

MCH-012

ASSIGNMENT BOOKLET

**M.Sc. in Chemistry Programme (MSCCHEM)
M.Sc. in Analytical Chemistry Programme (MSCANCHEM)**

STEREOCHEMISTRY AND REACTIVE INTERMEDIATES

(Valid from 1st January, 2025 to 31st December, 2025)

**It is compulsory to submit the assignment before filling in
the examination form.**



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

Dear Learner,

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 :

.....

.....

COURSE CODE :

COURSE TITLE :

ASSIGNMENT NO. :

STUDY CENTRE : **DATE** :

(NAME AND CODE)

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

- 2) Use only foolscap size paper (but not of very thin variety) for writing your answers.
- 3) Leave about 4 cm margin on the left, top and bottom of your assignment response sheet.
- 4) Your answers should be precise.
- 5) 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 January, 2025 to 31st December, 2025. If you have failed in this assignment or fail to submit it by December, 2025, then you need to get the assignment for the year 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 the assignment.

Wishing you good luck

Tutor Marked Assignment

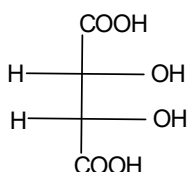
Stereochemistry and Reactive Intermediates (MCH-012)

Course Code: MCH-012
Assignment Code: MCH-012/TMA/2025
Maximum Marks: 100

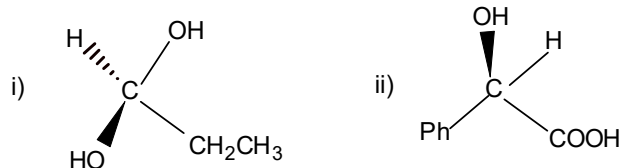
Note: Attempt all the questions. The marks for each question are indicated against it.

1. Carry out the following conversions as indicated.

- a) Fischer form to: i) Staggered and Eclipsed Sawhorse forms and (5)
ii) Staggered and Eclipsed Newman forms

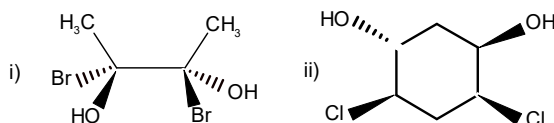


- b) Flying wedge form to Fischer forms (5)

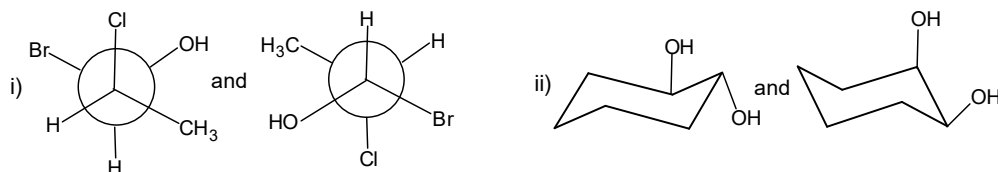


2. a) Suppose that there is a mixture having a specific rotation of $+75^\circ$ and an enantiomeric excess of 60%. Find out the enantiomeric composition of the mixture. (5)

- b) Draw the *meso* isomers of the following compounds. (5)

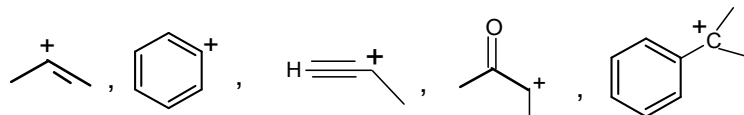


3. a) List the properties of diastereomers. Indicate whether the following are enantiomers or diastereomers. (5)

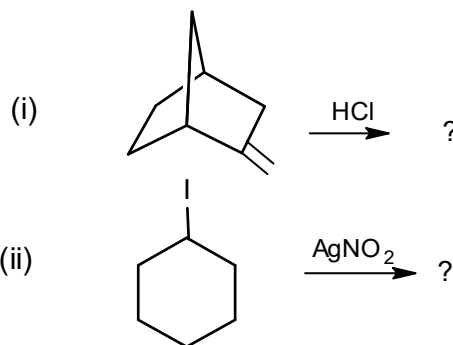


- b) How are disubstituted cyclohexanes different from monosubstituted cyclohexanes with reference to the isomerism? Draw the two chair conformations for each of the following disubstituted cyclohexanes. Draw also the *cis* and *trans* isomers and indicate the more stable isomer. (5)

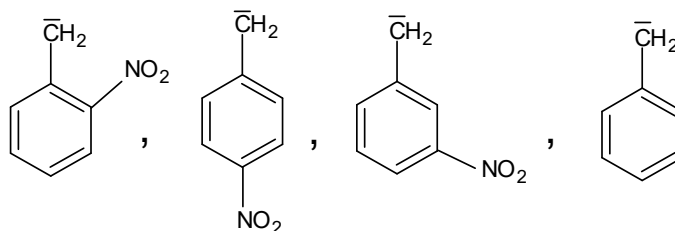
- i) *cis*-Bromo-1-methylcyclohexane
 ii) *trans*-2-Butyl-1-isopropylcyclohexane
 iii) *cis*-4-Ethyl-1-hydroxycyclohexane
4. a) What are the advantages and limitations of method of quasi-racemates? (5)
 b) What is pseudoasymmetry? Explain with the help of a suitable example. (5)
5. a) Briefly explain conformationally rigid systems and conformationally mobile diastereomers giving one example for each. Also correlate the reactivity and the conformations of these examples. (5)
 b) What are left- and right- circularly polarised lights? Draw suitable diagrams for them. (5)
6. a) Give any two applications of ORD and CD. (5)
 b) What is the principle of microscopic reversibility? Explain taking the example of an addition-elimination reaction or a nucleophilic substitution reaction. (5)
7. a) Select the resonance stabilised cation and give reason for your answer. (5)



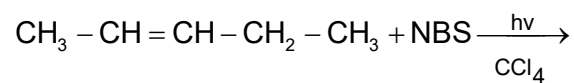
- b) Write the product formed and give the mechanism. (5)



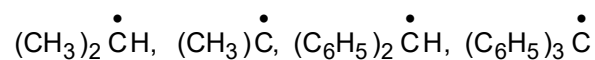
8. a) Does a carbanion behave as an acid or a base? Explain the stability of carbanion on the basis of this behaviour? (5)
 b) Arrange the following anions in the decreasing order of stability. (5)



9. a) Predict the product and write the mechanism. (5)



- b) Arrange the following radicals in their increase order of stability and give the reason of your answer. (5)



10. Write the products formed in each of the following and give the mechanism. (10)

