QP CODE: 22000489

22000489

Reg No : .....

Name : .....

MSc DEGREE (CSS) EXAMINATION , JANUARY 2022

Second Semester

CORE - CH500201 - COORDINATION CHEMISTRY

M Sc ANALYTICAL CHEMISTRY,M Sc APPLIED CHEMISTRY ,M Sc CHEMISTRY,M Sc PHARMACEUTICAL CHEMISTRY,M Sc POLYMER CHEMISTRY

2019 Admission Onwards

167C7288

Time: 3 Hours Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. Give the Splitting of d orbitals in square pyramidal crystal fields.
2. What are the implications of Jahn Teller (JT) effect on the structure of coordination compounds?
3. Derive the ground state term symbol of d^3 system.
4. Explain the electronic spectrum of $[Ti(H_2O)_6]^{3+}$
5. "In complexes having A or E ground states, normally the orbital motion is quenched.'' Comment on the statement.
6. Write a short note on racemisation reactions in square planar complexes.
7. Give the prerequisites of outersphere reactions.
8. Derive the ground state term symbol of Ce^{4+}.
9. What is the basic principle behind circular dichroism(CD)?
10. Define the concept of symbiosis in coordination chemistry.

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. Elaborate the sigma and pi bonding ability of the ligands CO and NO with examples.
12. Explain the significance of chelate effect in the stability of complexes with an example.
13. Explain the electronic spectra of the complex $[Cr(en)_3]^{3+}$.

14. Discuss Temperature Independent Pramagnetism(TIP).

15. Explain with examples Substitution reactions in tetrahedral and five-coordinate complexes.

16. Explain dissociative and associative mechanisms in complexes.

17. Write a note on the cyclopentadienyl complexes of lanthanides.

18. Explain the formation and properties of coordination complexes of thorium and uranium.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. Discuss Molecular Orbital theory of coordination complexes with special reference to (a) ML_6 sigma only system and (b) ML_6 π Donor and π acceptor systems.

20. Define antiferromagnetism. How it is affected by temperature? Discuss inter and intramolecular antiferrromegnetism with examples.

21. Discuss the kinetics and mechanism of nucleophilic substitution reactions in square planar complexes.

22. State and explain the types of isomerism that may be exhibited by the following complexes and draw structures of the isomers: (a) $[Co(en)_2(ox)]^+$ (b) $[Cr(ox)_2(H_2O)_2]^-$, (c) $[PtCl_2(PPh_3)_2]$ (d) $[Co(en)(NH_3)_2Cl_2]^+$.

(2×5=10 weightage)