

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

SIXTH SEMESTER – APRIL 2010

CH 6607/CH 6601 - COORDINATION CHEMISTRY

Date & Time: 17/04/2010 / 9:00 - 12:00 Dept. No.

Max. : 100 Marks

PART – A

Answer ALL the questions

(10 x 2=20 marks)

1. Give the number of unpaired electrons in a strong and weak octahedral field for Cr^{2+} .
2. Calculate CFSE value for $[\text{Cr}(\text{H}_2\text{O})_6]^{2+}$.
3. What are noncomplementary electron transfer reactions?
4. Define inner sphere mechanism.
5. What is Trans effect? Give an example.
6. Define metal template synthesis.
7. What is 16 electron rule? Give one example.
8. Draw the structure of $\text{Fe}_3(\text{CO})_{12}$.
9. Mention the advantages of chelate therapy.
10. What are coenzymes? Give an example.

PART – B

Answer any EIGHT questions

(8 x 5 =40 marks)

11. Describe with a neat diagram crystal field splitting of metal d-orbitals in octahedral field.
12. The octahedral complex of $[\text{Cu}(\text{H}_2\text{O})_6]^{2+}$ is distorted. Explain.
13. Explain photo substitution reactions with a suitable example.
14. Discuss the mechanism of outer sphere electron transfer reaction with a suitable example.
15. Explain associative mechanism of ligand substitution reactions in octahedral complexes.
16. Discuss any one theory of Trans effect.
17. Explain metal template synthesis of Schiff bases with suitable examples.
18. Describe bonding in $\text{Fe}_2(\text{CO})_9$.
19. What is nitrogen fixation? Explain.
20. Give the importance of contrast agents in MRI with suitable examples.
21. Discuss the biological role of peroxidases and catalases.
22. What are the experimental evidences for metal-ligand overlapping?

(P.T.O.)

PART – C

Answer any FOUR questions

(4 x 10 = 40 marks)

23. (a) Construct MO energy level diagram for $[\text{Co}(\text{NH}_3)_6]^{2+}$.
(b) Explain crystal field splitting of metal d-orbitals in square planar complexes.
24. (a) Discuss the structure and bonding in (i) metal alkyls (ii) ferrocene.
(b) Explain dissociative mechanism of ligand substitution reaction in octahedral complexes.
25. (a) Explain cis effect with two examples.
(b) Describe the template synthesis of phthalocyanins.
26. (a) Enumerate the biological importance of carboxypeptidase.
(b) Draw the structure of a. $\text{Co}_2(\text{CO})_8$ b. $\text{Fe}_3(\text{CO})_{12}$.
27. (a) Account for the stability of $\text{Fe}(\text{CO})_5$ and $\text{Cr}(\text{CO})_6$.
(b) Construct Metal orbitals and LGO's suitable for σ and Π bonding in octahedral geometry.
28. Explain any two of the following:
a) John – Teller theorem
b) Wilkinson's catalyst
c) Ziegler – Natta catalyst
d) Photoredox reactions.

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