 LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

THIRD SEMESTER – APRIL 2011

# CH 3809/3802 - COORDINATION CHEMISTRY

Date : 12-04-2011 Dept. No. Max. : 100 Marks

Time : 9:00 - 12:00

# PART – A

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

1. What are (i) spin paired and (ii) spin free complexes?
2. What is electro neutrality principle? Give its significance.
3. Derive ground state term for Cr[III] ion. How is it split in the presence of ligand field?
4. What are the d-electron cofigurations which show large Jahn-Teller distortions?
5. What are ambidentate ligands? Cite an example.
6. Account for the high intense colour of KMnO4?
7. Mention some metal containing biological molecules and the metal ions present in them.
8. What are the characteristics of (i) Orgel diagrams?
9. What are cupredoxins?
10. What is Zeigler-Natta catalyst? What type of reaction can make use of this catalyst?

# PART – B

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

1. Why is [Cu(en)3]2+ less stable than [Cu(en)2(H2O)2]2+.
2. Why is [Mn(CO)5] unstable, whereas its dimer is stable?
3. Explain the failure of valence bond theory in explaining square planar complexes of Cu(II).
4. Mention the assumptions of Crystal Field Theory? Why are they considered to be wrong assumptions?
5. Explain optical isomerism in octahedral coordination compounds citing examples.
6. How is IR spectroscopy useful in understanding back-bonding in carbonyl compounds?
7. Explain the nature of bonding in ferrocene.
8. How is a Tanabe-Sugano diagram different from an Orgel diagram?
9. Account for the (i)high intense colour of KMnO4 and (ii)low intense colour of [Mn(H2O)6]2+.
10. What is meant by photosensitiser? Give its application.
11. Briefly explain the use of Na+ and Ca2+ ions in human body.
12. Explain 18-electron rule with one example.

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# PART – C

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

1. Explain the formation of a square planar complex using (i) CFT and (ii) VBT.
2. What is meant by CFSE? Discuss any two evidences for the same.
3. Discuss various mechanisms proposed for substitution reactions of octahedral coordination   
    compounds.
4. Discuss factors affecting rate of an inner sphere electron transfer reactions.
5. Explain the use of coordination compounds as industrial catalysts.
6. Describe the nature of copper containing proteins.

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