

M.Sc Chemistry, 4th Semester
(2720)

Paper: Course-XXIII

Advanced Inorganic Chemistry

Time Allowed: 2 hrs.

Max. Marks: 75

Note: Attempt any four questions. All questions are of equal marks.

1. a) Mention the Adamson's role in photoinorganic chemistry. (5)
- b) Discuss the photosubstitution reactions of Rh(III) ammine and Ru-polypyridyl Complexes in brief. (10)
- c) Explain flash photolysis and its importance. (3 $\frac{3}{4}$)

2. a) Explain basic principles of photochemical processes (3 $\frac{3}{4}$)
- b) Discuss the different types of excited states involved in photochemistry of Cr(III) polypyridyl compounds. (10)
- c) Explain Kasha's rule and Thexi state in detail. (5)

3. a) Discuss the important features of photosynthesis in plants and Bacteriochlorophyll photosynthesis with Mechanism. (7 $\frac{1}{2}$)
- b) Discuss the methods involved for the characterisation of Metal hydride complexes. (11 $\frac{1}{2}$)

4. a) Write a note on molecular hydrogen compounds giving examples. (9 $\frac{1}{2}$)
- b) What are the different types of photoreactors involved in Solar energy conversion. (9 $\frac{1}{2}$)

(2)

5. a) How would you show experimentally that an insertion reaction require CO already co-ordinated to metal of incoming ligand is also CO. (10)
- b) Discuss in detail the mechanism involved in oxidative addition of some specific Molecules. (8 $\frac{3}{4}$)
6. a) What is alkane activation? Give in detail the reactions of free hydrocarbons. (8 $\frac{3}{4}$)
- b) Discuss insertion reactions of SO₂, NO₂ and C-C unsaturated compounds. (10)
7. a) How will you convert Acetic Acid into propanoic acid using Co₂(CO)₈ Catalyst. (7 $\frac{1}{2}$)
- b) How will you convert Methanol to ethanol using Fe(CO)₅ Catalyst. (7 $\frac{1}{2}$)
- c) Define Metathesis? Name Catalyst used for Metathesis of alkene and give Mechanism. (3 $\frac{3}{4}$)
8. a) Give Mechanism of hydroformylation of ethylene using Cluster Anion as Catalyst. (5)
- b) How will you get oxalate esters? What is use of oxalate esters. (5)
- c) Using Wilkinson's Catalyst how will you convert ethene to ethane via dihydrido intermediates. Give Mechanism. (5)
- d) How will you convert ethylene into ethanol using PdCl₂ and CuCl₂ in HCl. (3 $\frac{3}{4}$)

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