



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

THIRD SEMESTER – APRIL 2015

CH 921 – COORDINATION CHEMISTRY

Date : 15/04/2015
Time : 01:00-04:00

Dept. No.

Max. : 100 Marks

Part-A

Answer all questions. Each question carries two marks.

(10x2=20)

1. Give the IUPAC name of $[\text{Co}(\text{NH}_3)_3(\text{H}_2\text{O})\text{Cl}_2]\text{Cl}$ and $\text{K}_3[\text{Fe}(\text{CN})_6]$.
2. What is metal template synthesis? Cite an example.
3. Calculate the CFSE for a d^7 metal ion in high- and low spin octahedral geometries.
4. Why is $[\text{Cu}(\text{en})_3]^{2+}$ less stable than $[\text{Cu}(\text{en})_2\text{Cl}_2]$?
5. Derive the ground term for d^6 metal ion.
6. Why does $[\text{Co}(\text{NH}_3)_6]^{2+}$ undergo substitution reaction with water easily in basic medium than in acidic medium?
7. How are terminal and bridging carbonyl groups differentiated?
8. What is oxidative addition reaction? Cite an example.
9. What is nephelauxetic effect?
10. Mention the biological role of cytochromes.

Part-B

Answer any eight questions. Each question carries five marks.

(8x5=40)

11. How does ORD help in determining the absolute configuration of chiral complexes?
12. Explain the mechanism of Ziegler-Natta polymerization.
13. Explain the d -orbital splitting in square planar geometry using crystal field theory.
14. Write a brief note on static and dynamic Jahn-Teller effect.
15. Explain the electronic absorption spectrum of $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$?
16. Why do octahedral coordination compounds hardly follow associative mechanism in substitution reactions?
17. Explain the bonding in ferrocene using molecular orbital theory.
18. Give an account of the organometallic compounds of cyclooctatetraene.
19. Discuss the hydrogenation reaction of alkenes and mention the significance of this reaction.
20. What are CT and LF photochemical reactions? Cite an example each.
21. Explain the Mossbauer spectra of potassium ferrocyanide and potassium ferricyanide.
22. Explain the structure and biological role of superoxide dismutase.

Part-C

Answer any four questions. Each question carries ten marks. (4x10=40)

23. Justify the position of Cl^- and CN^- in the spectrochemical series with the help of MO theory.
- 24a. Explain the electronic spectral features of d^{1-9} metal ions in using Orgel diagrams. (7+3)
- b. Explain the features of Tanabe-Sugano diagrams.
25. Explain the mechanism of inner- and outer-sphere electron transfer reactions with examples.
26. What is *trans*-effect? Explain the influence of *d*- and *p*-bonding ability of ligand in their *trans* effect.
- 27a. Explain the epr spectrum of bis(salicylaldiimine)copper(II). (7)
- b. Explain Kramer's rule. (3)
28. Describe the mechanism of oxygen transport in mammals.
