



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – CHEMISTRY

FOURTH SEMESTER – NOVEMBER 2016

CH 4956 - ADVANCED COORDINATION CHEMISTRY

Date: 16-11-2016
Time: 01:00-04:00

Dept. No.

Max. : 100 Marks

Part-A

Answer ALL questions.

(10 × 2 = 20)

1. What is spectrochemical series?
2. Mention any two advantages of using glassy carbon electrodes as working electrode in cyclic voltammetry.
3. How many absorption bands are expected for Ti^{3+} , octahedral complex?
4. List the significant roles of Ru(II)polypyridyl complexes in solar cell?
5. How is Nephelauxetic effect used to predict the type of bonding in complexes?
6. Highlight the types of photochemical reactions with an example in metal complexes.
7. What is the role of hydrogen bond in supramolecular assemblies?
8. What are rubredoxins? Mention any two functions of rubredoxins.
9. Give an example for macrocyclic complex with crown ether as ligand and specify any one application.
10. How is ^{99m}Tc generated?

Part-B

Answer any EIGHT questions.

(8 × 5 = 40)

11. How is Schiff base macrocyclic metal complex synthesized by template method?
12. How does spin-spin coupling constant of NMR spectrum help in characterizing metal complexes? Explain with an example
13. Describe the possible electronic excitations of metal ions with d^1 , d^9 , d^6 and d^4 configuration in octahedral and tetrahedral environment using Orgel diagram.
14. How do the Mossbauer spectra of $[Fe(CN)_6]^{4-}$ and $[Fe(CN)_6]^{3-}$ differ?
15. Write a note on the principle involved in the polarographic analysis of metal complexes.
16. Discuss the role of Gadolinium complexes as MRI imaging agent.
17. How are supramolecules synthesized? Cite an example.
18. Write a brief note on the methods of appending pendant arm functionalities on macrocycles.
19. How are the geometry of metal complexes interpreted from EPR spectrum?
20. Derive the ground term for d^2 and d^5 configurations.
21. Briefly explain the role of any two metal complexes in solar cell.
22. Discuss the role of metal complexes in nuclear imaging.

Part-C

Answer any FOUR questions.

(4 × 10 = 40)

- 23 a. State static and dynamic Jahn-Teller effects.
b. Which d^n configuration leads to weak and strong Jahn – Teller distortion in octahedral and tetrahedral complexes? Explain.
24. Discuss the principle involved in explaining the ESR spectrum of $[Cu(salicylaldimine)_2]^{2+}$ ion.
25. Discuss the principle involved in the dye sensitized solar cell.
26. Discuss the types of metallodendrimers. Explain the divergent and convergent methodologies in synthesizing dendrimers with an example.
27. Explain the role of metal complexes in photosynthesis.
28. Write a brief note on the functions and structural features of ferredoxins.
