LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**M.Sc.** DEGREE EXAMINATION - **CHEMISTRY**

THIRD SEMESTER – NOVEMBER 2010

# CH 3809 - COORDINATION CHEMISTRY

Date : 01-11-10 Dept. No. Max. : 100 Marks

Time : 9:00 - 12:00

# Part – A

*Answer* ***all*** *the questions (10 x 2 = 20)*

1. What are (i) CFSE and (ii) CFSP?
2. What is electro neutrality principle? What is its significance?
3. Derive ground state term for Co[III] ion. How is it split in the presence of ligand field?
4. What is is nephelauxetic effect? What is its significance?
5. What is the principle of ORD?
6. What is photoisomerisation reaction? Cite an example.
7. Name the orbitals of the central atom/ion in a coordination compound which can form (i) sigma and (ii) pi bonds.
8. What is the nature of intermolecular interactions in supramolecular asssemblies.
9. What is ESCA?
10. What are cupredoxins?

# Part – B

*Answer any* ***eight*** *questions (8 x 5 = 40)*

1. What is Wilkinson catalyst? What type of reaction can make use of this catalyst?
2. State Jahn-Teller theorem. Which are the d-electron configurations prone for large Jahn-Teller distortions.
3. Why is [Mn(CO)5] unstable, whereas its dimer is stable?
4. Explain any one of the failures of valence bond theory.
5. What are the assumptions of Crystal Field Theory? Why are they considered to be wrong?
6. Explain optical isomerism in octahedral coordination compounds citing examples.
7. How is IR spectroscopy useful in understanding back-bonding in carbonyl compounds.
8. Explain the nature of bonding in cyclic alkene- metal compleses with an example.
9. How is a Tanabe-Sugano diagram different from an Orgel diagram?
10. Account for the high intense colour of KMnO4 and low intense colour of MnSO4.
11. Explain the role of photosystem I and photosystem II in photosynthesis.
12. Briefly explain the use of some essential elements in a human body.

# Part – C

*Answer any* ***four*** *questions. (4 x 10 = 40)*

1. Explain the formation of a square planar complex using CFT with a neat energy-level diagram.
2. Discuss some evidences for CFSE.
3. Discuss associative and dissociative mechanisms for substitution reactions of octahedral and square planar coordination compounds.
4. Discuss factors affecting rate of an electron transfer reactions.
5. Explain the use of coordination compounds as industrial catalysts.
6. Describe the nature of different types of copper present in proteins.

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