QP CODE: 22002451

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Reg No : .....

Name : .....

MSc DEGREE (CSS) EXAMINATION , NOVEMBER 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

BD1A8EFE

Time: 3 Hours Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. Establish a relationship between coordination numbers and geometries of coordination complexes by taking a few examples.
2. Explain the significance of chelate effect in the stability of complexes .
3. Explain the significance of correlation diagrams.
4. The electronic transitions in the complex $[Mn(H_2O)_6]^{2+}$ are doubly forbidden. Explain.
5. Explain temperature independent paramagnetism (TIP).
6. Discuss the solvolytic reactions in octahedral complexes.
7. Explain metal ion assisted and ligand assisted dechelation.
8. Write a note on uranium complexes with coordination number more than 6.
9. Explain the use of the concept Optical Rotatory Dispersion (ORD) in coordination chemistry.
10. Explain the phenomenon of linkage isomerism using an example with thiosulphate as ligand.

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. Explain what is meant by Nephelexetic effect. How does this effect explain the contribution of covalent bonding in metal- ligand bonds?

12. Discuss the sigma and pi metal ligand bonding in transition metal complexes with reference to tetrahedral transition metal complexes

13. Explain the origin of luminescence spectra in coordination complexes with a suitable example.

14. The magnetic moments of octahedral and tetrahedral complexes of Ni^{2+} ions are 2.9-3.9 BM and 4.1 BM respectively whereas square planar complexes of Ni^{2+} are diamagnetic. Explain the reason.

15. Discuss the kinetic and thermodynamic stability of complexes with suitable examples.

16. What are cross reaction? Explain with Marcus theory.

17. Write a descriptive account of the σ-bonded and cyclopentadienyl complexes of lanthanides.

18. "The chemistry of the actinide elements is not as smooth as that of the lanthanoids." Justify this statement by giving examples from the oxidation states of these elements.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. Explain the effect of octahedral, tetrahedral and square planar crystal fields on d orbitals.

20. What is spin state cross over? Explain the different factors influencing the spin state cross over.

21. Discuss water exchange, dissociative and associative mechanisms in octahedral complexes.

22. Explain the geometrical and optical isomerism shown by complexes with coordination number 6 with suitable examples.

(2×5=10 weightage)