



MANAV RACHNA UNIVERSITY
DEPARTMENT OF CHEMISTRY
"T3, Examination, June 2018"

Semester: II
Subject: Inorganic Chemistry-II
Branch: Chemistry
Course Type: Core
Time: 3 Hours
Max.Marks: 100

Date of Exam: 15/05/2018
Subject Code: CHH508
Session: I
Course Nature: Hard
Program: M.Sc.

Signature: HOD/Associate HOD: *Megha*

Note: Attempt any two questions from Section A (20 Marks). Attempt any two questions from Section B (40 Marks) and two questions from Section C (40 Marks)

PART A

Q1. (a) Write mechanism of aquation for $[\text{Co}(\text{NH}_3)_5\text{Cl}]^{+2}$ and $[\text{Co}(\text{en})(\text{NH}_3)_3\text{Cl}]^{+2}$. Compare their rate of reactions. (5)

(b) Why outer orbital complexes prefer to follow S_N^1 reactions and are labile in nature. (5)

Q 2. (a) Use the trans effect series to suggest synthetic route to cis and trans $[\text{PtCl}_2(\text{NH}_3)_2]$ from $[\text{Pt}(\text{NH}_3)_4]^{+2}$ and $[\text{PtCl}_4]^{-2}$. (5)

(d) What are electron transfer reactions. Compare the mechanisms of Outer Sphere and Inner Sphere. (5)

Q 3. (a) Compare the rate of electron transfer reactions in $[\text{Ru}(\text{NH}_3)_6]^{+2}$ and $[\text{Co}(\text{Phen})_3]^{+2}$. (5)

(b) How does polarizability and conductivity of ligand and Frank Condon energy affects rate of electron transfer reactions. (5)

PART B

Q. 4 (a) Comment upon catalytic efficiency and turnover frequency. (5)

(b) What are the various generations of Grubb's catalyst. How they are developed. (5)

(c) Explain hydrogenation of alkene by using Wilkinson's catalyst. What happens if in place of phenyl phosphine, alkyl phosphine ligand is used in catalyst. (10)

Q.5 (a) What is hydroformylation. Which catalyst can be used in this reaction. Explain detailed mechanism. (5)

(b) Explain catalytic applications of zeolite in chemical industries. (5)

(c) Explain mechanism of Wacker Oxidation of alkenes. What is the importance of copper in the reaction. (10)

Q 6. (a) Explain methanol carbonylation by using rhodium catalyst. (5)

(b) Explain electrocatalysis and Fischer Tropsch Synthesis with suitable example. (5)

(c) What is hybrid catalysis. Explain various processes where hybrid catalyst systems are used with relevant examples. (10)

PART C

Q 7 (a) Write a detailed note on electronic transition. (5)

(b) Describe Kerr effect and its applications. (5)

(c) Explain the phenomenon of polarization. What are the different ways for polarization of light. (10)

- Q 8 (a) What is optical rotator power. How it is calculated. (5)
(b) Explain birefrigerance and circular birefrigerance with suitable examples. (5)
(c) What do you understand by ORD and CD techniques. Explain the similarities and differences in both. (10)
What are the various information which can be obtained from these techniques.

- Q 9 (a) Explain Cotton effect and its applications. (5)
(b) Explain Faraday Effect and its application. (5)
(c) How ORD and CD is helpful is assigning absolute configuration of molecules. How CD spectra is useful in the structural elucidation of protein molecule. (10)