MCHE-013

ASSIGNMENT BOOKLET

M.Sc. in Chemistry Programme
(MSCCHEM)

SUPRAMOLECULAR CHEMISTRY

Valid from 1st July, 2025 to 30th June, 2026

It is Compulsory to submit the Assignment before filling in the Term-End Examination Form.

School of Sciences
Indira Gandhi National Open University
Maidan Garhi, New Delhi-110068
(2025-26)

Dear Student,

Please read the Section on assignments in the Programme Guide for M.Sc. in Chemistry that we sent you after your enrolment. A weightage of 30 per cent, as you are aware, has been earmarked for continuous evaluation, which would consist of one tutor-marked assignment for this course. The assignment is in this booklet, and covers all the four blocks of the course. The total marks of all the parts are 100, of which 40% are needed to pass it.

Instructions for Formatting Your Assignments

Before attempting the assignment please read the following instructions carefully:

1) On top of the first page of your answer sheet, please write the details exactly in the following format:

ENROLMENT NO.: ……

NAME: ……

ADDRESS: ……

……

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COURSE CODE: …….

COURSE TITLE: …….

ASSIGNMENT NO.: ……..…

STUDY CENTRE: ……..….. **DATE:** …….……...

PLEASE FOLLOW THE ABOVE FORMAT STRICTLY TO FACILITATE EVALUATION AND TO AVOID DELAY.

2) Use only foolscap size writing paper (but not of very thin variety) for writing your answers.

3) Leave 4 cm margin on the left, top and bottom of your answer sheet.

4) Your answers should be precise.

5) Solve Part (A) and Part (B) of this assignment, and **submit the complete assignment answer sheets within the due date.**

6) The assignment answer sheets are to be submitted to your Study Centre within the due date. **Answer sheets received after the due date shall not be accepted.**

   We strongly suggest that you retain a copy of your answer sheets.

7) This assignment is **valid from 1st July, 2025 to 30th June, 2026**. If you have failed in this assignment or fail to submit it by June, 2026, then you need to get the assignment valid from 1st July 2026, and submit it as per the instructions given in the Programme Guide.

8) **You cannot fill the examination form for this course** until you have submitted this assignment.

We wish you good luck.

Tutor Marked Assignment

MCHE-013: SUPRAMOLECULAR CHEMISTRY

Course Code: MCHE-013
Assignment Code: MCHE-013/TMA/2025-26
Maximum Marks: 100

Note: Attempt all questions. The marks for each question are indicated against it.

1. a) Explain cation– π interactions in supramolecular chemistry with a suitable example. (5)

   b) What are van der Waals interactions? What is its role in supramolecular chemistry? (5)

2. a) Explain the different types of cooperativity in supramolecular chemistry. Also give suitable examples (one each) for each type. (5)

   b) "A kinetically stable supramolecular complex may not always be the thermodynamically most stable product". Justify this statement. (5)

3. a) Discuss the important factors which may be considered when one designs a molecular receptor for selective binding of a guest molecule. (5)

   b) In what ways does preorganization reduce the entropic penalty during binding? (5)

4. a) What is spherical recognition? Which type of species exhibit such a recognition? Name three classes of hosts involved in such recognition. (5)

   b) What are spherands? Give their characteristics. Also draw the structure of a spherand. (5)

5. a) What is bis(tren)? Draw its structure and the structure of its smaller analogue. Discuss important features of its bonding with different anions. (5)

   b) What are cyclodextrins? Name three important cyclodextrins. Also give their constituent units and the type of bonds present in them. (5)

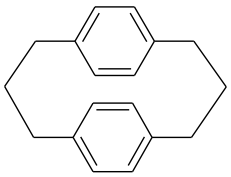
6 a) Write the structures of the following compounds (3)

   i) 15-crown-5

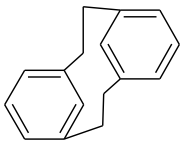
   ii) 18-crown-6

   b) Which cations will fit into these crown ethers? (2)

   i)



   ii)



   c) Explain entropic hydrophobic effect. What is its role in supramolecular chemistry? (5)

7. a) "Supramolecualar systems have been designed to mimic the structure or function of more complex biological processes". Explain this with any two examples. (5)

   b) Explain the supramolecular features of plant photosynthesis. (5)

8. a) What are the steps involved in supramolecular reactivity and catalysis? (5)

	b)	What are rotaxanes? Give a suitable diagram for it.	(5)
9.	a)	Elaborate on self-assembling coordination compounds with any one example.	(5)
	b)	What are tectons in supramolecular chemistry? How the concept of supramolecular synthon developed from this?	(5)
10.	a)	Explain the supramolecular electronic ionic and switching devices with a suitable example.	(5)
	b)	When is device supramoelcular?	(5)