

D4ACH2202

(2 Pages)

Name

Reg. No.

FOURTH SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2024

(Regular/Improvement/Supplementary)

CHEMISTRY

FCHE4E05 - SUPRA-MOLECULAR, MEDICINAL AND GREEN CHEMISTRY

Time: 3 Hours

Maximum Weightage: 30

Section A: Short answer questions. Answer any *eight* questions. Each question carries *one* weightage.

1. Discuss the role of cryptands in molecular recognition, emphasising their structural features.
2. Illustrate with an example how TMBA functions as a green catalyst in organic synthesis.
3. Explain the function of bio-catalysts in greener and more sustainable chemical processes.
4. Write a short note on supercritical fluid.
5. Give a synthetic application of the Bamford-Stevens reaction.
6. Illustrate how the Nazarov reaction can be used in the synthesis of cyclopentenone.
7. Demonstrate how the Mitsunobu reaction facilitates the functionalization of alcohol.
8. Give a synthetic application of the Grubb's catalyst.
9. What are the different types of literature databases? How do they support research activity?
10. Discuss ADME processes and their significance in determining the fate of drugs in the human body.
11. Write a short note on patenting.
12. Differentiate articles, communications and reviews in scientific reporting.

(8 × 1 = 8 weightage)

(P.T.O.)

Section B: Short essay questions. Answer any *four* questions. Each carries *three* weightage.

13. Discuss how molecular imprinting contributes to selective molecular recognition by citing examples such as crown ether and spherands.
14. Discuss how the green approach contributes to the principle of sustainable chemistry in the production of Ibuprofen by comparing it with the traditional method.
15. Explain the principles of atom economy and its significance. Provide an example of a reaction that exhibits high atom economy.
16. Illustrate the underlying principle involved in a multi-component reaction by citing a reaction that involves isocyanide as one of the components.
17. Demonstrate how the combinatorial approach can be used to fetch the chemo-diversity during organic synthesis.
18. What are the key criteria that govern a reaction as “Click”? Provide a well-known click reaction.
19. Provide an outline of the preparation of caffeine from uric acid.

(4 × 3 = 12 weightage)

Section C: Essay questions. Answer any *two* questions. Each carries *five* weightage.

20.
 - a) Define mechanically interlocked molecules (MIMs) and provide examples of different types such as rotaxane and catenanes.
 - b) Explore the impact of supra-molecular chemistry in the field of molecular sensing and data storage and processing.
21. Discuss the following
 - a) Principle and outline of the various processes involved in solid-state peptide synthesis
 - b) Microwave-assisted synthesis
22.
 - (a) Provide a synthetic outline of the following six-membered heterocycle with three hetero atoms (1) 1,3,5- triazines, (2) 1,2,3-triazines and (3) 1,2,4-triazines.
 - (b) Illustrate a method of synthesis of (1) benzoxazole, and (2) benzothiazole.
23.
 - a) Provide the significance of the structure-activity relationship in the design of drugs.
 - c) Define the concept of “prodrug”. Explain how prodrugs are utilized in targeted drug delivery systems.

(2 × 5 = 10 weightage)