

18P214

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Name:.....

Reg. No:.....

SECOND SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2019

(Regular/Improvement/Supplementary)

(CUCSS - PG)

CC15P CH2 C06 - COORDINATION CHEMISTRY

(Chemistry)

(2015 Admission onwards)

Time: Three Hours

Maximum:36 Weightage

Section A

Answer *all* questions. Each question has 1 weightage.

1. Comment on the Orgel diagrams for d^2 and d^6 systems.
2. Explain nephelauxetic effect in the light of metal ligand covalency in complexes.
3. Draw the splitting pattern of d-orbitals in a square planar ligand field.
4. Distinguish Sn(II) and Sn(IV) using Mossbauer spectroscopy.
5. Derive ground state terms for d^1 and d^3 systems.
6. Write a brief note on Jahn-teller effect.
7. Write a note on changes in ligand vibrations on coordination of metal M with CO ligand.
8. Write a note on macrocyclic ligands.
9. What is meant by spin-orbit coupling?
10. What is meant by lability in co-ordination complexes?
11. Write a note on photoisomerisation.
12. Explain cis effect.

(12 x 1 = 12 Weightage)

Section B

Answer any *eight* questions. Each question carries 2 weightage.

13. Explain the difficulties in assigning mechanism for a substitution reaction.
14. Explain the terms a) spin-spin coupling b) chemical shift in N.M.R spectroscopy.
15. Write a note on Marcus theory of electron transfer.
16. Write a note on base hydrolysis via SN^1CB mechanism.
17. Describe photosubstitution and photoaquation reaction with suitable examples.
18. Explain the role of ruthenium complexes in photochemical reactions.
19. Briefly explain the determination of formation constant by spectrophotometry.
20. Explain the shortcomings of VBT.

21. Using EPR spectra explain the nature of bonding in Cu(II) complex.
22. Define CFSE. Explain the factors affecting it.
23. Write a note on trans effect. Outline its synthetic utility.
24. Briefly explain Adamson's rule in photosubstitution.

(8 x 2 = 16 Weightage)

Section C

Answer any *two* questions. Each question carries 4 weightage.

25. Explain Gouy method for determination of magnetic susceptibility of solid metal complex.
26. a. Explain use of IR spectroscopy in the study of coordination complexes.
b. Write a note on salient features of nuclides that can be studied under Mossbauer spectroscopy.
27. a. Discuss the salient features and construct molecular orbital diagram for an octahedral complex with sigma bonding only.
b. Discuss crystal field theory of tetrahedral complexes.
28. a. What is temperature independent paramagnetism? Explain with example.
b. What are stepwise and overall stability constants of metal complexes? Explain.

(2 x 4 = 8 Weightage)
