



LOYOLA COLLEGE (AUTONOMOUS) CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

SIXTH SEMESTER – NOVEMBER 2024

UCH 6501 – COORDINATION CHEMISTRY



Date: 16-11-2024

Dept. No.

Max. : 100 Marks

Time: 01:00 pm-04:00 pm

SECTION A – K1 (CO1)

Answer ALL the Questions

1. **Answer the following.** (5 x 1 = 5 Marks)

- Comment on the term hapticity.
- Why are transition metals coloured?
- State EAN rule.
- Write any one use of organometallic compounds.
- What do you mean by coenzyme?

2. **Fill in the blanks.** (5 x 1 = 5 Marks)

- EDTA is a _____ dentate ligand.
- CFSE stands for _____.
- A bridging carbonyl ligand donates _____ electron to each metal centre.
- The metal ion present in the Vaska's complex is _____.
- The energy barrier between the staggered and eclipsed conformations is _____ kJ/mol.

SECTION A – K2 (CO1)

3. **Match the following.** (5 x 1 = 5 Marks)

- Werner's theory - Rhodium
- Spectrochemical series - Gadolinium
- π -acceptor ligand - Ligand strength
- Wilkinson's catalyst - Secondary valency
- Contrast agents - Carbon monoxide

4. **TRUE or FALSE** (5 x 1 = 5 Marks)

- 17-Electron metal complex forms a dimer complex.
- I^- is a strong field ligand.
- A higher stability constant means that a complex is more stable.
- In metal carbonyls, zero oxidation number of the metal atom is not possible.
- Myoglobin has weaker tendency toward oxygen than haemoglobin.

SECTION B – K3 (CO2)

Answer any TWO of the following in 100 words (2 x 10 = 20 Marks)

- Explain the following terms.
(i) Nephelauxetic effect (ii) Chelate therapy.
- Discuss the structure and synergic bonding in metal carbonyls.
- Outline the mechanism of hydrogenation of alkenes using Wilkinson's catalyst.
- a) How will you apply template effect in the synthesis of macrocyclic ligands? (6)

	b) Differentiate high and low spin metal complexes. (4)
SECTION C – K4 (CO3)	
Answer any TWO of the following in 100 words (2 x 10 = 20 Marks)	
9.	Explain the mechanism of associative and dissociative ligand substitution reactions.
10.	Describe Sidgwick theory of coordination complexes with suitable example.
11.	How would you determine the stability constant of a complex by spectrophotometric method?
12.	a) Outline the biological role of cytochrome C. (5)
	b) Discuss the biological role of carboxypeptidase A. (5)
SECTION D – K5 (CO4)	
Answer any ONE of the following in 150 words (1 x 20 = 20 Marks)	
13.	a) State Jahn-Teller distortion and explain the static and dynamic distortions in octahedral complexes. (10)
	b) Describe the Werner's theory of coordination compounds based on its electrical conductivity experiments. (10)
14.	a) Elaborate the oxidative addition and reductive elimination reactions with examples. (10)
	b) Explain the <i>in vivo</i> and <i>in vitro</i> nitrogen fixations. (10)
SECTION E – K6 (CO5)	
Answer any ONE of the following in 150 words (1 x 20 = 20 Marks)	
15.	Illustrate the following isomerisms in coordination compounds with examples. (i) Linkage (ii) Optical (iii) Hydrate (iv) Geometrical (v) Coordination position
16.	a) Explain the oxygen transport process in the mammalian system. (10)
	b) Discuss the importance of Ziegler-Natta catalyst in the polymerisation of olefins. (10)
