



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

SIXTH SEMESTER – APRIL 2017

CH 6613- COORDINATION CHEMISTRY

Date: 20-04-2017
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

PART -A

Answer ALL the questions

(10 x 2 =20 marks)

1. Calculate CFSE for d^5 , high spin complex.
2. Apply EAN rule to $V(CO)_6$.
3. Predict whether d^2 metal ion has Jahn-Teller distortion or not? Justify your answer.
4. Draw the structure of $Fe(CO)_5$.
5. Give any two characteristics of nitrogenase enzymes.
6. Mention the applications of radiopharmaceuticals.
7. Define metal template synthesis with a suitable example.
8. Give the biological role of myoglobin.
9. What is chelate therapy?
10. Give an example for non-complementary electron transfer reaction.

PART-B

Answer any EIGHT questions

(8 x 5 = 40 marks)

11. Write a note on photoredox reactions.
12. Explain Trans effect with suitable examples.
13. $[Ni(CN)_4]^{2-}$ is diamagnetic, whereas $[Ni(Cl)_4]^{2-}$ is paramagnetic. Explain.
14. Discuss the structure and function of carboxypeptidase A.
15. How does Zeigler Natta catalyst catalyze the polymerization of ethylene?
16. Explain why Cu^{2+} does not form a regular octahedral complex whereas Ni^{2+} does.

17. The order of Δ_o is $[\text{CrCl}_6]^{3-} < [\text{Cr}(\text{NH}_3)_6]^{3+}, [\text{Cr}(\text{CN})_6]^{3-}$. Account for the following observation.
18. Using CFT, show the orbital occupancies for both weak and strong octahedral fields for $\text{Mn}^{2+}, \text{Zn}^{2+}, \text{Fe}^{2+}$ and Co^{2+} . Indicate the number of unpaired electrons in each case.
19. Explain metal template synthesis of Schiff bases with suitable examples.
20. Discuss the mechanism of outer sphere electron transfer reaction with suitable examples.
21. Describe the structure and bonding in i) metal alkyls ii) carbenes
22. Explain the relative affinity of O_2 for haemoglobin.

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 $\text{Fe}_3(\text{CO})_{12}$ and $\text{Cr}(\text{CO})_6$.
24. Discuss the metal –ligand bonding in transition metal complexes with σ -forming ligand of octahedral geometry, using Molecular orbital theory.
25. a) Explain the biological role played by cytochromes.
 b) Give the importance of contrast agents in MRI. **(5+5)**
26. a) Apply 18 electron rule to $\text{Ni}(\text{CO})_4$ and $\text{Cr}(\text{CO})_6$.
 b) Discuss the structure and bonding of ferrocene. **(5+5)**
27. a) What do you understand by nucleophilic substitution mechanism reactions for octahedral complexes?
 b) Discuss associative and dissociative mechanism of ligand substitution for square planar complexes. **(5+5)**
28. a) Giving a neat diagram explain Crystal Field splitting of d orbitals when d^6 (high spin) metal ion is placed in an octahedral field
 b) Discuss the mechanism of hydroformylation reaction. **(5+5)**
