

21P411

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Name:

Reg.No:

FOURTH SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2023

(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. Differentiate homoleptic and heteroleptic organometallic compounds with specific examples.
2. Give any one method for the preparation of metal carbyne complex.
3. What is Heiber base reaction?
4. What is Collman's reagent?
5. Discuss any two synthesis of N-heterocyclic carbenes.
6. Write a note on reductive elimination reaction.
7. Complexes of the type $\text{Pt}(\text{PR}_3)_4$ can form $\text{PtCl}_2(\text{PR}_3)_2$ with HCl. How do you explain this result?
8. Explain sigma bond metathesis.
9. Selectivity is higher for homogeneous catalysis compared to heterogeneous catalysis. Justify.
10. Write the reaction scheme for hydrocyanation of ethylene by metal complex NiL_4 .
11. Write a note on organometallic polymers.
12. Explain reductive carbonylation.

(8 × 1 = 8 Weightage)

Section B

Answer any *four* questions. Each question carries 3 weightage.

13. Discuss the ionic and neutral atom counting methods of 18 e rule. What are the limitations of 18e rule?
14. Write a note on Collman's reagent.
15. Describe the structure and bonding in $(\text{LiCH}_3)_4$.
16. Give a brief account of synthesis of cyclopentadienyl complex.
17. Write a note on hydrogen complex.

18. Explain the hydroformylation.
19. Discuss oxidative coupling and reductive decoupling with suitable examples.

(4 × 3 = 12 Weightage)

Section C

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

20. Explain in detail the preparation, structure and reactions of transition metal complexes of butadiene.
21. Discuss the synthesis, structure and bonding in cyclopentadienyl complexes taking ferrocene as an example.
22. Discuss CO and alkene insertion reactions.
23. Write notes on following homogeneous catalytic processes i) Water gas shift reaction and ii) Fischer Tropsch reaction.

(2 × 5 = 10 Weightage)
