PC-1732/M

L-7/2050

CHEMISTRY OF ORGANOMETALLIC COMPOUNDS-411

(Semester–IV)

Time : Two Hours] [Maximum Marks : 55

Note : Attempt any *four* questions. All questions carry equal marks.

I. (a) Write the IUPAC name of the following compounds:

(i) $[Nb_2(CO)_{12}]$.

(ii) $[W(CH_3CO)Cl_{12}(CO)_4]$.

(b) Find out the number of metal-metal bonds in the following complexes:

(i) $[Fe_3(CO)_{12}]$.

(ii) $[Mn_2(CO)_{10}]$.

(c) Explain the effect of metal hydrogen interaction on the stability of C–H bond.

II. (a) Write the correct chemical formula of the following organometallic complexes:

(i) di-chloro(n-butyl)magnesium.

(ii) bromo-di-iodo(ethene)platinum.

(b) With the help of appropriate calculations find out the complex following the 18 electron rule, from the followings: (i) $[Co(NH_3)_6]^{3+}$ (ii) $[Fe(CO)_4(PPh_3)]$

(c) Discuss the formation and application of borohydride compounds.

III. (a) Describe with the help of chemical reactions, how the reaction of C_5H_5 ring in ferrocene will differ from free C_5H_5 group?

(b) Give the preparation of (i) monocyclopentadienyl and (ii) carbocyclic -π-complexes.

IV. (a) With the help of chemical reactions, give the preparation and properties of transition metal complexes with alkenes and alkynes.

(b) Describe the main difference between Fisher and Schrock carbine with the help of chemical equation.

V. (a) Discuss the mode of action of the catalyst involved in hydroformylation reaction of unsaturated compounds.

(b) What do you understand by supported homogeneous catalyst? How it is different from the conventional homogeneous catalysts, explain.

VI. (a) Discuss the reductive carbonylation of alcohols with the help of catalyst involved.

(b) Write note on hydrosilation of unsaturated compounds.

VII. (a) With the help of chemical equation, give the synthesis of tertranuclear and polynuclear carbonyls.

(b) With the help of IR spectroscopy, how will you differentiate between terminal and bridged carbonyl ligand in organometallic compounds, explain?

VIII. (a) What do you understand by fluxional behavior of organometallic complexes? How will you study fluxional property of the molecule, explain?

(b) With the help of chemical reactions, explain the nucleophilic attack on CO in metal carbonyls.

IX. (a) Draw the structure of the catalyst employed in alkene hydrogenation.

(b) If complex $(CO)_5Mn(C_3H_5)$ is following the 10 electron rule, find out the hapticity of C_3H_5 ligand.

(c) How will you differentiate between a bridged and terminal carbonyl in metal carbonyls.

(d) What do you understand by carbonylate anions, explain?

(e) How will you predict the molecular symmetry with the help of number of IR bands?

(f) Give an example of photochemical reaction of metal carbonyls.

(g) Explain the oxygen transfer from NO_2 group.

(h) Give the synthesis of a complexes involving hydrogen bridge.

(i) What do you understand by sandwich compounds, explain with the help of an example,

(j) What is oxo process, explain?

(k) Write the chemical equation involved in the synthesis of monohydrido complexes.