



K25P 1862

Reg. No. :

Name :

II Semester M.Sc. Degree (C.B.C.S.S. – OBE – Reg./Supple./Imp.)
Examination, April 2025
(2023 and 2024 Admissions)
CHEMISTRY/CHEMISTRY WITH DRUG CHEMISTRY SPECIALISATION
PROGRAMME
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. Discuss the effect of crystal field on ionic radii and lattice energies.
2. How does π -bonding affect the stability of metal-ligand complexes ?
3. How does temperature influence the magnetic behaviour in transition metal complexes ?
4. Explain the significance of charge transfer spectra in transition metal complexes.
5. Explain the difference between outer sphere and inner sphere electron transfer mechanisms.
6. Describe the basic principle of nuclear magnetic resonance spectroscopy.
(5×3=15)

SECTION – B

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

7. Discuss the crystal field theory and d-orbital splitting in octahedral complexes.

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8. What is nephelauxetic series ? Discuss its experimental evidence for metal-ligand bonding.
 9. What is Gouy's method ? Explain its application in measuring magnetic susceptibility.
 10. Explain any two factors that influence the stability of metal complexes.
 11. Describe photon electron spectroscopy and how it is used in surface analysis.
- (3×6=18)**

SECTION – C

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

12. Describe the role of crystal field stabilization energy in determining the stability and geometry of metal complexes.
 13. Construct the Tanabe-Sugano diagram for $[\text{V}(\text{H}_2\text{O})_6]^{3+}$ and explain the electronic transitions. How do they differ from Orgel diagrams ?
 14. Explain different types of isomerization reactions in coordination complexes.
 15. Discuss the working principle of Mössbauer spectroscopy and its applications in the study of inorganic compounds with suitable examples.
 16. Explain the principles and applications of X-ray fluorescence spectroscopy.
- (3×9=27)**
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