

Unit IV

7. (a) Discuss reductive elimination and insertion reaction in detail. **10**
(b) Describe Monsanto process and oxo-process. **10**
8. (a) Discuss homogeneous catalytic hydrogenation in detail. Also discuss hydroformylation of olefins. **10**
(b) Describe the role of Zeigler-Natta catalysts and Wilkinson catalyst in various catalysis processes. **10**

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DD291

M. Sc. EXAMINATION, May 2019

(Fourth Semester)

(B. Scheme) (Main & Re-appear)

CHEMISTRY

CH602B

Inorganic Special-IV (Organometallic Chemistry)

Time : 3 Hours]

[Maximum Marks : 100

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) Discuss various methods of preparation and properties of nitrosyls of transition metal complexes. **10**
(b) Explain the different types and routes of synthesis of transition metal aryls. **10**
2. (a) Compare the stability of alkyls and aryls of transition metals. Also discuss the various decomposition pathways. **8**
(b) Write short notes on the following : **12**
 - (i) Bonding modes of transition metal carbonyls
 - (ii) Application of $18e^-$ rule.

Unit II

3. (a) Discuss nature of bonding and structural features of transition metal alkene complexes. **10**
(b) Explain structural features of ferrocene and write its important reactions. **10**

4. (a) Describe nature of bonding in transition metal allyl and alkyne complexes. **10**
(b) Discuss IR and NMR spectral techniques used for structure elucidation of transition metal arene complexes. **10**

Unit III

5. (a) Discuss the various methods of preparation, structure and bonding of Fischer type carbene complexes. **10**
(b) Explain the following : **5,5**
 - (i) Rotation of ligands on metals
 - (ii) Ligand scrambling on metals.
6. (a) Discuss fluxionality and dynamic equilibrium in s-bonded and p-bonded cyclic alkenes. **10**
(b) Write down the major differences between Fischer type and Schrock type carbene complexes. **10**