# AF-3518

M.Sc. (Final)
Term End Examination, 2017-18

## CHEMISTRY

Group - A (I)

Paper - III

Organotransition Metal and
Photo-Inorganic Chemistry

*Time* : Three Hours] [*Maximum Marks* : 100
[*Minimum Pass Marks* : 36

**Note** : Answer **five** questions in all, selecting at least **two** questions from each Section. All questions carry equal marks.

### Section-A

**1.** (*a*) Describe routes of synthesis of alkyls or aryls of transition metal.

(*b*) Write a brief note on decomposition pathway of organo-copper compounds.

**2.** (*a*) Discuss the synthesis of transition metal-carbyne complexes.

(*b*) Explain the nucleophilic nature of the carbon in Alkylidene complexes by taking suitable example.

**3.** Write a brief note on any **two** of the following :

(*a*) Reactions of cyclopentadienyl transition metal complexes

(*b*) Preparations of trienyl complexes

(*c*) Nucleophilic addition to diene complexes

(*d*) Structure of transition metal allyl complexes

**4.** Explain in brief any **two** of the following :

(*a*) Distinguishing features between catalytic and stoichiometric reagents

(*b*) Oxopalladation reactions

(*c*) Homogenous catalytic hydrogenation

(*d*) Activation of C–H bond

**5.** (*a*) Discuss in brief the transition metal compounds with bond to hydrogen.

(*b*) Give a brief idea about classification of fluxional organometallic compounds.

## Section-B

**6.** Write short notes on any **two** of the following :

(*a*) Photochemical Laws

(*b*) Primary and Secondary process

(*c*) Radiative and non-radiative processes

(*d*) Quantum yield

**7.** (*a*) Explain the biomolecular deactivation quenching.

(*b*) Explain how the dipole moment is related to acid-base strengths in photochemical reactions.

**8.** (*a*) Distinguish between the photooxidation and photoreduction reaction.

(*b*) Describe the equation for redox potential of the excited states.

**9.** (*a*) Explain the role of spin-orbit coupling on life time of $[Fe(bipy)_3]$ complex.

(*b*) Discuss the applications of redox processes of electronically excited states for catalytic purposes.

**10.** Write short notes on any **two** of the following :

(*a*) Zero vibrational levels of ground and excited states

(*b*) Transformation of low energy reactants into high energy products

(*c*) Role of electron relay on excimers and exciplexes

(*d*) Role of metal oxides as metal complex sensitizers

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