22P211 (Pages: 2) Name: .....

Reg.No: .....

SECOND SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2023

(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. Name two methods used for the determination of stability constants.
2. Calculate the EAN of Cu in$[Cu(CN)_4]^{3-}$ and Ni in $[Ni(NH_3)_6]^{2+}$
3. Explain the term Nephlauxetic effect.
4. Briefly discuss the the merits and demerits of MOT.
5. Derive ground state terms d^2 and d^4 systems.
6. Name the two substances used in Gouy's method as standard. Explain.
7. Give any one application of NMR spectroscopy in metal complexes.
8. What are labile and inert complexes?
9. Explain photoisomerization and photo racemization with suitable example.
10. Write a note on photoisomerisation.
11. What is the effect of electronegativity of the bridging ligand of the inner sphere electron transfer reactions?
12. What is Racah parameter?

(8 × 1 = 8 Weightage)

Section B

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

13. Discuss the stereochemistry of complexes with coordination number 8.
14. If the Fe^{2+} coordination complex is $[Fe(CN)_6]^{4-}$, state whether you expect the complex to be high spin or low spin. Explain your answer.
15. Give the orgel diagram for d^2 configuration in octahedral and tetrahedral field. How orgel diagram is different from Tanabe Sugano diagram?

16. Using EPR spectra explain the nature of bonding in Cu(II) complex.

17. Sketch the Mossbauer spectrum of $K_4[Fe(CN)_6]^{4-}$ and $K_3[Fe(CN)_6]^{4-}$ complexes. Explain the spectral features.

18. What is trans effect? How is cis and trans $[Pt(NH_3)_4]^{2+}$ synthesized by the application of trans effect?

19. Write a note on Marcus theory of electron transfer.

(4 × 3 = 12 Weightage)

Section C

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

20. Derive the relationship between stepwise formation constants and overall formation constants.

21. a. What is temperature independent paramagnetism? Explain with example.
    b. What are the types of Antiferromagnetism? Explain its exchange pathways.

22. What are the factors influencing the group frequency vibrations? Is there any drawbacks for the group frequency concept?

23. Explain the SN^1CB mechanism of base hydrolysis as taking the example of substitution reactions of Co(III) ammine complexes.

(2 × 5 = 10 Weightage)

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