

QP CODE: 19002495



Reg No : .....

Name : .....

**M.Sc. DEGREE (C.S.S ) EXAMINATION, NOVEMBER 2019**

**First Semester**

Faculty of Science

CHEMISTRY

**Core - CH500101 - ORGANOMETALLIC AND NUCLEAR CHEMISTRY**

(Common to all Branches of Chemistry)

2019 Admission Onwards

32882531

Maximum Weight: 30

Time: 3 Hours

**Part A (Short Answer Questions)**

*Answer any **eight** questions.*

*Weight 1 each.*

1. Write one method for the synthesis of ferrocene.
2. Compare the CO stretching frequency of bridging and non-bridging CO ligands.
3. Distinguish between nucleophilic addition and nucleophilic abstraction.
4. When  $\text{RhH}(\text{CO})(\text{PPh}_3)_3$  is used as the catalyst for hydroformylation, excess  $\text{PPh}_3$  is added to the reaction mixture. Why?
5. Distinguish between simple metathesis and cross metathesis.
6. Write one reaction catalysed by  $\text{Pd}^0$ .
7. Distinguish between active and passive transport across biological membranes.
8. What are the functions of cyanocobalamin?
9. What is  $1/V$  law?
10. List four common criteria used to evaluate the performance of any radiation detector type.

( $8 \times 1 = 8$  weightage)

**Part B (Short Essay/Problems)**

*Answer any **six** questions.*

*Weight 2 each.*

11. Compare the bonding in carbonyl and cyanide complexes.





12. Give an account of fluxional behaviour of  $\eta^3$ -allyl complexes.
13. Discuss the mechanism of alkene hydrogenation using Wilkinson's catalyst.
14. Give an account of dehydrogenation reactions involving oxidative addition.
15. Compare the modes of binding of  $O_2$  to the metal centres in (a) myoglobin (b) haemerythrin and (c) haemocyanin.
16. Write a note on biological calcification.
17. Write a note on radiometric titrations.
18. What is radiation polymerisation?

(6×2=12 weightage)

**Part C (Essay Type Questions)**

*Answer any **two** questions.*

*Weight 2 each.*

19. Give an account of the chemistry, structure and bonding of the  $\pi$ -allyl complexes of transition metals. Discuss methods for the preparation of  $\pi$ -allyl complexes of transition metals.
20. Give a detailed account of oxidative addition reactions with reference to different mechanisms involved.
21. Discuss various types of carbonylation reactions with special reference to catalysts and mechanisms involved.
22. a) Give a detailed account of redox metalloenzymes.  
b) Discuss the structure and functions of carbonic anhydrase, carboxypeptidase A and superoxide dismutase.

(2×5=10 weightage)

