

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION MAY 2023
(Second Semester)

Branch – CHEMISTRY

ORGANOMETALLIC CHEMISTRY

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(5 x 1 = 5)

- Which of the following is the neutral complex which follows the 18- electron rule?
(i) $(\eta^5\text{-C}_5\text{H}_5)\text{Fe}(\text{CO})_2$ (ii) $(\eta^5\text{-C}_5\text{H}_5)_2\text{Mo}(\text{CO})_3$
(iii) $(\eta^5\text{-C}_5\text{H}_5)_2\text{Co}$ (iv) $(\eta^5\text{-C}_5\text{H}_5)_2\text{Re}(\eta^6\text{-C}_6\text{H}_6)$
- The organometallic compound is used in Oxo process.
(i) $[\text{HCo}(\text{CO})_4]$ (ii) $[\text{Pt Et Cl}_3]^-$
(iii) $\text{RhCl}(\text{PPh}_3)$ (iv) None of these
- The point group symmetry of the staggered form of ferrocene molecule is
(i) C_{3v} (ii) D_{5h} (iii) D_{5d} (iv) D_{3h}
- How many M - M bonds are present in $[\text{Cp Mo}(\text{CO})_3]_2$?
(i) 1 (ii) 2 (iii) 0 (iv) 4
- Supramolecules calixarene contain
(i) NH groups (ii) OH groups
(iii) COOH groups (iv) None of these

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(5 x 3 = 15)

- a) Discuss the classification of organometallic compounds.
OR
b) Explain the 18 electron rule.
- a) Give an account on olefin metathesis reactions.
OR
b) Explain the Ziegler-Natta polymerization of olefins.
- a) Write a note on synthesis of metallocenes.
OR
b) Summarize the multidecker complexes.
- a) Explain the use of Wade's rule to predict polyhedral structures of boranes.
OR
b) Give a brief account on structure of Zintl ions.
- a) Illustrate the podand and cryptand.
OR
b) Give a brief account on Catenanes and Rotaxane.

Cont...

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

11. a) Explain the synthesis and stability of metal alkyl complexes.
OR
b) Discuss the synthesis, bonding and properties carbene complexes.
12. a) Outline the nature of metal-olefin interaction in transition metal olefin complexes.
OR
b) Explain: i) Wacker process ii) Heck reaction.
13. a) Discuss the structure of Ferrocene.
OR
b) Give the synthesis and structure of Arene complexes.
14. a) How IR spectra is used in the diagnosis of different types of carbonyl groups?
OR
b) What are carboranes? How they are obtained?
15. a) Write a brief account on: i) Keesom forces ii) Debye forces.
OR
b) Explain the applications of supramolecules.

Z-Z-Z

END