



21002177

QP CODE: 21002177

Reg No : .....

Name : .....

**M Sc DEGREE (CSS) EXAMINATION, NOVEMBER 2021****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

D63CF03B

Time: 3 Hours

Weightage: 30

**Part A (Short Answer Questions)***Answer any **eight** questions.**Weight 1 each.*

1. What are  $\pi$ -acceptor ligands? Give two examples.
2. What are low nuclearity carbonyl clusters? Give an example.
3. Give an example for oxidative carbonylation.
4. Which is the chief decomposition pathway for metal alkyls that have  $\beta$ -H substituents? Give an example.
5. What is turnover number and turnover frequency in homogeneous catalysis?
6. What is platinum pop? What is its use?
7. What are the toxic effects of chromium?
8. What is cytochrome P<sub>450</sub>?
9. Give the basic principle of proportional counters.
10. What are dosimeters? Mention two types of dosimeters.

(8×1=8 weightage)

**Part B (Short Essay/Problems)***Answer any **six** questions.**Weight 2 each.*

11. Explain important methods for the synthesis of alkene and acetylene complexes.
12. Mo(CO)<sub>5</sub> is isolobal with CH<sub>2</sub>. Justify.
13. Discuss SN<sup>2</sup> pathway of oxidative addition reactions.





14. Explain why metallocene catalysed polymerisation of propylene generally leads to syndiotactic polypropylene.
15. Discuss carbonylation of alkanes with suitable examples.
16. The presence of cobalt is essential for vitamin B<sub>12</sub> to serve its biological functions. Justify.
17. Discuss the role of calcium in muscle contraction.
18. What is neutron capture cross section? What is its importance?

(6×2=12 weightage)

### **Part C (Essay Type Questions)**

*Answer any two questions.*

*Weight 5 each.*

19. What are sandwich complexes? Discuss synthetic methods for metallocenes and cyclic arene complexes. Illustrate the bonding in ferrocene and dibenzenechromium.
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 CO<sub>2</sub>.
22. Discuss analytical applications of radioisotopes.

(2×5=10 weightage)

