

25P211

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Name:

Reg.No:

SECOND SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2026

(CBCSS - PG)

(Regular/Supplementary/Improvement)

CC19PCHE2C06 - COORDINATION CHEMISTRY

(Chemistry)

(2019 Admission onwards)

Time : 3 Hours

Maximum : 30 Weightage

Section A

Answer any *eight* questions. Each question carries 1 weightage.

1. Discuss the optical isomerism in complexes with coordination number 4.
2. Explain the term stability constant.
3. What is Racah parameter.
4. How can MOT explain the magnetic behaviour of $[\text{FeF}_6]^{3-}$?
5. Derive ground state terms d^1 and d^3 systems.
6. The Racah parameter B is 460 cm^{-1} in $[\text{Co}(\text{CN})_6]^{3-}$ and 615 cm^{-1} in $[\text{Co}(\text{NH}_3)_6]^{3+}$. Consider the nature of bonding with the two ligands and explain the difference in nephelauxetic effect.
7. Write an expression for the effective magnetic moment of a complex having spin-orbital coupling. Explain the terms involved in it.
8. Why is low temperature preferred for NMR/ESR spectroscopic studies?
9. What are labile and inert complexes?
10. What are prompt and delayed reactions? Give examples.
11. What is a macrocyclic ligand? Give examples.
12. Explain the term Nephelauxetic effect.

(8 × 1 = 8 Weightage)

Section B

Answer any *four* questions. Each question carries 3 weightage.

13. What is macrocyclic effect? Explain with examples.
14. Discuss the Sidgwick concept of coordination.
15. Discuss the crystal field splitting diagram of d-orbitals in octahedral field.

16. Using EPR spectra explain the nature of bonding in Cu(II) complex.
17. When the Mossbauer Effect will occur?
Why the Mossbauer line splits into a doublet in $\text{Na}_2[\text{Fe}(\text{CN})_5\text{NO}] \cdot 2\text{H}_2\text{O}$?
18. Explain Eigen Wilkins mechanism of octahedral substitution and Fuoss Eigen equation.
19. Describe photosubstitution and photoaquation reaction with suitable examples.

(4 × 3 = 12 Weightage)

Section C

Answer any *two* questions. Each question carries 5 weightage.

20. Explain the determination of binary formation constants by pH-metry and spectrophotometry.
21. a. How do magnetic susceptibility vary with temperature for different types of magnetic materials?
b. Explain the antiferromagnetism in co-ordination compounds.
22. Draw the Orgel diagram for $[\text{V}(\text{H}_2\text{O})_6]^{3+}$ and assign the possible electronic transitions.
a. How Orgel diagrams differ from Tanabe-Sugano diagrams?
b. Explain selection rule for electronic transition in complexes.
23. What is meant by trans effect? Explain the different theories put forward to explain trans effect.

(2 × 5 = 10 Weightage)
