

ASSIGNMENT BOOKLET**Bachelor's Degree Programme (B.Sc.)****ORGANIC CHEMISTRY**

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

(Valid from 1st January, 2023 to 31st December, 2023)

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
Indira Gandhi National Open University
New Delhi
(2023)

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 percent, 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:

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.

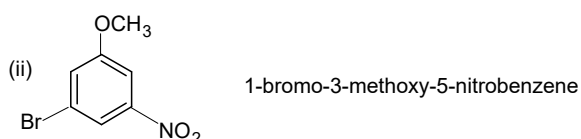
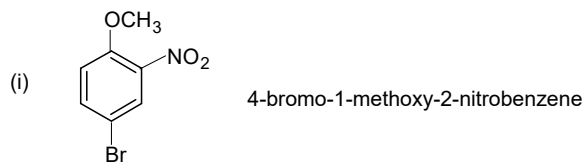
2. Use only foolscap size writing paper (but not of very thin variety) for writing your answers.
3. Leave 4 cm margin on the left, top and bottom of your answer sheet.
4. Your answers should be precise.
5. While writing answers, clearly indicate the Question No. and part of the question being solved.
6. Please note that:
 - i) The Assignment is valid from 1st January, 2023 to 31st December, 2023.
 - 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 filling the exam for 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-05: ORGANIC CHEMISTRY

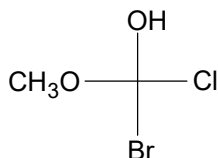
Course Code: CHE-05
Assignment Code: CHE-04/TMA/2023
Maximum Marks: 100

Note: Answer all the questions given below. The marks are indicated in the brackets.

1. (a) Give the IUPAC name of the following: (2)

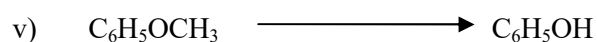


- (b) Explain the type of hybridisation in ethyne giving suitable diagrams. (3)
2. (a) Draw the geometric isomers of 2,3-diodopent-2-ene. Assign their configuration as E or Z. (3)
- (b) How can these isomers be differentiated? (2)
3. (a) What is Walden inversion? Explain giving a suitable example. (3)
- (b) Write two more Fischer projections for the following compound: (2)



4. (a) Write the isomers of pentane. Which isomer will have the highest melting point? Explain. (3)
- (b) Which will have higher λ_{\max} value - 1,3-butadiene or 1,4-pentadiene? (2)
5. (a) Label the acid-base and conjugate acid-conjugate base pairs in the following systems: (3)
- (i) propanoic acid and water
- (ii) water and ethylamine
- (b) What are Lewis acids and Lewis bases? Give one example of each. (2)
6. (a) How would you prepare alkanes from the following? (Give only one example). (3)
- (i) Alkyl halide
- (ii) Carboxylic acid
- (iii) Alkene
- (b) Explain the following: (2)
- (i) In the mass spectra, alkanes give a series of peaks separated by 14 mass units.
- (ii) Alkanes with an odd number of carbon atoms have a lower melting point than those

- with an even number of carbon atoms.
7. (a) Explain the following in one to two lines. (2)
- (i) Alkenes are more soluble in water than corresponding alkanes.
- (ii) Addition reactions of alkenes are exothermic processes.
- (b) Complete the following reactions: (3)
- (i) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}=\text{CHCH}_3 \xrightarrow[2. \text{H}_2\text{O}/\text{Zn}]{1. \text{O}_3}$
- (ii) $\text{CH}_3\text{CH}_2\text{BH}_2 \xrightarrow{\text{CH}_3\text{COOH}}$
- (iii) $\text{CH}_2=\text{CH}-\text{CH}=\text{CH}_2 + \text{CH}_2=\text{CH}_2 \longrightarrow$
8. (a) How would you prepare a *cis*- and *trans*- alkenes from an alkyne? Give reaction for each. (2)
- (b) Which one of the following is most basic? Justify your answer. (3)
- alkanide anion; alkenide anion; alkynide anion
9. (a) Why does nitrobenzene does not undergo Friedel-Crafts alkylation? (2)
- (b) What do you understand by *para*-directing activators, *ortho*-directing activators and *meta*-directing deactivators?
10. (a) Give the reactions for following conversions: (3)
- (i) Furfural to furan
- (ii) Pyridine to 2-hydroxypyridine
- (iii) Thiophene to 2,5-dihydrothiophene
- (b) Give various resonance structures of carbocation formed during electrophilic substitution of furan. (2)
11. (a) Discuss the advantages of crown ethers in organic synthesis? (2)
- (b) Alcohols are not as strong acids as phenols, Explain. (3)
12. Taking a suitable example for each, write the mechanism of following reactions: (5)
- i) Haloform reaction
- ii) Aldol condensation
13. Explain the following reactions with the help of suitable examples: (5)
- i) E2 reaction
- ii) S_N1 reaction
14. (a) How you will carry out following conversions? (5)
- i) $\text{ArNH}_2 \longrightarrow \text{ArX}$
- ii) $\text{C}_6\text{H}_6 \longrightarrow \text{C}_6\text{H}_5\text{OH}$
- iii) $\text{CH}_3\text{CH}=\text{CH}_2 \longrightarrow \text{CH}_2\text{OH}-\text{CH}(\text{OH})-\text{CH}_2\text{OH}$



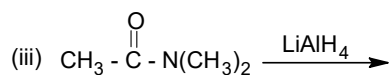
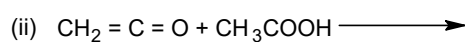
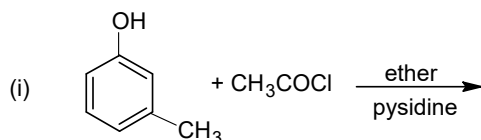
15. Discuss the mechanism of Fischer esterification. (5)

16. (a) How would you prepare 1, 2-benzenedicarboxylic acid by two different ways? (2)

(b) How can the above acid be converted to its anhydride and imide? Write chemical reactions for the conversions. What is an imide group? (3)

17. (a) What is trans-esterification? Give an example. (2)

(b) Complete the following reactions: (3)



18. (a) How will you prepare 1,4-dinitrobenzene starting from benzenamine? (3)

(b) Briefly explain the spectral characteristics of nitro compounds. (2)

19. (a) Explain why the enantiomers of an amine cannot be separated while those of the quaternary ammonium compounds, these can be separated. (3)

(b) What is carbylamine reaction? Explain its use. (2)

20. Discuss Edman degradation of a peptide giving suitable reactions. (5)