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Reg. No.....

SECOND SEMESTER M.Sc. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, APRIL 2024

(CBCSS)

Chemistry

CHE2C06—CO-ORDINATION CHEMISTRY

(2019 Admission onwards)

me : Three Hours Maximum : 30 Weightage

Section A

Answer any **eight** *questions.*

Each question carries a weightage of 1.

1. Stepwise stability constants for Cd^{2+}/Br^- system in aqueous medium is given below:

   $\log k_1 = 1.56$, $\log k_2 = 0.54$, $\log k_3 = 0.06$, $\log k_4 = 0.37$.

   Explain why $\log k_4 > \log k_3$?

2. Distinguish between kinetic stability and thermodynamic stability of metal complexes.

3. Crystal field splitting energy (Δ) for $[CoCl_6]^{4-}$ is 18000 cm^{-1}. Calculate (Δ) for $[CoCl_4]^{2-}$.

4. Transition metals of 4d and 3d series form low spin complexes ; why ?

5. Derive the term symbols for Cr^{3+} and Mn^{2+}.

6. High spin octahedral complexes of Mn^{2+} ions are colourless. Explain.

7. What is meant by chemical shift in MMR spectroscopy ?

8. $[Cr(H_2O)_6]^{3+}$ is inert, whereas $[Cr(H_2O)_6]^{2+}$ is labile to substitution reactions. Give reasons.

9. What are prompt and delayed photochemical reactions? Give examples.

10. What is photoracemization reaction? Explain with an example.

(8 × 1 = 8 weightage)

Section B

Answer any **six** *questions.*

Each question carries a weightage of 2.

11. Describe the pH-metric method for the determination of formation constants of metal co

12. Draw the splitting patterns of d orbitals in tetrahedral and square planar ligand fields. Giv for such kind of splitting patterns

13. Differentiate between ferromagnetism and antiferromagnetism. How do these properties temperature ?

14. Discuss the application of Fuoss-Eigen equation for the study of substitution reactions complexes.

15. Describe the use of NMR spectroscopy in the structural investigation of diamagnetic metal co

16. Explain the influence of bridging ligand on inner sphere electron transfer reactions.

17. Define 'stepwise formation constants' and 'overall formation constant'. Derive the rela between them.

18. State and explain Adamson's rules. How they are useful in the study of photoch reactions ?

(6 × 2 = 12 wei

Section C

Answer any **two** *questions.*

Each question carries a weightage of 5.

19. Critically evaluate valence bond theory and ligand field theory in the study of metal comp

20. Describe the Gouy method for the determination of magnetic moment values of metal com Bring out the significance of Pascal's constants, in this experiment.

21. Discuss the principle and experimental setup involved in ESR spectroscopy. How this techn useful for the structural study of copper (II) complexes ?

22. What is *trans* effect ? Discuss the theories and any one synthetic application of *trans* effec

(2 × 5 = 10 weig