24P211 (Pages: 2) Name : .....

Reg. No : .....

SECOND SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2025

(CBCSS-PG)

(Regular/Supplementary/Improvement)

CC19P CHE2 C06 - COORDINATION CHEMISTRY

(Chemistry)

(2019 Admission onwards)

Time: 3 Hours Maximum: 30 Weightage

Section A

Answer any ***eight*** questions. Each question carries 1 weightage.

1. Give four examples for complexes with coordination number 2. Suggest its geometry.
2. Discuss the Irving–William order.
3. Explain Template effect
4. What are the factors affecting in CFS?
5. How can MOT explain the magnetic behaviour of $[FeF6]^{3-}$?
6. Derive ground state terms d' and d^3 systems.
7. The magnetic moment of $[MnBr_4]^{2-}$ is 5.94BM. Determine the geometry of the molecule.
8. How antiferromagnetism affects the magnetic properties of metal complexes. Explain.
9. Explain cis effect.
10. Explain photoisomerization and photo racemization with suitable example.
11. Write a note on ambidentate ligand. Give two examples.
12. What is Racah parameter?

(8 × 1 = 8 Weightage)

Section B

Answer any ***four*** questions. Each question carries 3 weightage.

13. How will you determine the stability constant by spectrophotometry?
14. Discuss the formation of the following complex ions on the basis of VBT
    (a) $[Cr(NH_3)_6]^{3+}$ (b) $[Fe(H_2O)_6]^{2+}$
15. Sketch the Orgel diagram for d^1, d^3 and d^7 configuration in octahedral field.
16. Explain the changes that occur in carbonate ligand upon coordination to metal ions.

17. In a complex, there is one unpaired electron in Cu^{2+} (I=3/2) and the copper ion is coordinated by one nitrogen atom (I=1) and one OH^- (I=1/2), how many lines can be expected in the EPR spectrum?

18. Givean account of the classes of materials those can be studied using Mossbauer spectroscopy.

19. Discuss briefly the A, D, I mechanisms of substitutions in metal complexes.

(4 × 3 = 12 Weightage)

Section C

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

20. Explain Jahn Teller effect. Illustrate with examples.

21. Explain How NMR spectroscopy is useful in characterizing diamagnetic cooedination complexes based on ^{13}C and ^{1}H nuclei.

22. (a) Explain SN^1CB mechanism for base hydrolysis with suitable example.
    (b) Explain Eigen-Wilkinson mechanism of substitution reactions in octahedral complexes.

23. Explain trans effect and theories of trans effect.

(2 × 5 = 10 Weightage)

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