LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **CHEMISTRY**

SIXTH SEMESTER – **APRIL 2023**

UCH 6501 – COORDINATION CHEMISTRY

Date: 29-04-2023 Dept. No. Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

PART A

ANSWER ALL QUESTIONS. (10 x 2 = 20 Marks)

1. Mention the oxidation state and the coordination number of Zn in $[Zn(CN)_4]^{2-}$ and Au in $[AuCl_2]^-$.
2. Write the structural formula of the following ligands (i) Nitrosyl (ii) acac.
3. Calculate the magnetic moment of Fe^{3+} and Ni^{2+}.
4. Calculate the CFSE of low spin Co^{3+} complex.
5. Distinguish between labile and inert complexes.
6. Draw the possible isomers of $[PtClBrNH_3Py]$ complex, where Pt is the central metal atom.
7. What is meant by homogenous catalysis? Give an example.
8. Sketch the various structures of $Co_2(CO)_8$.
9. Mention the oxidation state of iron in myoglobin and hemoglobin.
10. Mention the metal present in the following enzymes
    (i) alcohol dehydrogenase (ii) carboxy peptidase.

PART B

ANSWER ANY EIGHT QUESTIONS. (8 x 5 = 40 Marks)

11. Classify the following ligands as mono/bi/tri or hexa dentate.
    (a) OH^- (b) en (c) EDTA (d) Glycinato (e) oxalato (f) acetato (g) carbanato (h) ONO^- (i) CN^- (j) Ammine
12. Calculate the EAN of $[Ni(CO)_4]$ and $[Co(NH_3)_6]^{3+}$. Mention the oxidation number of the central metal ion in the complex and the number of electrons gained through coordination.
13. Mention the limitations of VBT.
14. List out the factors affecting the magnitude of Dq values.
15. What are the assumptions of CFT?
16. Explain the following terms (i) nephelauxetic effect (ii) spectrochemical series.
17. How would you determine the stability constant of a complex by spectrophotometric method?
18. Explain Trans effect and Trans influence with suitable examples.
19. Explain the concept of bonding in metal carbonyls using suitable examples.
20. Outline the mechanism of hydrogenation of alkenes using Wilkinson's catalyst.
21. Explain in brief the general structure of haemoglobin.
22. Outline the biological role of cytochrome C.

PART C

ANSWER ANY FOUR QUESTIONS. (4 x 10 = 40 Marks)

23. Explain the concept of various isomerism observed in coordination complexes with suitable examples.

24. Discuss the splitting pattern in octahedral and tetrahedral complexes using CFT.

25. What is Jahn Teller distortion? Mention its consequences.

26. (a) What are the factors influencing the substitution in square planar Pt complexes? |5+5]

(b) Distinguish between associative and dissociative mechanism with an example.

27. (a) Explain the structure of Ferrocene. [5+5]

(b) Outline the polymerization process employing Ziegler Natta Catalyst.

28. Discuss the structure, properties and biological role of Myoglobin.

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