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(Pages : 2)

Name.....

Reg. No.....

SECOND SEMESTER M.Sc. DEGREE (REGULAR/SUPPLEMENTARY)
EXAMINATION, APRIL 2023

(CBCSS)

Chemistry

CHE 2C 06—CO-ORDINATION CHEMISTRY

(2019 Admission onwards)

Time : Three Hours

Maximum : 30 Weightage

Section A*Answer any eight questions.**Each question carries a weightage of 1.*

1. What is an ambidentate ligand ? Give two examples.
2. Explain macrocyclic effect, giving a suitable example.
3. What is Jahn-Teller effect ? Explain.
4. Explain the limitations of valence bond theory.
5. What do you mean by 'spin-orbit coupling' ?
6. State and explain Curie-Weiss law.
7. What is Mössbauer effect ?
8. What happens to the $\nu(\text{C}=\text{N})$ stretching frequency in N-salicylideneaniline on co-ordination with metal ion ? Give reasons.
9. What is cis.effect ? Explain.
10. Explain photoisomerization reaction with a suitable example.

(8 × 1 = 8 weightage)

Turn over

Section B

*Answer any six questions.
Each question carries a weightage of 2.*

11. Describe the spectroscopic method for the determination of stability constant of a metal complex.
12. Differentiate between spectrochemical series and nephelauxetic series.
13. Discuss the selection rules for $d-d$ transitions in metal complexes.
14. How infrared spectroscopy is applicable in the structural investigation of coordination compounds?
15. Discuss the application of Fuoss-Eigen equation in the study of substitution reactions of transition metal complexes.
16. Describe the effect of bridging ligand on inner sphere electron transfer reactions.
17. What do you mean by stepwise and overall formation constant? Bring out the relationship between them.
18. Explain photoaquation and photo-reduction reactions of metal complexes.

$(6 \times 2 = 12)$

Section C

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

19. Critically evaluate valence bond theory, crystal field theory and molecular orbital theory for transition metal complexes.
20. Give an account of the various types of magnetic properties exhibited by solids.
21. What is the principle involved in ESR spectroscopy? How this technique is useful for the investigation of copper(II) complexes.
22. Describe the D, A and I mechanisms of substitution reactions of octahedral metal complexes.

$(2 \times 5 = 10)$