

22P409

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Name:

Reg.No:

FOURTH SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2024

(CBCSS - PG)

(Regular/Supplementary/Improvement)

CC19P CHE4 E08 - ORGANOMETALLIC CHEMISTRY

(Chemistry)

(2019 Admission onwards)

Time : 3 Hours

Maximum : 30 Weightage

Section A

Answer any *eight* questions. Each question carries 1 weightage.

1. Organolithium compounds are appreciably covalent and soluble in hydrocarbons in contrast to other metal compounds of the same group. Why?
2. Explain the any two method for the preparation of Fischer type carbene complexes
3. How has the use of IR spectroscopy contributed to our understanding of the structure in metal carbonyls?
4. What is Collman's reagent?
5. Explain Schrock carbenes.
6. Discuss the synthesis any two Polyalkyl organometallic compounds
7. What are dioxygen complexes, and how are they formed?
8. A 16e metal complex LnM is found to react with ethylene to give 1-butene and LnM . Provide a reasonable mechanism involving oxidative coupling.
9. Explain sigma bond metathesis
10. Explain the difference between insertion and elimination with suitable examples
11. Give any two examples for photochemical substitution.
12. Explain migratory insertion with a suitable example.

(8 × 1 = 8 Weightage)

Section B

Answer any *six* questions. Each question carries 2 weightage.

13. Explain the 16 e rule for organometallic compounds with examples.
14. What is a carbonyl cation and what role does it play in the reactions of metal carbonyls?
15. Write a note on nitrosyl complexes.

16. Explain hydrozirconation reaction.
17. Discuss enantioselective synthesis using metal complexes as catalysts.
18. Discuss oxidative coupling and reductive decoupling with suitable examples
19. Which of the following will be more reactive towards oxidative addition of dihydrogen? $\text{Rh}(\text{PPh}_3)_3\text{Cl}$ or $\text{Rh}(\text{PPh}_3)_2(\text{CO})\text{Cl}$. Why?

(4 × 3 = 12 Weightage)

Section C

Answer any *two* questions. Each question carries 5 weightage.

20. Discuss in detail the various classification of organometallic compounds.
21. Discuss the synthesis, structure and bonding in cyclopentadienyl complexes taking ferrocene as an example.
22. Discuss the mechanisms of oxidative addition in organometallic complexes.
23. Write notes on following homogeneous catalytic processes i) Water gas shift reaction and ii) Fischer Tropsch reaction.

(2 × 5 = 10 Weightage)
