

THIRD SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2023
(Regular/Improvement/Supplementary)
CHEMISTRY
FCHE3C10 - ORGANOMETALLIC AND BIOINORGANIC CHEMISTRY

Time: 3 Hours

Maximum Weightage: 30

Section A: Short answer questions. Answer any *eight* questions. Each carries *one* weightage.

1. What are Chevrel compounds?
2. Describe the use of 16 electron rule to organometallic compounds.
3. Write a note on quadrupole bonding in metal clusters.
4. Which is more basic: anthracene or ferrocene? Substantiate your answer.
5. Discuss the role of ferritin in biological systems.
6. What is cisplatin? Discuss its pharmaceutical applications.
7. What are polyatomic zintl anions? Give examples.
8. Discuss the bonding in cyclobutadiene complexes. Cyclobutadiene is more stable in complex form than in free ligand. Why?
9. Which is the metal ion present in the enzyme tyrosinase? Explain the main functions of this enzyme.
10. What are fluxional organometallics?
11. Explain Fischer Tropsch Process. What are the environmental benefits of this method?
12. What is the role of manganese in photosynthesis?

(8 × 1 = 8 weightage)

Section B: Short essay question. Answer any *four* questions. Each carries *three* weightage.

13. What are organometallic polymers? Explain with examples.
14. Explain the structure and functions of hemerythrin.
15. Describe Wade rule for counting electrons in carbonyl clusters.
16. What is Collman's reagent? Give any two of its synthetic applications.
17. Discuss structure and bonding in metal Carbonyls.
18. What are carbide metal clusters? Give examples.
19. Write a note on fullerene complexes.

(4 × 3 = 12 weightage)

(P.T.O.)

Section C: Essay questions. Answer any *two* questions. Each carries *five* weightage.

20. What is Wilkinson's catalyst? Give the industrial importance of this catalyst. Briefly discuss the mechanism of the reaction. How nature of alkene affects the rate of reaction?
21. Discuss the structure of oxygen binding site in hemoglobin. Explain the mechanism of transport of oxygen in human beings and the significance of cooperative effect in transport of oxygen by hemoglobin.
22. How are metal nitrosyls prepared? Give an account of the structure and bonding in metal nitrosyl complexes.
23. Discuss the mechanism of biological nitrogen fixation.

(2 × 5 = 10 weightage)