LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

SIXTH SEMESTER – **NOVEMBER 2016**

CH 6613 – COORDINATION CHEMISTRY

Date: 15-11-2016 Dept. No. Max. : 100 Marks

Time: 09:00-12:00

PART -A

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

1. Write the oxidation number and coordination number of cobalt in $[Co(NH_3)_6]^{2+}$.
2. What are labile complexes?
3. Draw the structure of $Cr(CO)_6$.
4. What is nephelauxetic effect?
5. Mention the applications of radiopharmaceuticals.
6. Give an example for non-complementary electron transfer reaction.
7. Mention any two Iron-Sulphur proteins
8. What is Zeigler Natta catalyst?
9. Give the biological role of peroxidase.
10. Calculate the CFSE for $K_3[Fe(CN)_6]$.

PART –B

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

11. What is Trans effect? Mention its applications.
12. Write a note on photoisomerisation reactions.
13. $[Mn(H_2O)_6]^{2+}$ is a high spin complex whereas $[Mn(CN)_6]^{4-}$ is a low spin complex. Give reason.
14. Describe the structure and function of carboxypeptidase A.
15. State and explain Jahn Teller theorem with a suitable example. What are its consequences?
16. Give one evidence to show that metal – ligand bonding in coordination chemistry is not purely electrostatic?
17. How many unpaired electrons are present in each of the following complexes
    i. $[CoF_6]^{3-}$ ii. $[Fe(H_2O)_6]^{2+}$ iii. $[Ni(CN)_4]^{2-}$ iv. $[MnCl_6]^{4-}$.
18. Explain metal template synthesis of Schiff bases with suitable examples.
19. Discuss the mechanism of inner sphere electron transfer reaction with suitable examples.
20. Discuss the mechanism of hydrogenation of olefins using Wilkinson's catalyst.
21. What are MRI? contrast agents.
22. Apply 18 electron rule to $Ni(CO)_4$ and $Fe(CO)_5$.

PART – C

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

23. What are π–acceptor ligands? Discuss the nature of M-C bonding in $Ni(CO)_4$ and $Fe_2(CO)_9$.

24. Discuss the σ and π metal –ligand bonding in $[Co(NH_3)_6]^{3+}$with an MO diagram.

25. a) Describe the structure and bonding in i. Metal alkyls ii. Carbenes.

    b) Give the importance of Chelate therapy.

26. a) How does Zeigler Natta Catalyst catalyze the polymerization of alkene?

    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 splitting of d orbitals in the case of $[Fe(H_2O)_6]^{3+}$.

    b) Write a note on the biological fixation of Nitrogen.

****