Chemistry (P.G.)

[CBCS]

M.Sc. Third Semester End Examination-2023

(Regular & Supplementary Paper)

PAPER-CEM-303

Organic Special

Full Marks: 40 ***Time: 02 Hrs***

The figures in the right hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

Group - A

A. Answer any four questions of the following: **4x2= 8**

1. Discuss the basic difference between cryptand and crown ether.
2. What is the percentage atom utilization?
3. What is the major product of the following reaction with proper stereochemistry?

(R)-2-Chloropentan-3-one $\xrightarrow{NaBH_4}$?

4. Explain how Supramolecular chemistry plays animportant role in the field of chemotherapy.
5. Though *cis* decalin is chiral but it is non resolvable— Explain

6. What is atom economy? Give the range of atom economy for green synthesis.

Group - B

2. Answer any four questions of the following: 4x8= 32

7. What is "Green Chemistry"? Write down the principles of "Green Chemistry". Why Ionic liquid is used as green solvent? 2+4+2=8

8. a). Write a short note on molecular recognition by chemosensing method with schematic representation.

   b). Draw the structure of β-cyclodextrin (BCD) what are the foroes involved in stabilizing BCD-Guest Complex in water..

   c). Write down the structures of dibenzo-18- crown- 6 and [2.2.2] cryptand. 3+3+2=8

9. a). Write a short note on the following topics

   (i) Molecular docking,

   (ii) Static molecular recognition,

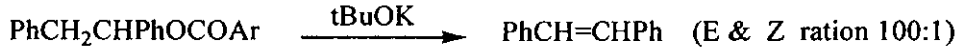
   (iii) Aza-crown ether.

   b). How 18-crown-6 can be synthesized from 1,2 diol by stepwise reaction? (2+2+1)+3

10. a). Deduce Curtin-Hammett (C-H) principle from first principles for a case where the more stable conformer gives rise to the predominant product. Explain with an energy

profile diagram. Briefly state the conditions for validity of the C-H principle.

b). Explain the following stereoselective elimination reaction applying Curtin-Hammet Principle



5+3=8

11. a) Give examples of Green synthesis (**any four**)

   i) Mannich reaction (Under Solvent free).

   ii) Heck reaction (Under MW irradiation condition).

   iii) Ullmann condensation (Ultrasound-mediated)

   iv) Diels-Alder Reaction (Under aqueous condition).

   v) Aspirin synthesis (Under solvent free).

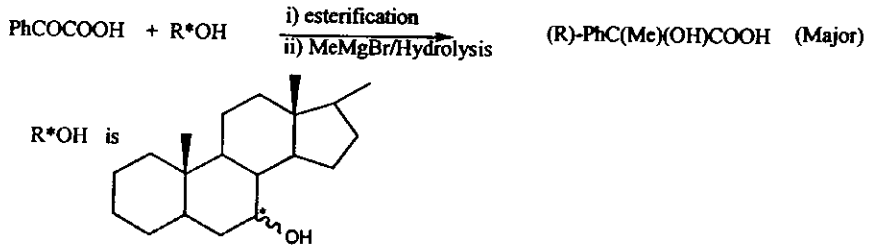
   vi) Passerini reaction (Under aqueous condition).

   b). Biocatalytic procedure is more superior than classical chemical procedure for the preparation of 6-aminopenicillanic acid from penicillin G -Explain? 1.5*4+2=8

12. (a) Describe two major secondary structures of proteins pictorially and the stabilizing forces for these structures.

   b). How would you synthesize Caprolactum from cyclohexanone (By sumitomo process)

   c). Find the product of the following reaction as per Prelog's rule and assign R/S configuration of the marked centre.



3.5+2+2.5 = 8

13. (a) Locate the following secondary structural element of proteins in Ramachandran plot: α -helix, parallel β -pleated sheet, antiparallel β -pleated sheet, 3.10 helix.

(b) Why is Hammett equation important?

(c) Write down the basic principle of green chemistry.

13+2+3=8