron(0) pentacarbonyl ($\text{Fe}(\text{CO})_5$). Discuss the structure and bonding in ($\text{Fe}(\text{CO})_5$).

2. What is the Valence Shell Electron Pair repulsion (VSEPR) theory ? Predict the geometry of the XeOF_4 , IF_7 and XeO_2F_2 molecules with the help of VSEPR theory.
3. What are the metal clusters ? Classify the metal clusters. Explain the structure of the $[\text{Re}_2\text{X}_8]^{2-}$ metal Clusters.
4. Attempt any *two* :
 - (a) Wade's rule.
 - (b) Thermodynamic and kinetic stability.
 - (c) What is the chelate? Discuss the factors which affect the stability of the chelate.
5. What is the organometallic compound? Discuss the synthesis, structure and uses of the Grignard Reagent.

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. What are phosphonitrilic compounds? Discuss the synthesis of cyclophosphazenes.

3. Write short note on any *two* :
- (a) Walse Diagram.
 - (b) Organolithium compounds.
 - (c) Gilman Reagent.
4. What is the 18-electron rule ? Find out the 18-electron in the $\text{Fe}_2(\text{CO})_9$, $\text{Fe}_3(\text{CO})_{12}$ and $\text{Cp}_2 - \text{Rh}_2 (\mu - \text{NHMe})_2$ complexes.
5. Discuss the structure and bonding in Zeise's salt. Give the application of the Zeise's salts.
6. Find out the STYX number of the Borane B_2H_6 , B_4H_6 , B_2H_4 and B_4H_8 .
7. Identify the shapes of the molecules IF_5 , PH_3 , XeF_4 and SnCl_2 by using the concepts of the VSEPR theory.
8. What are the higher Borane? Classify the Higher borane with suitable example.
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