

ASSIGNMENT BOOKLET**Organic Chemistry****Bachelor's Degree Programme (B.Sc.)****(Valid from 1st January, 2019 to 31st December, 2019)****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
(2019)

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, 2019 to 31st December, 2019.
 - 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.**

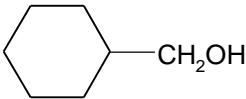
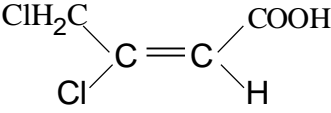
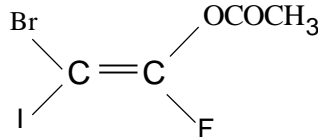
Wishing you all good luck.

Tutor Marked Assignment

ORGANIC CHEMISTRY

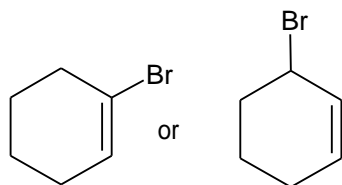
Course Code: CHE-05
Assignment Code: CHE-05/TMA/2019
Maximum Marks: 100

- 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.
-

1. a) Give the IUPAC names of the following compounds:
- i) $\text{CH}_3\text{COOCH}_2\text{CH}_2\text{CH}_3$ (1)
- ii) $\text{C}_2\text{H}_5-\overset{\text{O}}{\parallel}{\text{C}}-\text{O}-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3$ (1)
- iii)  (1)
- b) Write the structures of the following compounds:
- i) *N*-ethyl-*N*-methylethanamide (1)
- ii) 4-Nitro-*N*-phenylethanamide (1)
2. a) Explain the following giving suitable examples: (3)
- i) Enantiomers
- ii) Diastereomers
- iii) Meso compounds
- b) Assign the configuration as *E* or *Z* to the following compounds: (2)
- i) 
- ii) 
3. a) Draw sawhorse projections for the most stable and the least stable conformations of butane. (2)
- b) Discuss the relative stabilities of various conformations of 1,3-dimethylcyclohexane. (3)
4. Give reason for the following:
- i) Ethanol has higher boiling point than dimethyl ether. (2)
- ii) Hexanol is less soluble in water than butanol. (1)
- iii) The λ_{max} value for ethene is 175 nm whereas that for 1,3-butadiene is 217 nm. (2)

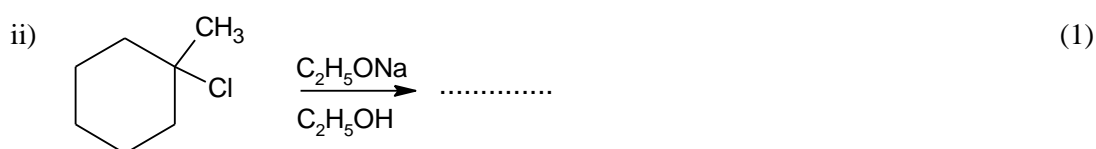
5. Explain why a tertiary carbocation is more stable than secondary carbocation which in turn, is more stable than a primary carbocation. (5)
6. a) How would you prepare an alkane/a cycloalkane from the following? (Give only one example). (3)
- i) Alkyl halide
 - ii) Carboxylic acid
 - iii) Hexanedioic acid
- b) Explain the following: (2)
- i) In the mass spectra, alkanes give a series of peaks separated by 14 mass units.
 - ii) Hydrohalogenation is a regiospecific reaction.
7. a) An alkene having molecular formula C_6H_{12} , on ozonolysis yielded butanal and ethanal. What is the structural formula of the alkene? Give equation for this (2)
- b) Explain Markonikoff's and *anti*-Markonikoff's rules with suitable examples. (3)
8. a) How would you prepare (2)
- i) 1,2-dibromobutane from 1-butyne, and
 - ii) 1-propyne from 1-propene?
- b) Explain the following: (3)
- i) In the NMR spectrum, δ the value of alkenyl protons is higher than those of alkynyl protons.
 - ii) Addition of water to an alkyne does not give a diol.
 - iii) Reduction of an alkyne in the presence of sodium metal gives a *trans* alkene.
9. a) What is resonance energy? Explain by taking the example of benzene. (2)
- b) Explain the following: (2+1)
- i) In the electrophilic substitution reactions, 1-position of naphthalene is more reactive than its 2-position. (Draw all possible resonance structures).
 - ii) Chlorination of ethylbenzene gives 1-chloro-1-phenylethane as the major product.
10. a) Compare the basicities of pyridine and pyrrole. (2)
- b) Give the chemical equations of the following reactions: (3)
- i) Condensation of methanal and ethanal in the presence of ammonia
 - ii) Paal-Knorr reaction
 - iii) Friedel-Crafts acylation ofazole.

11. a) Which member of the following pair would undergo a faster S_N1 reaction? (2)

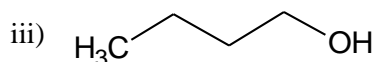
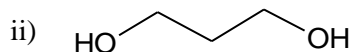
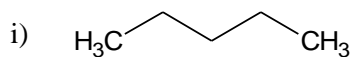


Explain your answer.

- b) Complete the following reactions. If more than one product is formed which one is the major product? (3)

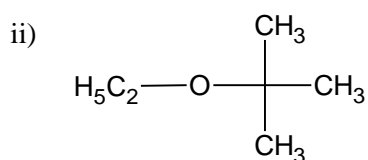
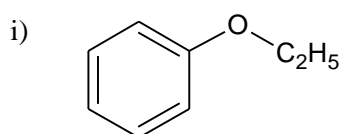


12. a) Arrange the following compounds in the order of their increasing solubilities in water. (3)



- b) How will you prepare 2, 4, 6-trinitrophenol starting from phenol? (2)

13. a) Using Williamson ether synthesis, how would you prepare following ethers? (3)



- b) By taking a suitable example, write the mechanism of the reaction of a thiol with an alkyl halide. Explain why thiols react more rapidly than open chain ethers. (2)

14. a) By taking a suitable example, give one laboratory test which is commonly used for the detection of aldehydes and ketones. Write the names of two reagents used for distinguishing between aldehydes and ketones. (3)

- b) Write chemical reactions for following name reaction: (2)

i) Benzoin condensation

ii) Gattermann synthesis

15. What is Fischer esterification? Explain its mechanism. (5)
16. a) Explain the following:
- Lactones (1)
 - Zwitter ion (1)
 - Lactam (1)
17. Complete the following reactions: (5)
- $$\text{RCOCl} \xrightarrow[\text{quinoline}]{\text{H}_2\text{Pd-BaSO}_4} \dots\dots\dots$$
 - Ethanoyl chloride + propanol $\xrightarrow{\text{N}(\text{CH}_2\text{CH}_3)_2} \dots\dots\dots$
 - $\text{CH}_2 = \text{C} = \text{O} + \text{RCOOH} \longrightarrow \dots\dots\dots$
 - $\text{RCOOCOR} + \text{R}'\text{OH} \longrightarrow \dots\dots\dots + \dots\dots\dots$
 - $$\text{CH}_3\text{COOCH}_2\text{CH}_3 + \text{H}_2 \xrightarrow[523\text{ K}]{\text{Copper chromite}} \dots\dots\dots$$
18. a) Explain Henry reaction using aliphatic and aromatic aldehydes. (2)
- b) How will you prepare 1,4-dinitrobenzene by starting with benzenamine? (3)
19. a) Explain isocyanide reaction and its importance. (2)
- b) Give examples of the following reactions: (3)
- Gattermann reaction
 - Gomberg – Bachmann reaction
 - Schiemann reaction
20. a) Explain mutarotation in glucose by drawing suitable structures. (2)
- b) Define the following for oils and fats: (3)
- Acid value
 - Saponification value
 - Iodine value.