

20001117



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Reg. No.....

Name.....

**M.Sc. DEGREE (C.S.S.) EXAMINATION, NOVEMBER 2020**

**Second Semester**

Faculty of Science

Branch : Chemistry

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

(2012—2018 Admissions)

[Common to all Branches of Chemistry]

Time : Three Hours

Maximum Weight : 30

**Section A**

*Answer any ten questions.*

*Each question carries weight 1.*

1. What is meant by chelate effect ?
2. What are the evidences of covalency in metal-ligand bond ?
3. What is meant by nephelauxetic effect ?
4. Explain Curie's law.
5. What is meant by  $d - d$  transition ?
6. Explain the IR spectra of  $[\text{Ni}(\text{CN})_5] \text{Cl}_3$ .
7. Discuss the Marcus theory.
8. Discuss the kinetics of octahedral substitution.
9. Draw the possible isomers and name the type of isomerism exhibited for the compound  $[\text{Co}(\text{ph})_2 \text{Br}_2]^+$ .
10. What is meant by circular dichroism ?
11. Distinguish between hard and soft ligands.
12. What are macrocycles ?
13. What are the general characteristics differences between  $4f$  and  $5f$  orbitals ?

(10 × 1 = 10)

**Turn over**





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### Section B

*Answer any five questions.  
Each question carries weight 2.*

14. Explain the Jahn-Teller distortion in  $[\text{Cu}(\text{H}_2\text{O})_6]^{2+}$ .
15. Discuss the evidences of  $\pi$  bonding in co-ordination compounds.
16. Briefly explain the selection rules for electronic transition.
17. Explain the demerits of Orgel diagram.
18. Distinguish between dissociative and associative mechanisms.
19. Explain the steric factors affecting the linkage isomerism of co-ordination compounds.
20. Explain the methods of determination of absolute configuration of complexes.
21. Briefly discuss the magnetic properties of actinides.

(5 × 2 = 10)

### Section C

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

22. (a) Discuss the M.O. energy level diagram for octahedral complex.  
(b) Explain splitting of  $d$ -orbital in a square pyramidal field.  
(c) Explain the various factors that determine the stability of a co-ordination complex.
- (1.5 + 1.5 + 2 = 5)
23. (a) How will you elucidate the structure of  $[\text{Ni}(\text{NH}_3)_4(\text{OH}_2)_2]\text{Cl}_2$  using spectroscopic techniques?  
(b) Discuss the Gouy method for the determination of magnetic moment of co-ordination complex.
  24. Explain the various mechanisms of electron transfer reactions of co-ordination compounds.
  25. (a) By taking suitable examples, explain the geometrical isomerism of octahedral complexes.  
(b) What is lanthanide contraction? What are its significances? Explain the various factors that mitigate against the formation of lanthanide contraction.

(2 × 5 = 10)

