

THIRD SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2022
(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. Explain Synergic effect of CO in metal carbonyls.
2. What is the role of Hemocyanin in living system? Its oxy form is blue and deoxy form is colourless, why?
3. What are naked clusters? Give two examples.
4. Distinguish between Carbene and Carbyne Organometallics.
5. Discuss the role of vanadium metal complexes in medicine.
6. Metals which are in high oxidation state or surrounded by strong π acceptor ligands can form stable dihydrogen complexes. Why?
7. What is hapticity of an organic ligand? Predict the hapticity of Cyclopentadienyl ligand in Ferrocene.
8. What are Siderophores?
9. What is Zeigler Natta Catalyst? Early transition metal halides can function as good Zeigler-Natta Catalyst along with aluminiumalkyls but not with other transition metal halides. Why?
10. What is Cytochrome P-450?
11. How does Oxygen binding affect the spin state of iron in haemoglobin?
12. What is Superoxide dismutase? Which is the active site in the enzyme?

(8 × 1 = 8 weightage)

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

13. Discuss the structure and bonding in $[\text{Re}_2\text{Cl}_8]^{2-}$.
14. Explain the mechanism of Cativa Process and the advantages in using Iridium metal in it.
15. What is Na^+/K^+ Pump? Explain the mechanism of its function.

(P.T.O.)

16. What is 18 electron rule and explain electron counting in organometallic compounds by neutral atom method.
17. Write a note on structural role of Calcium in biology.
18. Discuss structure and bonding in Organometallic complexes with $C_5H_5^-$.
19. Describe the bonding in metal dinitrogen complexes.

(4 × 3 = 12 weightage)

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

20. Describe the Photosynthetic process in plants bringing out the functions of PSI and PSII.
21. Write detailed notes on:
 - a) Fluxional organometallic compounds.
 - b) Fullerene complexes.
22. Describe bonding in metal-metal single, double, triple and quadrapole bonded non-carbonyl clusters.
23. Explain the mechanism of Wacker process using catalytic cycle. Give evidences for the mechanism.

(2 × 5 = 10 weightage)