LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

SIXTH SEMESTER – APRIL 2017

CH 6607- COORDINATION CHEMISTRY

Date: 18-04-2017 Dept. No. Max. : 100 Marks
Time: 09:00-12:00

PART- A

Answer **ALL** questions **10X2 = 20**

1. State Jahn Teller theorem.
2. Mention the coordination number and oxidation state of the central metal ion in $[Co(NH_3)_6]^{3+}$ and $K_3[Fe(CN)_6]$
3. What is non-complementary electron transfer reaction?
4. What are iron – sulphur proteins. Give an example.
5. Mention any two advantages of Ziegler- Natta catalyst.
6. Give the IUPAC name of the following complexes i) $[Co(NH_3)_3(H_2O)_3]Cl_3$
   ii) $[Pt(NH_3)_4]\{PtCl_4]$
7. What is nitrogen fixation?
8. Draw the structure of $Fe_3(CO)_{12}$.
9. What is 18 electron rule in metal complexes? Give an example.
10. Draw the structure of cisplatin and carboplatin.

PART- B

Answer any **EIGHT** questions **8x5 = 40 marks**

11. Explain the structural isomerism found in coordination complexes with suitable example.
12. Discuss Jahn –Teller distortion in d^1-d^{10}, high spin octahedral complexes.
13. Explain the concept of associative and dissociative mechanism for the substitution of Co(III) octahedral complex.
14. Differentiate photo oxidation from photo oxygenation with suitable example.
15. Explain the concept of template effect in the synthesis of macrocyclic ligands.
16. How does Crystal field theory support the variation of ionic size of first row transition elements?
17. What are Vaska's complex? Explain oxidative addition reaction of any one Vaska's complex..
18. Discuss the structure of myoglobin and its significance.
19. Explain Dewar- Chatt- Duncanson model of bonding in Zeise's salt.
20. What are Schiff base complexes? Write a method of its preparation.
21. What is trans effect? Mention its application in the synthesis of isomers of Pt (II) complex of square planar geometry.
22. Explain the biological applications of MRI in mankind.

PART- C

Answer any **FOUR** questions **4x10 = 40 marks**

23. i) Describe the evidence for covalency of M-L bond in complexes. **(3)**

    ii) How does molecular orbital theory explain the bonding between metal and σ-bond forming ligand in octahedral geometry? **(7)**

24. (i) Explain the term, 'spectrochemical series' **(3)**

    (ii) Describe d- orbital splitting in square planar metal complexes. **(7)**

25. Discuss the structure and bonding in ferrocene.

26. Explain the concept of electron transfer in octahedral complexes by inner sphere and outer sphere mechanism using suitable example.

27. (i). How will you prepare stereo regulated polypropylene by Zeigler- Natta catalyst and explain its mechanism. **(5)**

    (ii) Describe the role of metal complexes as a catalyst in the hydroformylation reaction. **(5)**

28. (i)Describe briefly the preparation and characteristics of an alkylidene. **(5)**

    (ii) Carbon monoxide occupies higher position in the spectrochemical serieseventhough it is a neutral ligand.' Explain. **(5)**

****