



23003253

QP CODE: 23003253

Reg No :

Name :

M Sc DEGREE (CSS) EXAMINATION, APRIL 2023

First Semester

CORE - CH500101 - ORGANOMETALLIC AND NUCLEAR CHEMISTRY

M Sc CHEMISTRY, M Sc ANALYTICAL CHEMISTRY, M Sc APPLIED CHEMISTRY, M Sc
PHARMACEUTICAL CHEMISTRY, M Sc POLYMER CHEMISTRY

2019 ADMISSION ONWARDS

73C4CBBF

Time: 3 Hours

Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. What are Fischer and Schrock carbynes? Give one example each.
2. Carbonyl complexes can be used as precursors for a variety of complexes of other ligands. Why?
3. What is decarbonylation? Give an example.
4. What are concerted additions? Give an example.
5. What is turnover number and turnover frequency in homogeneous catalysis?
6. Write down the dehydrogenation reaction of cyclopentane.
7. What is photosynthesis?
8. Give one application of paramagnetic transition metal ions in MRI.
9. What are threshold fission neutrons?
10. What are the problems associated with the use of a very high amplification factor in the Geiger-Muller region?

(8×1=8 weightage)



Part B (Short Essay/Problems)

Answer any **six** questions.

Weight 2 each.

11. Discuss different modes of binding of CO in polynuclear metal carbonyls.
12. Explain how infrared spectroscopy helps in the structure elucidation of metal carbonyls.
13. What are redistribution reactions? Explain with suitable examples.
14. Why is it easier to investigate the Cossee-Arlman mechanism using metallocene alkene polymerization catalysts rather than Ziegler-Natta catalysts?
15. Discuss the mechanism of Wacker process.
16. Discuss the structure and functions of biological membranes.
17. Outline the structure and functions of carbonic anhydrase.
18. Discuss the applications of radiotracers in the study of kinetics of exchange reactions.

(6×2=12 weightage)

Part C (Essay Type Questions)

Answer any **two** questions.

Weight 5 each.

19. Give a detailed account of the structure and bonding in organometallic compounds with linear pi donor ligands.
20. a) Discuss the application of palladium catalysts in the formation of C-O and C-N bonds. b) Explain the role of organometallic compounds in the following reactions, i) carbonylation and borylation of arenes and ii) The Dötz reaction.
21. Explain the role of haemoglobin and myoglobin in the transport and storage of oxygen and CO₂.
22. a) Discuss radiation chemistry of water and aqueous solutions. b) Give an account of the relevance of radiation chemistry in biology, organic compounds and in polymerization.

(2×5=10 weightage)

