



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – CHEMISTRY

THIRD SEMESTER – NOVEMBER 2016

CH 3809 - COORDINATION CHEMISTRY

Date: 03-11-2016
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

Part-A

Answer ALL questions.

(10 × 2= 20)

1. Why does Cr^{3+} form octahedral complex rather than tetrahedral complex?
2. What is Nephelauxetic effect?
3. What is meant by linkage isomerism of coordination compounds? Give an example.
4. How many peaks are expected for $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$ in the electronic spectrum?
5. Derive the ground term symbol for d^4 electronic configuration.
6. Compute CFSE for d^6 high spin octahedral complexes.
7. Predict whether the octahedral, d^4 metal complexes possess only spin magnetic moment or spin and orbital magnetic moment?
8. What is meant by oxidative addition reaction in metal complexes?
9. Name any two copper proteins.
10. What are the differences between haemoglobin and myoglobin.

Part-B

Answer any EIGHT questions.

(8 × 5= 40)

11. How does crystal field theory explain the formation of high and low spin octahedral complexes?
12. What is Jahn-Teller effect. Explain how does crystal field theory help in predicting distortion of the octahedral complexes with d^{1-10} configuration.
13. Predict the following oxides as spinel or inverse spinel (i) ZnFe_2O_4 (ii) Mn_3O_4
14. How does the ionic size of M^{3+} of first row transition element vary?
15. What is trans effect? How is it useful in synthesizing stereoisomers of metal complexes?
16. How are the stereoisomers of metal complexes differentiated by ORD method?
17. Explain the synergic effect of carbonyl group in forming bond with metal.
18. Write a brief note on Ziegler- Natta polymerization.
19. Briefly explain the possible electronic transitions in transition metal complexes.
20. How are d^1 - d^9 configurations of metal related by hole formulation?
21. Write a brief note on the role of metal complexes in photosynthesis.
22. Discuss the mechanism of oxygen transport by haemoglobin.

Part-C

Answer any FOUR questions.

(4 × 10= 40)

23. How does MO theory explain the formation of $[\text{Co}(\text{NH}_3)_6]^{3+}$ and $[\text{Co}(\text{CN})_6]^{3-}$?
24. Discuss the features of Orgel diagram in explaining the electronic excitation of d^2 , d^8 , d^3 and d^7 tetrahedral and octahedral complexes.
25. Discuss the bonding in ferrocene using molecular orbital theory.
26. Discuss the principles involved in characterizing the EPR spectrum of $[\text{Cu}(\text{salen})_2]^+$ complex.
27. Give a detailed account of inner- and outer sphere electron transfer mechanisms in coordination compounds.
28. Describe the role of carboxypeptidase in the hydrolytic breakdown of protein.
