

**ASSIGNMENT BOOKLET****Bachelor's Degree Programme (B.Sc.)****ORGANIC REACTION MECHANISM****(Valid from 1<sup>st</sup> January, 2025 to 31<sup>st</sup> December, 2025)****Please Note**

- You can take electives (56 to 64 credits) from a minimum of TWO and a maximum of FOUR science disciplines, viz. Physics, Chemistry, Life Sciences and Mathematics.
- You can opt for elective courses worth a MINIMUM OF 8 CREDITS and a MAXIMUM OF 48 CREDITS from any of these four disciplines.
- At least 25% of the total credits that you register for in the elective courses from Life Sciences, Chemistry and Physics disciplines must be from the laboratory courses. For example, if you opt for a total of 64 credits of electives in these 3 disciplines, at least 16 credits should be from lab courses.
- You cannot appear in the Term-End Examination of any course without registering for the course. Otherwise, your result will not be declared and the onus will be on you.



School of Sciences  
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(2025)

Dear Student,

We hope, you are familiar with the system of evaluation to be followed for the Bachelor's Degree Programme. At this stage you may probably like to re-read the section on assignments in the Programme Guide 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. The assignment is based on Blocks 1, 2, 3 and 4.

**Instructions for Formatting Your Assignments**

Before attempting the assignments, 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:

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ENROLMENT NO.....

NAME:.....

ADDRESS:.....

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COURSE CODE : .....

COURSE TITLE : .....

ASSIGNMENT NO.: .....

STUDY CENTRE : ..... DATE:.....  
(NAME AND CODE)

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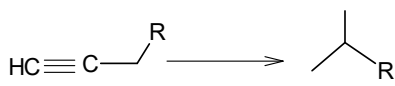


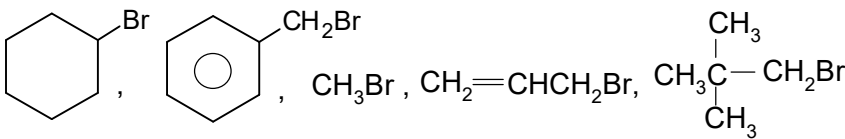
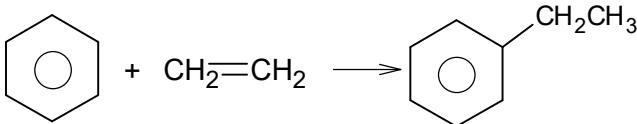
**PLEASE FOLLOW THE ABOVE FORMAT STRICTLY TO FACILITATE EVALUATION AND TO AVOID DELAY.**

- 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 While writing answers, clearly indicate the Question No. and part of the question being solved.
- 6 Please note that:
  - i) The Assignment is valid from 1<sup>st</sup> January, 2025 to 31<sup>st</sup> December, 2025.
  - ii) The response to this assignment is to be submitted to the Study Centre Coordinator within eight weeks of the receipt of this booklet in order to get the feedback and comments on the evaluated assignment.
  - iii) In any case, you have to submit the assignment response before appearing in the term end examination.
- 7 **We strongly suggest that you should retain a copy of your assignment responses.**  
**Wishing you all good luck.**

## Tutor Marked Assignment CHE-06: Organic Chemistry

Course Code: CHE-06  
Assignment Code: CHE-06/TMA/2025  
Maximum Marks: 100

- Note:** \*
- \* This assignment is based on all the four Blocks of the entire course.
  - \* All questions are compulsory. Marks for the questions are shown within brackets on the right hand side.
  - \* Please answer in your **own words**; do not copy from the course material.

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| 1. | a)   | List the factors that are responsible for the relative strength of nucleophiles. Write the conjugate acids of the following nucleophiles.<br>$R_3N$ , $RCHCN^-$ , $^-NH_2$ , $Br^-$ , $CH_3CH_2O^-$  | (5) |
|    | b)   | Categorise the following reactions as oxidation or reduction reaction indicating the oxidation state of carbon in the reactants and the products for all the reactions:  | (5) |
|    | i)   |   |     |
|    | ii)  |   |     |
|    | iii) |    |     |
|    | iv)  |   |     |
|    | v)   |   |     |
| 2. | a)   | What is the principle of microscopic reversibility? How is it explained by the transition state theory of organic reactions? Explain with the help of an example.  | (5) |
|    | b)   | Why is a substitution reaction proceeding by $S_N2$ mechanism referred sometimes as direct displacement process? Arrange the following aliphatic bromides in the increasing order of reactivity by $S_N2$ mechanism:<br><br> | (5) |
| 3. | a)   | Answer the questions given for the following reaction:<br><br>  | (5) |
|    | i)   | Write the electrophile participating in this reaction.   |     |
|    | ii)  | Write the reagents used for the reaction.  |     |
|    | iii) | Name the reaction.   |     |

|    |     |  |      |
|----|-----|--|------|
|    | iv) | Write the complete mechanism of the reaction.  |      |
|    | b)  | Which of the following pair of carbocation is more stable and why?   | (5)  |
|    | i)  | $\text{NCCH}^+-\text{CH}_3$ or $\text{NC}\cdot\text{CH}_2-\overset{+}{\text{C}}\text{H}_2$<br>Secondary carbocation    Primary carbocation                   |      |
|    | ii) | $\overset{+}{\text{C}}\text{ICH}-\text{CH}_3$ or $\text{CICH}_2-\overset{+}{\text{C}}\text{H}_2$<br>Secondary carbocation    Primary carbocation             |      |
| 4. | a)  | Explain the following:   | (5)  |
|    | i)  | Electron withdrawing substituents at the carbonyl carbon increase the reactivity towards nucleophilic addition reactions.                                    |      |
|    | ii) | Rate of reaction of acetaldehyde with aniline increases with the increase in acidity but beyond certain limit it decreases with further increase of acidity. |      |
|    | b)  | Differentiate Saytzeff and Hofmann rules giving suitable examples.   | (5)  |
| 5. | a)  | Predict the product(s) and give the mechanism of the following reactions:  | (5)  |
|    | i)  | $\text{CH}_3\text{C}\equiv\text{CCH}_2\text{CH}_3 \xrightarrow[2. \text{H}_2\text{O}]{1. \text{Na, Li, NH}_3}$   |      |
|    | ii) | $\text{CH}_3(\text{CH}_2)_7\text{COCH}_3 \xrightarrow{\text{LiAlH}_4/\text{H}^+}$  |      |
|    | b)  | Write short notes on the following giving mechanism:   | (5)  |
|    | i)  | Aldol condensation   |      |
|    | ii) | Michael addition   |      |
| 6. |     | Write the chemical reaction for the following reactions along with their detail description:   | (10) |
|    | a)  | Reimer-Tiemann reaction  |      |
|    | b)  | Carbylamine reaction   |      |
|    | c)  | Witting reaction   |      |
|    | d)  | Wolff rearrangement  |      |
|    | e)  | Hofmann rearrangement  |      |
| 7. | a)  | Explain, why the reaction of <i>m</i> -bromoanisole with sodamide gives only one product.  | (5)  |
|    | b)  | Describe the bromination reactions at allylic and benzylic positions by <i>N</i> -bromosuccinimide.  | (5)  |
| 8. | a)  | Write detail mechanism for the following rearrangements:   | (5)  |
|    | i)  | Wagner-Meerwein rearrangement  |      |
|    | ii) | Beckmann rearrangement   |      |
|    | b)  | Explain the mechanism of [4+2] cycloaddition reaction.   | (5)  |

|     |  |            |
|-----|--|------------|
| 9.  | a) Taking suitable examples, explain the role of sensitisers in photo-reactions.<br>b) Describe reaction types used to construct a carbon skeleton with suitable examples. | (5)<br>(5) |
| 10. | Write short notes on the following:<br>a) Cleaning action of soaps<br>b) Auxochromes<br>c) Antibiotics<br>d) Condensation polymers<br>e) Retrosynthesis                    | (10)       |