TM211070TR **Reg. No :.....**

Name :.....

M. Sc. DEGREE (C.S.S.) EXAMINATION, NOVEMBER 2021

[2021 Admissions Regular and 2020 Admissions Improvement & Supplementary]

SEMESTER I - CORE COURSE (CHEMISTRY)

CH1C01TM20 - ORGANOMETALLICS AND NUCLEAR CHEMISTRY

Time : 3 Hours **Maximum Weight : 30**

Part A

I. Answer any Eight questions. Each question carries 1 weight **(8x1=8)**

1. Differentiate between different types of bi nuclear metal carbonyls with examples.
2. Discuss the different types of molecular orbitals formed in ferrocene and their energy levels.
3. Draw and discuss the Duncunson- Chat model briefly.
4. Illustate what is meant by 1,2- addition to double bonds with an example.
5. Explain what is meant by Platinum POP catalyst. What is its use?
6. Cite the types of membrane carbohydrates.
7. Summarize the different types of proteins in membranes.
8. Nuclear fusion reactions are called thermonuclear reactions. Discuss.
9. Discuss the principle of PGNAA.
10. List the steps involved in the production of radiopharmaceuticals.

Part B

II. Answer any Six questions. Each question carries 2 weight **(6x2=12)**

11. Discuss diagrammatically the bonding in Re_2Cl_8.
12. Illustrate in the form of a short essay about carbene and carbyne complexes.
13. Explain the hydrogenation of olefins using Tolman catalytic loop.
14. Explain the term water gas? What is its use?
15. Explain the role of cytochromes in electron transport.
16. Illustrate the structure of hemerythrins.
17. Discuss the importance, advantages and disadvantages of autoradiography.
18. Describe fission energy. Compute the energy released in the following fission:
    $_{99}Es^{249} + n = _{64}Gd^{161} + _{35}Br^{87} + 2n$, given the following atomic masses: $Es^{249} = 249.0762u$, $Gd^{161} = 160.9286u$, $Br^{87} = 86.9220u$, $n= 1.0087u$.

Part C

III. Answer any Two questions. Each question carries 5 weight **(2x5=10)**

19. Discuss the structure and bonding in a) Ferrocene b)Cyclic arene complexes.
20. Discuss a)Ring closing and ring opening metathesis b) Insertion of alkenes in Ar-H bond (any 2 examples) c) Regioselective borylation of alkanes and cycloalkanes.
21. Explain the role of Calcium in a) muscle contraction b) blood clotting.
22. Explain (a) Prompt gamma neutron activation analysis. (b) Principle, working and applications of Proportional counters.