Exam. Code : 103205
Subject Code : 1394

B.A./B.Sc. Semester—V

CHEMISTRY (Inorganic Chemistry—IV)

Time Allowed—3 Hours] [Maximum Marks—35

PART—A

Note :— All questions are compulsory. Each question carries **1** mark. The maximum length of answer can be **ONE-THIRD** of a page.

1. What is the basic assumption of crystal field theory ?
2. Which of the following complexes have large CFS of d-orbitals ?

   $[Co(H_2O)_6]^{3+}$ or $[Co(NH_3)_6]^{3+}$.
3. What is Curie temperature ?
4. What is chelate effect ?
5. Define L–S coupling.
6. Why do organolithium compounds tend to oligomerize than exist as single molecule ?
7. What is IUPAC name of the complex Ni $(\pi - C_5H_5)_2$?
8. What is term symbol for p^6 configuration ?

PART—B

Note :— Attempt any **TWO** questions from each section. Each question carries **4.5** marks. The maximum length of the answer can be upto **FIVE** pages.

SECTION—I

9. Discuss crystal field splitting of d-orbitals in case of tetrahedral complexes and explain why all these are high spin complexes ?

10. What is crystal field stabilization energy ? Calculate CFSE for the following :

    (i) d^5 strong field octahedral

    (ii) d^7 weak field octahedral

    (iii) d^6 tetrahedral

    (iv) d^4 tetrahedral.

11. What is magnetic susceptibility ? Discuss, how this is measured by Gouy's method.

SECTION—II

12. What is meant by the terms : Inert and labile complexes ? Discuss the factors which affect the stability of complexes.

13. What are selection rules for d–d transitions ? Under what conditions these are relaxed ? Discuss why tetrahedral complexes give intense spectra.

14. What are Orgel diagrams ? Give its limitations. Discuss Orgel energy level diagram for V^{3+} ion.

SECTION—III

15. What are metal olefin complexes ? Discuss the main features of bonding in these complexes.

16. Discuss preparation, properties and bonding in organoaluminium compounds.

17. What are organometallic compounds ? Discuss in detail classification of organometallic compounds.