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AG—151—2018

FACULTY OF SCIENCE

M.Sc. (Third Semester) EXAMINATION

OCTOBER/NOVEMBER, 2018

(CBCS Course)

INORGANIC CHEMISTRY

Paper XVII (CH-533/1)

(Organo-metallic Chemistry)

(Friday, 30-11-2018) **Time : 2.00 p.m. to 5.00 p.m.**

Time—Three Hours *Maximum Marks*—75

N.B. :— (*i*) Attempt *All* questions.

(*ii*) *All* questions carry equal marks.

1. Solve any *three* out of five : 15

(*a*) Describe salient features of 18-electron rule.

(*b*) Describe properties of unsaturated organic ligand.

(*c*) Discuss the synthesis of Fischerk carbene complexes.

(*d*) Write detailed preparations of transition metal allyl complexes.

(*e*) Explain the mechanism of de-insertion reactions.

2. Solve any *three* out of five : 15

(*a*) Enlist various properties of cyclopentadienyl complexes.

(*b*) Discuss the nature of bonds involved in organometallic compounds.

(*c*) Classify the organometallic compounds on the basis of their physical properties.

(*d*) Discuss the chemistry of metal nitrosyl complexes.

(*e*) Explain the structure of chromium butadiene complex.

P.T.O.

3. Answer the following :

(*a*) Explain the insertion reaction with suitable example. 8

(*b*) Describe the structure of Schrock complexes. 7

Or

(*a*) Describe the formation of iron complexes with carbonyl molecules. 8

(*b*) Describe the properties of complexes with arene ligand. 7

4. Answer the following :

(*a*) Enlist various physical properties of phosphine complexes. 8

(*b*) Discuss.the mechanism of reductive elimination reactions. 7

Or

(*a*) Discuss the structural chemistry of Zeise's complex. 8

(*b*) Discuss the chemistry of ferrocene. 7

5. (A) Choose the correct option from the given alternatives : 5

1. In ..... a metal catalyses a coupling between two formal radical fragments.

(*a*) coupling reactions

(*b*) addition reactions

(*c*) elimination reactions

(*d*) cyclization reactions

2. ..... of Phosphine ligands is due to P-C σ* anti-bonding orbitals.

(*a*) σ-acidity

(*a*) π-acidity

(*a*) π-basicity

(*a*) σ-basicity

3. Allyl consists of a methylene bridge ($-CH_2-$) attached to a ..... .

(*a*) methyl group

(*a*) phenyl group

(*a*) ethyl group

(*a*) vinyl group

4. A transition metal carbene complex is an organometallic compound featuring a divalent organic ligand ..... .

(*a*) divalent

(*b*) trivalent

(*c*) monovalent

(*d*) tetravalent

5. Fischer carbenes are found with ..... subsituents on the carbene atom.

(*a*) π-acceptor

(*b*) σ-donor

(*c*) π-donor

(*d*) σ-acceptor

(B) Write brief notes on (any *two*) : 10

(*a*) Schrock complex

(*b*) Nucleophilic attack

(*c*) Cylcobutadiene complexes.