K26P 1175

Reg. No. : .....

Name : .....

Second Semester M.Sc. Degree (C.B.C.S.S. – O.B.E. – Reg./Supple./Imp.) Examination, April 2026

(2023 Admissions Onwards)

CHEMISTRY/CHEMISTRY WITH DRUG CHEMISTRY SPECIALIZATION

MSCHE02C09/MSCHD02C09 : Inorganic Chemistry – II

Time : 3 Hours

Max. Marks : 60

SECTION – A

Short answer questions. Answer **any five** questions. **Each** question carries **three** marks.

1. Illustrate Jahn-Teller effect.
2. What is nephelauxetic series ?
3. What is meant by magnetic susceptibility ?
4. State the Laporte selection rule.
5. What is meant by antiferromagnetic coupling ?
6. State the significance of the Marcus-Hush theory.

(5×3=15)

SECTION – B

Paragraph questions. Answer **any three** questions. **Each** question carries **six** marks.

7. Describe the limitations of Valence Bond Theory in explaining properties of metal complexes.
8. Discuss charge-transfer spectra and their importance in coordination chemistry.
9. Explain the factors affecting the stability of metal complexes.

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10. Explain the spectrophotometric method for the determination of binary formation constants.
11. Compare IR and Raman spectroscopy, highlighting selection rules and applications.

(3×6=18)

SECTION – C

Essay type questions. Answer **any three** questions. **Each** question carries **nine** marks.

12. Describe Crystal Field Theory, explaining d-orbital splitting in octahedral and tetrahedral complexes.
13. Discuss in detail the electronic spectra of octahedral d^5 and d^8 complexes. Explain differences between high-spin and low-spin cases using appropriate diagrams.
14. Discuss the fundamental principles of X-ray diffraction, including lattice planes, Bragg's law and structure factor. Explain how crystal structures are determined using X RD.
15. Discuss the ligand substitution reactions of square planar complexes.
16. Compare and contrast diffraction, spectroscopic and ionization techniques in terms of the type of information they provide.

(3×9=27)