

M.Sc. 4th Semester, (CBCS Scheme)

Examination, May-2023

CHEMISTRY

Paper - 17CHE24GA1

Inorganic Special-IV

Time allowed : 3 hours]

[Maximum marks : 80

Note: Attempt five questions in all, selecting one question from each section. Q. No 1 is compulsory. All questions carry equal marks.

1. (a) Give one method of preparation of transition metal alkyls.
- (b) Define Homoleptic and Heteroleptic metal hydrocarbyls.
- (c) What are sandwich compounds?
- (d) What are Nucleophilic carbene ligands? Give one example.
- (e) How will you distinguish between η^1 allyl and η^3 allyl complexes?

- (f) What is carbonyl scrambling?
- (g) What is Ziegler-Natta catalyst and where it is used?
- (h) Distinguish between carbyne and alkylidyne complexes.

Section-A

2. Define organometallic compounds. Give their classification based on haptacity and nature of M-C bond with suitable examples. 16
3. (a) Discuss the various decomposition pathways of transition metal alkyls. How can these reactions be inhibited? 10
- (b) Write down the synthetic applications of organocopper compounds. 6

Section-B

4. (a) What are the metal-alkyne complexes? Differentiate the different types of bonding in detail in these complexes with one example of each. 12

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(b) Give some general methods of preparations of metal alkene complexes. 4

5. (a) How many types of allyl complexes are present? Give various methods of preparation of η^3 -allyl complexes. 8

(b) Show how the magnetic properties of metallocenes are determined by molecular orbital diagram of ferrocene. 8

Section-C

6. (a) Write down methods of preparation, structure and bonding of heteronuclear carbene complexes. 10

(b) Give important reactions of Schrock carbene complexes. 6

7. (a) Explain bonding and important reactions of metal carbyne complexes? 10

(b) Give methods of preparation of alkylidyne complexes 8

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Section-D

8. (a) Discuss the mechanism of hydrogenation of alkenes using Wilkinson Catalyst. 8

(b) Explain the fluxional character in the complexes of cyclopentadienyl. 8

9. (a) Describe the mechanism of aerial oxidation of propene in the presence of PdCl_2 and CuCl_2 in dil. HCl . 8

(b) Discuss the fluxional behaviour of organometallic compounds with special reference of σ bonded cyclic alkenes. 8

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