Roll No. .....

78051

M. Sc. (Chemistry) 4th Semester Examination – December, 2014

INORGANIC SPECIAL - IV

Paper : CH- 504 XIV

Time : Three Hours] *[Maximum Marks : 80*

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

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

1. (a) Define hapticity with suitable example.

(b) Differentiate between Homoleptic and Heteroleptic Organometallic Compounds.

(c) How the Zeise salt is prepared ?

(d) What are Sandwich and Half Sandwich Compound ?

(e) What are electrophilic carbene legands ?

(f) Define singlet and triplet carbene.

(g) Write the conditions under which organometallic compound can act as catalyst.

(h) Which catalyst is used for hydroformylation reaction ? Write the formula. $2 \times 8 = 16$

SECTION – A

2. (a) Discuss general methods of preparation of σ – bonded transition metal hydrocarbyls. 10

(b) Write note on the following :– 6

(i) 18 e^- rule,

(ii) Cluster compounds.

3. (a) Why transition metal aryls are more stable than corresponding alkyls ? Explain. 8

(b) Discuss the application of organo-copper compounds in organic synthesis. 8

SECTION – B

4. (a) Explain bonding in transition metal-alkene complexes with suitable example. 10

(b) Write down the stoichiometric reactions of transition metal alkene complexes. 6

5. (a) What are Enyl complexes and how such ligands can bind to metals ? Describe modes of bonding in these complexes. 10

(b) Give a brief account of various methods for the synthesis of transition metal alkyne complexes. 6

SECTION – C

6. (a) What are Nucleophilic carbene ligands ? Give the various methods of preparation of their complexes. 8

(b) Discuss the bonding in Schrock type metal - carbene complexes. 8

7. (a) What are transition metal- alkylidyne complexes ? Explain structure, bonding and important reactions of these complexes. 12

(b) Write down synthesis and synthetic applications of Tebbe's reagent. 4

SECTION – D

8. (a) Discuss the mechanism of polymerisation of alkene using Ziegler Natta - Catalyst. 8

(b) What do you mean by legend Scrambling on metals ? Discuss with the help of suitable examples. 8

9. (a) Discuss the fluxionality in η^3 - allyl complexes. 8

(b) Discuss the mechanism of process of oxidation of alefins. 8