

Roll No.

Total Pages : 03

LMDQ/D-23

6535

INORGANIC CHEMISTRY SPECIAL-II
CHEM-305

Time : Three Hours]

[Maximum Marks : 60

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

Section A

1. (a) Explain the synthesis of σ -bonded organometallic compounds by metal alkene nucleophile interaction and elimination reactions. **8**
- (b) Define in brief about the fluxionality in organometallic compounds. **4**
2. (a) Write the reactions of organo-copper compounds with α , β -unsaturated carbonyls and epoxides with mechanism. **8**
- (b) Explain the β -hydrogen elimination decomposition pathway in σ -bonded organometallic compounds. **4**

Section B

3. (a) Discuss the structure and bonding in Schrock type carbene complexes. **6**

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- (b) Give any *three* methods of preparation of metal hydrides. **6**
4. (a) Differentiate between Fischer and Schrock type carbene compounds. **6**
- (b) Give any *three* methods of preparation of Fischer carbene complexes. **6**

Section C

5. (a) Complete the following reactions : **6**
- (i) $\text{Mn}(\eta^5\text{-C}_5\text{H}_5)_2 \xrightarrow{3\text{CO}}$
- (ii) $\text{Mn}(\eta^5\text{-C}_5\text{H}_5)_2 \xrightarrow{2\text{H}_2\text{O}}$
- (iii) $\text{Ni}(\eta^3\text{-C}_3\text{H}_5)_2 \xrightarrow{\text{CO}_2}$
- (b) Give any *three* methods for the synthesis of transition metal cyclopentadienyls. **6**
6. (a) Give any *two* methods of preparation of η^2 -alkene metal complexes. **6**
- (b) Write *three* reactions of η^2 -alkyne metal complexes with electrophiles. **6**

Section D

7. (a) Explain the mechanism of hydrogenation of alkene using Wilkinson catalyst. **6**

- (b) Discuss the hydroformylation of alkene by using Rhodium catalyst. **6**
8. (a) Write a brief note on the activation of C-H bond. **6**
- (b) Give the mechanism of polymerization of propylene using Zeigler-Natta catalyst. **6**