

D 51231

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Name.....

Reg. No.....

**THIRD SEMESTER M.Sc. DEGREE (REGULAR/SUPPLEMENTARY)  
EXAMINATION, NOVEMBER 2023**

(CBCSS)

Chemistry

CHE 3C 10—ORGANOMETALLIC AND BIO-INORGANIC CHEMISTRY

(2019 Admission onwards)

Time : Three Hours

Maximum : 30 Weightage

**Section A**

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

1. Show that  $[V(CO)_7]^+$  obey 18 electron rule.
2. What do you mean by fluxionality ? Why NMR technique is preferred to other special techniques for studying fluxionality ?
3. Internuclear spacing is the major criterion for metal metal bonding. Justify.
4. Give examples of compounds with metal-metal quadrupole bonds.
5. Illustrate Insertion reaction in organometallics.
6. Apply Wades rule to predict the structure of  $[Os_6(CO)_{18}]^{2-}$ .
7. Wacker process is carried out in the presence of of Cu (II) salt. Why ?
8. What is meant by red drop in photosynthesis ?
9. What is meant by co-operativity in hemoglobin ?
10. Give a short note on siderophores.

(8 × 1 = 8 weightage)

**Section B**

*Answer any **six** questions.  
Each question carries a weight of 2.*

11. State and explain 16 electron rule as applied to organometallic compounds.
12. Discuss the structure of organometallic compound with allyl ligand.

**Turn over**

13. Explain water gas shift reaction.
14. Hydroformylation of alkene can be carried out using Cobalt complex or Rhodium complex as catalyst. Which is more advantageous ? Justify your answer.
15. Discuss the role of Calcium in blood clotting.
16. Sketch the isolobality of  $\text{CH}_2^-$  and  $\text{NH}_2^-$ .
17. Discuss the structural features and activity of tyrosinase.
18. Discuss the significance and mechanism of Sodium/Potassium pump.

(6 × 2 = 12 weightage)

### Section C

*Answer two questions.  
Each question carries a weight of 5.*

19. Give an account of synthesis, structure and bonding in metal carbonyls.
20. Brief the classification of metal clusters.
21. Discuss the role of alkali metal ions in biological systems.
22. Discuss the structure and biological functions of :
  - (a) Vitamin B<sub>12</sub>.
  - (b) Catalase.

(2 × 5 = 10 weightage)