D 131961 **(Pages : 3)** **Name.....**

Reg. No.....

THIRD SEMESTER M.Sc. DEGREE [REGULAR/SUPPLEMENTARY] EXAMINATION, NOVEMBER 2025

(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. Which of the following do not obey 18 electron rule.

   $Cr(CO)_6$, $V(CO)_6$, $Mn_2(CO)_{10}$.

2. What are π bonded organometallics ? Give examples.

3. Give one method of synthesis of Zeise's salt ? Give its structure.

4. Early transition metal halides can function as good Zeiglar Natta catalyst along with aluminium alkyls but not late transition metal halides. Why ?

5. What do you mean by fluxionality ? Why NMR technique is preferred to other special techniques for studying fluxionality ?

6. First row transition metals rarely form M-M bonding. Comment.

7. Give examples of compounds with metal- metal multiple bonds.

8. Give the name and structure of two platinum complexes approved clinically for the treatment of human cancer.

Turn over

9. What do you mean by reaction centre in photosynthesis? How does it participate in the photoexcitation process ?

10. Justify the structural role of calcium in living system.

(8 × 1 = 8 weightage)

Section B

Answer any **six** *questions.*

Each question carries a weight of 2.

11. Illustrate with suitable examples how hapto notations are used in naming organometallics.

12. Give a brief note on Fullerene complexes.

13. Explain the structure and bonding in butadiene complexes.

14. Illustrate Olefin metathesis.

15. Calculate the total electron count and predict the geometry of $[H_3Ru_4(CO)_{12}]^{2-}$

16. State and illustrate Wade's rule.

17. Distinguish between essential, bulk, trace and ultratrace elements.

18. Draw the active site structure of Cu-Zn SOD, mention the function of the enzyme and also the role of Zn in the enzyme.

(6 × 2 = 12 weightage)

Section C

Answer **two** *questions.*

Each question carries a weight of 5.

19. Give methods for the synthesis of ethylene, allyl, butadiene and acetylene transition metal complexes.

20. Discuss the mechanism of alkene hydrogenation by nickel catalyst. Compare the process with Wilkinson catalyst method.

21. Describe the mechanism involved in Oxidative addition, Reductive elimination and Insertion reaction of organometallic compounds giving suitable examples.

22. (a) Discuss the structural features of Chlorophyll. How does the chlorin ring differ from the porphyrin ring ?

(b) Explain the role of Mg and Mn in photosynthesis.

(2 × 5 = 10 weightage)