

Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 3

P1894

[5323] - 307

M.Sc. - II

INORGANIC CHEMISTRY

**CHI-330: Inorganic Reaction Mechanism, Photochemistry and
Magnetic Properties of Coordination Compounds
(2013 Pattern) (Semester - III) (4 Credit)**

Time : 3 Hours]

[Max. Marks : 50

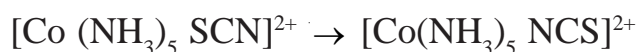
Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Use of calculator is allowed.*

Q1) Attempt the following:

[20]

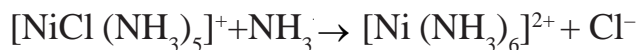
- a) Four coordinated tetrahedral or square planer complexes reacts faster than six coordinated octahedral complexes. Explain.
- b) Thermodynamically stable complexes could be kinetically inert or labile. Illustrate with suitable example.
- c) How does following modifications affects the rate of substitution reactions in square planer complexes.
 - i) Adding bulky substituent to the cis ligand.
 - ii) Increasing positive charge on metal complex.
- d) Suggest the mechanism for following reaction.



- e) List out the characteristics of outer sphere electron transfer reactions.

P.T.O.

- f) Which of the following octahedral substitution reaction is faster? Why?



- g) List out the reactions coordinated ligands.
- h) Describe the phenomenon of phosphorescence.
- i) Find out the R.S. term symbol for Cr^{2+} & Cu^{2+}
- j) What do you mean by magnetically dilute and concentrated systems.

Q2) Answer the following: (Any Two)

[10]

- a) Differentiate between intimate and stoichiometric mechanism.
- b) How isotope labelling technique is used in studying the kinetics and mechanism of the reactions.
- c) What is base hydrolysis? Explain with suitable example.
- d) What do you mean by quenching of orbital angular momentum. Provide explanation by VBT and CFT for the same.

Q3) Attempt the following: (Any Two)

[10]

- a) Discuss the mechanism of cis-trans isomerism in octahedral complexes with suitable example.
- b) Explain the nucleophilic behaviour of coordinated ligand.
- c) Discuss the mechanism of inner sphere electron transfer reaction with suitable example.
- d) Predict the magnetic exchange which occurs via the 90° exchange pathway in the system $d^1 - d^1$, $d^2 - d^2$, $d^3 - d^3$, $d^8 - d^8$, and $d^9 - d^9$.

Q4) Write a note on (Any Two):

[10]

- a) Methyl migration and CO insertion reactions.
- b) Applications of photochemic reactions of coordination compounds.
- c) Complementary and Non complementary reactions.
- d) Magnetic properties of mixed valence compounds.

EEE