



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

SIXTH SEMESTER – APRIL 2016

CH 6613 – COORDINATION CHEMISTRY

(FROM 12-BATCH)

Date: 18-04-2016

Dept. No.

Max. : 100 Marks

Time: 09:00-12:00

PART A

ANSWER ALL QUESTIONS:

(10 x 2 = 20 marks)

1. Write the IUPAC name of $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$ and $\text{K}_4[\text{Fe}(\text{CN})_6]$.
2. Mention the coordination number and oxidation state of the central metal atom in $[\text{Ni}(\text{CO})_4]$ and $[\text{Ni}(\text{Cl})_4]^{2-}$.
3. What is meant by atom transfer reaction and provide a suitable example.
4. Mention any two Iron-Sulphur proteins.
5. Mention the advantages of Ziegler-Natta Catalyst.
6. Draw the structure of $\text{Fe}_3(\text{CO})_{12}$.
7. Arrange the following ligands in their increasing order of trans effect. Cl , H_2O , NH_3 and Pyridine
8. What is a Schiff base? Give an example.
9. Mention the oxidation state of Iron in hemoglobin and methemoglobin.
10. Draw the structure of cisplatin and carboplatin.

PART B

ANSWER ANY EIGHT QUESTIONS:

(8 x 5 = 40 Marks)

11. Classify the following as mono or bi or tri or tetra or polydentate ligands. i) aqua ii) oxalato iii) glycinato iv) en v) pyridine vi) thiourea vii) anion of aspartic acid viii) EDTA ix) trien x) ammine.
12. Explain the structural isomerism in coordination complexes with suitable examples.
13. What is Jahn-Teller distortion? Sketch the d orbital spilling when dz orbital are along the path of the incoming ligand.
14. Explain the concept of associative and dissociative mechanism of substitution of Co (III) octahedral complex.
15. Distinguish Photo oxidation from photo oxygenation with suitable example.
16. What is Kurnakov test? Mention its application for any Pt (II) complex of square planar geometry.
17. Explain the concept of template effect in synthesis of macrocyclic ligands.
18. Discuss the structure of myoglobin and its significance.
19. a) Mention the criteria of metals used for Diagnosis and Chemotherapy.
b) Suggest four metals used for the detection of cancer.
20. Explain Dewar-Chatt-Duncanson model of bonding in Zeise's Salt.

21. What is meant by Homogeneous catalysis? What are the advantages of Wilkinson Catalyst over other Homogeneous catalyst?
22. Explain the bonding in ferrocene and indicate the metal orbitals and ligands orbitals involved in bonding with a neat sketch.

PART C

ANSWER ANY FOUR QUESTIONS

(4 x 10 = 40 marks)

23. For the following complexes i) calculate the EAN ii) mention the coordination number iii) Charge on the central metal atom iv) IUPAC name.
 a) $\text{Ni}(\text{CO})_4$ b) $\text{K}_4[\text{Fe}(\text{CN})_6]$ c) $[\text{Ni}(\text{Cl})_4]^{2-}$.
24. a) Explain the following terms. i) Nephelauxetic effect. ii) Spectrochemical series. (4)
 b) Explain the concept of optical isomerism in octahedral complex of type MA_4B_2 , MA_3B_3 and $\text{MA}_2\text{B}_2\text{C}_2$, where M is the central metal atom, A, B and C are neutral monodentate ligands. (6)
25. a) What are the factors influencing the rate of substitution in square planar complexes.
 b) Distinguish Trans effect from Trans influence. (6 + 4)
26. a) How will you prepare stereo regulated polypropylene by Zeigler-Natta catalyst and explain the mechanism.
 b) Why Carbon monoxide ligand occupies higher position in the spectrochemical series even though it is a neutral ligand. (7+3)
27. Explain the concept of electron transfer in octahedral complexes by inner sphere and outer sphere mechanism using suitable example.
28. a) Explain the importance of MRI in biological applications for mankind. (6)
 b) Mention the active site in carboxy peptidase? Mention the role and function of the carboxy peptidase. (4)

-
 \$\$\$\$\$\$