

**M.Sc. DEGREE (C.S.S.) EXAMINATION, AUGUST 2015****Second Semester**

Faculty of Science

Branch : Chemistry

AN2C05/AP2C05/CH2C05/PH2C05/POH2C05—CO-ORDINATION CHEMISTRY

(Common to all branches of Chemistry)

(2012 Admission onwards)

Time : Three Hours

Maximum Weight : 30

**Section A***Answer any ten questions. Each question carries a weight of 1.*

1. What is meant by Chelate effect ?
2. On what all aspects the Crystal Field Theory theoretically fails ?
3. Distinguish between stepwise formation constants and overall formation constants with suitable example.
4. What are the demerits of Orgel Diagram ?
5. Compare Curie's law and Curie-Weiss law.
6. Discuss the selection rules of electronic transitions of a complex.
7.  $\text{Cis-}[\text{Co}(\text{en})_2\text{Cl}_2]^+$  or  $\text{trans-}[\text{Co}(\text{en})_2\text{Cl}_2]^+$  is optically active ? Clarify your answer.
8. What are the reasons for anomalous magnetic moments of complexes ?
9. If d-d transitions in centrosymmetric complexes are forbidden by the Laporte selection rule, why do we see them ?
10. The IR stretching frequency of CO in metal carbonyls occurs at a lower frequency than that in free CO molecule. Why ?
11. What are the differences between  $4f$  and  $5f$  orbitals ?
12. What are the applications of Trans Effect Theory ?
13. What are the factors soften the formation of lanthanide complexes ?

(10 × 1 = 10)

**Section B***Answer any five questions. Each question carries a weight of 2.*

14. Discuss the experimental evidences of  $\pi$  bonding.
15. How does Tanabe Sugano diagram differ from an Orgel diagram ?
16. How does the measurement of magnetic moments useful in predicting whether the complex is high or low spin ? Illustrate with suitable examples.

Turn over

17. Explain the Gouy method for the determination of magnetic moment of a complex.
18. What are the steps involved in elucidating the structure of cobalt metal complex using electronic spectra.
19. Explain the dissociative and associative mechanisms ?
20. Briefly discuss the outer sphere and inner sphere reaction mechanisms.
21. What is linkage isomerism ? What are the factors affecting linkage isomerism ?

(5 × 2 = 10)

### Section C

*Answer any two questions. Each question carries a weight of 5.*

22. Discuss the different types of charge transfer spectra with suitable examples and respective MO diagrams
23. How will you determine the absolute configuration of a complex by ORD and CD ? Discuss one asymmetric synthesis catalyzed by a co-ordination compound.
24. Explain the kinetics and mechanism of nucleophilic substitution reactions in square planar complexes
25. Compare the co-ordination chemistry of lanthanides and actinides.

(2 × 5 = 10)