LOYOLA COLLEGE (AUTONOMOUS) CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **CHEMISTRY**

SIXTH SEMESTER – **APRIL 2025**

UCH 6501 – COORDINATION CHEMISTRY

Date: 23-04-2025 Dept. No. Max. : 100 Marks

Time: 09:00 AM - 12:00 PM

SECTION A

Answer ANY FOUR of the following **(4 x 10 = 40)**

1. Give the structure of EDTA and explain how it complexes with Calcium?
2. Give the structure and coordination number of $K_4Fe(CN)_6$ based on Werner's theory.
3. Write the effective atomic number rule and explain how it is used to predict the stability of metal complexes with a suitable example.
4. Write the postulates of CFT. Applying the CFT predict the orbital occupancies for weak octahedral field for Fe^{2+}.
5. Define CFSE. Write the factors affecting CFSE. Calculate the CFSE for d^4 system in octahedral environment.
6. Show that $\Delta_t = \frac{4}{9}\Delta_o$.
7. State the rules to be followed in the nomenclature of complex compounds.
8. Describe d-orbital splitting in square planar complexes.

SECTION B

Answer ANY THREE of the following **(3 x 20 = 60)**

9. a) Discuss in detail the optical isomerism of coordination compounds. (10)
   b) "$[NiCl_4]^{-2}$ is paramagnetic while $[Ni(CO)_4]$ is diamagnetic though both are tetrahedral" Explain. (10)
10. Explain the postulates and drawbacks of Valence bond theory.
11. Discuss the following isomerisms.
    (i) linkage (ii) ionisation (iii) hydrate (iv) coordination
12. State Jahn Teller theorem. Discuss the causes of Jahn Teller distortion with a suitable example.
13. a) Describe Nephelauxetic effect. (8)
    b) Explain the factors affecting crystal field splitting of a complex. (12)
14. Discuss in detail the crystal field splitting of *d* orbitals in tetrahedral and explain the factors affecting the stability of complexes.
