

19001837



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Reg. No.....

Name.....

M.Sc. DEGREE (C.S.S.) EXAMINATION, JUNE 2019

Second Semester

Faculty of Science

Branch : Chemistry

AN 2C 05/AP 2C 05/CH 2C 05/PH 2C 05/POH 2C 05—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 weight 1.

1. Describe the bonding in $[\text{Ni}(\text{NH}_4)_6]^{2+}$ with molecular orbital theory.
2. 'Complexes in which two metals of different oxidation states are close together frequently highly coloured'. Why ?
3. Why do high spin complexes show paramagnetism ?
4. Draw the IR and electronic spectra of $[\text{Co}(\text{NO}_2)_3(\text{bipy})]$.
5. The hydrolysis of chelated carbonato complexes of Cobalt (III) is much faster in acid than in neutral solution. Why ?
6. What are the factors that affect the stability of chelates ?
7. Discuss the Taube mechanism.
8. Distinguish between hard and soft ligands
9. Discuss the temperature independent paramagnetism.
10. How will you make Prussian blue ? What are its uses ?
11. '+3 oxidation state of lanthanides is more stable'. Why ?
12. Why the spin-orbit coupling in f orbitals is bigger than that of d orbitals ?
13. Compare the ion contraction of lanthanides with that of actinides.

(10 × 1 = 10)

Turn over





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Section B

*Answer any **five** questions.*

Each question carries weight 2.

14. What is the meaning of 'Dq' in crystal field theory ? What are its importances ?
15. Briefly discuss the evidences of covalency in metal-ligand bond of a co-ordination compound.
16. Discuss the demerits of Orgel diagram.
17. What are the causes of anomalous magnetic moments in co-ordination compounds ?
18. How will you determine the magnetic properties of a complex ?
19. Compare the outer sphere and inner sphere mechanisms of electron transfer reactions.
20. Using ORD (optical rotator dispersion) and CD (circular dichroism), how will you determine the absolute configuration ?
21. What are lanthanoids and actinoids ? Why are they called so ?

(5 × 2 = 10)

Section C

*Answer any **two** questions.*

Each question carries weight 5.

22. Explain the various theories adopted for the formation of co-ordination compounds.
23. (a) Discuss the various factors that affect the electronic transition of a co-ordination compound.
(b) Explain the effect of temperature on magnetic properties of complexes.
24. (a) Discuss the kinetics of nucleophilic substitution reaction in square planar complexes.
(b) Briefly explain the mechanism of octahedral substitution of complexes.
25. (a) Explain the types of isomerism exhibited by the co-ordination compounds.
(b) How lanthanide complexes are formed ? What are the factors affecting the formation of lanthanide complexes ?

(2 × 5 = 10)

