LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **CHEMISTRY**

SIXTH SEMESTER – **APRIL 2015**

CH 6613 - COORDINATION CHEMISTRY

Date : 17/04/2015 Dept. No. Max. : 100 Marks
Time : 09:00-12:00

PART -A

Answer ALL the questions **(10 x 2 =20 marks)**

1. Calculate CFSE for $[Co(NH_3)_6]^{2+}$
2. Write the oxidation number and coordination number of Pt in $K_2[Pt(Cl)_4]$
3. What are labile complexes?
4. Draw the structure of $Ni(CO)_4$
5. What is nephelauxetic effect?
6. Mention the applications of radiopharmaceuticals.
7. Define metal template synthesis with a suitable example.
8. Give the biological role of peroxidase.
9. Give an example for complementary electron transfer reaction
10. What is chelate therapy?

PART –B

Answer any EIGHT questions **(8 x 5 = 40 marks)**

11. Write a note on photoredox reactions.
12. What is Trans effect? Mention its applications.
13. Which among the complex ions $[Fe(H_2O)_6]^{2+}$ and $[Fe(H_2O)_6]^{3+}$ is expected to give greater splitting of d orbitals? Explain
14. Discuss the structure and function of carboxypeptidase A
15. How does Zeigler Natta Catalyst catalyze the polymerization of ethylene?
16. State and explain Jahn Teller theorem. Mention any one of its consequences?
17. Explain one experimental evidence in support of covalent characteristics of metal- ligand bond.
18. $[Co(NH_3)_6]^{3+}$ is diamagnetic but $[Co(H_2O)_6]^{3+}$ is paramagnetic. Account for the difference in magnetic properties of these two octahedral complexes using CFT.
19. Explain metal template synthesis of Schiff bases with one suitable example.
20. Discuss the mechanism of inner sphere electron transfer reaction with one example.
21. Describe the structure and bonding in metal alkyls and carbines.
22. Explain the factors which affect the magnitude of crystal field splitting.

PART – C

Answer any FOUR questions **(4 x 10 = 40 marks)**

23. What are π–acceptor ligands? Discuss in detail the nature of bonding involved in $Fe_2(CO)_9$ and $Cr(CO)_6$.

24. Discuss the σ and π metal –ligand bonding in transition metal complexes with reference to octahedral geometry.

25. a) Discuss the biological significance of nitrogen fixation.

    b) Give the importance of contrast agents in MRI.

26. a)Apply the 18 electron rule to a)$V(CO)_6$ b)$[Cu(NH_3)_4]^{2+}$.

    b) Discuss the structure and bonding of ferrocene.

27. Discuss S_N^1 and S_N^2 mechanisms for octahedral complexes.

28. a) Describe with a neat diagram the Crystal Field splitting of d orbitals when a transition metal ion is placed in a tetrahedral field.

    b) Discuss the mechanism of hydrogenation of olefins using Wilkinson's catalyst.

$$$$$$$