

**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**



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

**FIFTH SEMESTER – NOVEMBER 2019**

**16/17UCH5MC01 – COORDINATION CHEMISTRY**

Date: 29-10-2019

Dept. No.

Max. : 100 Marks

Time: 09:00-12:00

**PART- A**

Answer **ALL** questions

**10X2 = 20**

- Write the IUPAC name of the following:-
  - $[\text{Cr}(\text{en})_3][\text{CrF}_6]$
  - $[\text{PdI}_2(\text{ONO})_2(\text{H}_2\text{O})_2]$
- Mention the limitations of Sidgwick theory.
- Define crystal field stabilization energy.
- $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$  is coloured, while  $[\text{Sc}(\text{H}_2\text{O})_6]^{3+}$  is colourless. Why?
- What is oxidative addition reaction?
- What are electron transfer reactions? Give any two examples.
- Differentiate bridging and terminal carbonyls with an example.
- State 18 electron rule.
- What is chelation therapy?
- Mention the differences between apoenzymes and coenzymes.

**PART- B**

Answer any **EIGHT** questions

**8 x 5 = 40**

- Write the postulates of Werner's coordination theory.
- Describe the structural isomers of coordination complexes.
- Explain Jahn- Teller theorem with an example.
- What is nephelauxetic effect?
  - Write notes on adjusted crystal field theory. (2+3)
- Construct MO energy level diagram for octahedral metal complexes with bonding ligand.
- Describe the associative and dissociative mechanism of substitution in metal complexes.
- How are Schiff's bases synthesised by metal template synthesis?
- Discuss the structure and reactivity of Vaska's complex.
- What is Ziegler- Natta catalyst? Discuss its role in polymerization reaction.

20. Discuss briefly the nature of bonding in metal carbonyls.
21. Explain the biological role of super oxide dismutase.
22. Discuss the structural features of myoglobin.

**PART- C**

Answer any **FOUR** questions

4x10 = 40

23. Based on VB theory explain why  $[\text{Cr}(\text{NH}_3)_6]^{3+}$  is paramagnetic while  $[\text{Ni}(\text{CN})_6]^{2-}$  is diamagnetic.
24. Discuss the crystal field splitting in tetrahedral and octahedral complexes.
25. (i) Explain the thermodynamic stability of complexes  
(ii) Discuss the methods of determining stability constant. (5+5)
26. (i) What is Wilkinson's catalyst? How is it used in the hydrogenation of alkene?  
(ii) Discuss the structure of ferrocene. (5+5)
27. (i) Write notes on invivo and invitro nitrogen fixation.  
(ii) What is MRI? Mention its functions. (5+5)
28. (i). Explain the covalency in transition metal complexes with an example.  
(ii). Describe the cis and trans effect in the synthesis of square planar complexes. (5+5)

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