

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION MAY 2022
(Second Semester)

Branch – **CHEMISTRY**

INORGANIC CHEMISTRY-II

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (5 x 1 = 5)

1. Consider the 18-electron rule as a guide and determine the value of n in the following complex. $\text{Rh}(\eta^5\text{-C}_5\text{H}_5)(\text{CO})_n$.

a) 2	b) 3
c) 4	d) 5
2. Which among the following are related to Wilkinson's catalyst?

i) 18 electron complex	ii) Undergoes oxidative addition with H_2 .
iii) 16 electron complex	iv) diamagnetic square planar complex
a) (ii) and (iii) only	b) (ii), (iii) and (iv)
c) (i) and (iv)	d) (i) and (ii)
3. The structure of half sandwich complex is correlated with the structure of

a) Single cone	b) piano stool
c) umbrella	d) mushroom
4. Which of the following pair is not isolobal?

a) $\text{Mn}(\text{CO})_5, \text{CH}_3$	b) $[\text{Fe}(\text{CO})_4], \text{O}$
c) $\text{Mn}(\text{CO})_5, \text{Cl}$	d) $\text{Mn}(\text{CO})_5, \text{O}$
5. Vaska's complex is

i) trans-complex	ii) cis-complex
iii) rhodium complex	iv) iridium complex
a) (i) and (iii)	b) (ii) and (iii)
c) (ii) and (iv)	d) (i) and (iv)

SECTION - B (15 Marks)

Answer **ALL** Questions

ALL Questions Carry **EQUAL** Marks (5 x 3 = 15)

6. a) What is oxidative addition? Write the addition of hydrogen with Vaska's complex.
 OR
 b) Describe dative bonding and electron deficient bonding in organometallic complexes.
7. a) Write the synthesis of alkene complexes by ligand substitution.
 OR
 b) What is Reppe process? Explain.

Cont...

- 8 a Discuss on bent Sandwich complexes.
 OR
 b What are multidecker complexes? How are they synthesised?
- 9 a How is IR spectroscopy used to identify the terminal and bridging carbonyl group in carbonyl complexes?
 OR
 b What are carboranes? How is 1,2-dicarba-*clos*-dodecaborane prepared?
- 10 a What is *cis* platin? Write its mode of action in chemotherapy.
 OR
 b Explain the role of manganese in photosystem II.

SECTION -C (30 Marks)

Answer ALL questions
 ALL questions carry EQUAL Marks (5 x 6 = 30)

- 11 a Explain the mechanism of the following reaction.
 $(OC)_5Mn-CH_3 + CO \rightleftharpoons (OC)_5Mn-COCH_3$
 OR
 b What are carbene complexes? Explain the electrophilic and nucleophilic nature of carbene complex with appropriate reaction.
- 12 a Explain Ziegler-Natta polymerisation of olefins.
 OR
 b How is Ziese's salt prepared? Explain the structure and bonding
- 13 a Discuss the structure of ferrocene.
 OR
 b What are half sandwich complexes? How are they synthesised? Explain their structure and reactivity.
- 14 a What is photoredox reaction? Explain the reactions involving inner sphere mechanism and outer sphere mechanism.
 OR
 b Discuss the preparation and properties of carbonyl hydride complexes.
- 15 a Explain the designing of molecular host - guest complexes.
 OR
 b What are synthetic oxygen carriers? Explain.

Z-Z-Z

END