

Your Roll No. :-----

DEPARTMENT OF CHEMISTRY, SCLS
B.Sc. – M.Sc. INTEGRATED PROGRAM IN CHEMISTRY
SEMESTER-IV EXAMINATIONS-2022

PAPER CODE: BCH-CC13 TH

PAPER TITLE: INORGANIC CHEMISTRY IV, ORGANOMETALLIC CHEMISTRY
(Write your Roll No. at the top immediately on receipt of this question paper)

Time: Three Hours

Maximum Marks: 75

Q 1. Attempt all the following:

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| (a) What is hapticity? Give examples of ligands with hapticity 2, 3 and 5. | 2 |
| (b) What is 18 electron rule? | 2 |
| (c) Define solubility product. | 2 |
| (d) What is qualitative analysis? How does it differ from the quantitative analysis? | 2 |
| (e) Give two methods of preparation of ferrocene. | 2 |
| (f) Why cis-platinum complex is active as anticancer agent not trans? | 2 |
| (g) Name the diseases that appear due to zinc deficiency. | 2 |
| (h) What is Wilkinson's catalyst? | 1 |

Q 2. Attempt any three of the following:

(3X5 = 15)

- (a) How will you distinguish between NO_2^- and NO_3^- ions?
- (b) Define common ion effect and give its importance in qualitative analysis of cation.
- (c) Give the chemistry of separation of IIA and IIB groups of cations.
- (d) Discuss the theory of removal of phosphate in group III qualitative analysis.
- (e) Describe the role of NH_4OH in Group III and Group V of the qualitative analysis of basic radicals of these groups.

Q 3. Attempt any three of the following:

(3X5 = 15)

- (a) Discuss the structure of $\text{Fe}_3(\text{CO})_9$ and $\text{Mn}_2(\text{CO})_{10}$.
- (b) Explain the structure of Zeise's salt.
- (c) Describe synergic effect with example. Also give evidence of this effect.
- (d) Give the general methods of preparations of metal carbonyls of 3d series.
- (e) Write the important reactions of ferrocene.

Q 4. Attempt any three of the following:

(3X5 = 15)

- (a) Explain the mechanism of Na^+/K^+ pump.
- (b) Discuss the toxicity induced by heavy metal ions.
- (c) Many Chelating agents show antiviral activity, discuss.
- (d) How does myoglobin differ from hemoglobin in its function?
- (e) How is iron stored in the human body by ferritin and released from it?

Q 5. Attempt any three of the following:

(3X5 = 15)

- (a) Discuss the classification of organometallic compounds in terms of bond type.
 - (b) Give the mechanism of peptide hydrolysis by carboxypeptidase.
 - (c) Describe the mechanism of polymerization of alkene using Zeigler-Natta catalyst.
 - (d) Briefly explain Fischer Tropsch reaction.
 - (e) Explain the π acceptor behaviour of CO through the molecular orbital diagram.
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