QP CODE: 22001592

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Reg No : .....

Name : .....

M Sc DEGREE (CSS) EXAMINATION, JULY 2022

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

0E3DB6C3

Time: 3 Hours Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. Cyclic polyene and polyenyl ligands tend to be kinetically more stable to dissociation than their open-chain analogs. Why?
2. Analyse the CO bond strength in carbonyl complexes with metals in high oxidation states.
3. Free ethylene is sensitive to electrophilic attack whereas ethylene coordinated to a metal is sensitive to nucleophilic attack. Justify.
4. Terminal alkenes insert in the anti-Markownikov direction. Why?
5. What are the catalysts used in Monsanto acetic acid process?
6. Show the imortant steps involved in the oxidative coupling of two alkynes to give a cycli compound.
7. Why is the change from deoxyhaemoglobin to the oxy-form accompanied by a decrease in the observed magnetic moment?
8. Which are the important transition metal ions that found applications in MRI?
9. Define the term "reaction threshold".
10. What are radiometric titrations? Give an example.

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. Discuss the structure of metal-diene and metal-allyl complexes.
12. Discuss the structures of $Co_2(CO)_8$, $Fe_2(CO)_9$ and $Fe_3(CO)_{12}$.
13. Give an account of reductive elimination reactions of octahedral complexes.
14. Discuss metallocene catalysed polymerisation of propylene.
15. Discuss carbonylation of alkanes with suitable examples.
16. Explain the toxic effects of chromium, arsenic and cadmium.
17. Discuss the structure and functions of cytochrome P450.
18. Write a note on the radiation chemistry of water.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. a) Give an account of carbonyl clusters. b) Demonstrate isoelectronic and isolobal species with the help of suitable examples.
20. Explain the role of transition metal catalysts in the following reactions. a)olefin metathesis b) Wacker Process c) epoxidation of olefins and d) hydroxylation of olefins.
21. Discuss the role of PS I and PS II in photosynthesis.
22. What are the criteria used to evaluate the efficiency of radiation detectors? Discuss various techniques for radiation detection and compare the efficiecy of different radiation detectors.

(2×5=10 weightage)