LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – **CHEMISTRY**

SECONDSEMESTER – APRIL 2018

17/16PCH2MC02- COORDINATION CHEMISTRY

Date: 19-04-2018 Dept. No. Max. : 100 Marks

Time: 01:00-04:00

Part-A

Answer ALL questions. **(10 × 2= 20)**

1. What are ambidentate ligands? Give an example.
2. Mention any two differences between primary and secondary valencies in Werner's theory.
3. Calculate the CFSE of high spin and low spin octahedral complexes having d^6 configuration.
4. Mention any two functions of carboxypeptidase A.
5. How is Curie-Weiss law varied for ferro, antiferro and ferrimagnetic materials?
6. State Grothus-Draper law.
7. What are excimers?
8. Mention the selection rules for electronic absorption of a photon.
9. Bring out the differences between intermediate and transition state.
10. What is trans effect?

Part-B

Answer any EIGHT questions. **(8 × 5= 40)**

11. Explain the splitting of d orbitals in square planar complexes using crystal field theory.
12. Write a short note on z-in and z-out cases using Jahn-Teller distortion.
13. Explain the hybridization of $[Cu(NH_3)_4]^{2+}$ using valance bond theory (μ = 1.73 BM).
14. Discuss the z-scheme of photosynthesis in brief.
15. Explain any two methods of determining the magnetic susceptibility of the complexes.
16. Explain the structural features and functions of cytochromes.
17. Account for the high intense colour of potassium permanganate.
18. How is cis-platin prepared?
19. Why do Mn^{2+} complexes show feeble colour? Explain.
20. Why do the charge transfer bands show very high intensity?
21. Why does Cl^- show very high trans effect? Explain.
22. Why do octahedral complexes follow D-mechanism but not A-mechanism during substitution reactions?

Part-C

Answer any FOUR questions. **(4 × 10= 40)**

23. Draw the molecular orbital diagram of octahedral complexes having only σ interaction and explain it with a suitable example.
24. What are copper proteins? Explain their classification.

25a. Explain the oxygen transport mechanism in biological systems.

b. How is the structure of spinel and inverse spinel determined using CFT? (6+4)

26. Discuss Adamson's model of photochemical reaction of a Co^{3+} complex.
27. Explain the use of organometallic compounds as catalysts.
28. Discuss the electronic spectrum of a Co^{3+} complex and assign the transitions for the bands.

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