MCH-017

ASSIGNMENTBOOKLET

M.Sc. in Chemistry Programme
(MSCCHEM)

M.Sc. in Analytical Chemistry Programme
(MSCANCHEM)

ORGANIC CHEMISTRY-II

(Valid from January, 2025 to 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, NewDelhi – 110068
(2026)

Dear Learner,

Please read the Section on assignments in the Programme Guide for M.Sc. in Chemistry/M.Sc.in Analytical 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:……...

(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 4cm 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 solved assignment.
7) This assignment is valid from **1st January, 2026 to 31st December, 2026**. If you have failed in this assignment or fail to submit it by **31st December, 2026**, then you need to get the assignment for the year **2027**, 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.**

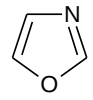
Wishing you good luck

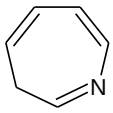
Tutor Marked Assignment
Organic Chemistry-II

Course Code: MCH-017
Assignment Code: MCH-017/TMA/2026
Maximum Marks: 100

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

1. (a) Write the names of the following compounds (2)

(i) 

(ii) 

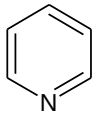
(b) Write the structures: (3)

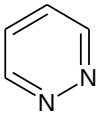
(i) Carbazole

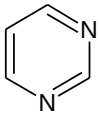
(ii) Pyrizino [2,3-d] pyridazine

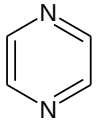
(iii) 3-Methylazacyclohexane

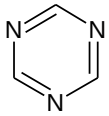
2. How many signals will appear in the ^{1}H-NMR of the following compounds? (5)

(i) 

(ii) 

(iii) 

(iv) 

(v) 

Also give their chemical shift values.

3. Give the oxiranes formed by the epoxidation reactions of *cis*- and *trans*-2-butenes. Also write the mechanism of this reaction. (5)

4. Discuss any *two* methods of preparation of oxetanes giving suitable examples. (5)

5. How can you obtain imidazoles using the following methods? (5)

(i) Maquene synthesis

(ii) Bredereck reaction

6. (a) Give the products of the following reactions: (3)

(i) Vilsmeier-Haack reaction of benzofuran

(ii) Nitration of benzothiophene

(iii) Chlorination of benzothiophene

(b) Which position of indole is preferred for electrophilic substitution reaction of indole and why? (2)

7. (a) Give the products formed when (3)

(i) Benzimidazole reacts with acrylonitrile

(ii) Benzimidazole reacts with formaldehyde

(iii) Benzotriazole is nitrated

(b) Describe the uses of benzotrioles. (2)

8. (a) How did Emil Fischer synthesise purine? Give the sequence of reactions. (3)

(b) Give any *two* examples of synthetic antimalarial drugs with structure wherein a quinoline moiety is present. (2)

9. Draw the products of the following: (5)

(i) Reduction of quinoline with different reagents.

(ii) Oxidative cleavage of quinoline

(iii) Bromination of quinoline

10. (a) How can you synthesis oxepine from the following: (4)

(i) [2,2,0] hexa-2,5-diene

(ii) 1,4- cyclohexadiene

(b) Give the product of reaction of oxepine with maleic anhydride. (1)

11. Discuss the disconnections for the synthesis of paracetamol. Also write its scheme of synthesis. Draw the general scheme/mechanism of Stille coupling reaction. Give examples of some additives which are used to increase the rate of these reactions. (5)

12. Explain using suitable diagram the mechanism of catalytic hydrogenation of an alkene. (5)

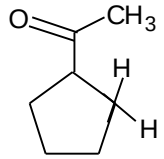
13. What is Lindlar's catalyst? Give the products of reaction of mandelic acid and naphthalene using hydrogenation. (5)

14. What is DIBAL? Give the method of its preparation. Which groups can be reduced using this reagent? Give any *three* examples of the compound which can be reduced using DIBAL. (5)

15. Write the structures and the preparation of the following: (5)
(i) Disimylborane
(ii) Thexylborane
(iii) 9-BBN
Give the products of reduction of 4-methylpent-2-ene with the above boranes.

16. Give a general reaction of asymmetric 1, 2-aminohydroxylation of alkenes using $(DHQ)_2$ –PHAL AD catalyst in the presence of (TsNClNa). Also give various nitrene equivalents which are frequently as reagents in this reaction. (5)

17. Discuss the sequence of reactions for preparing the following compound using ethylaceoacetate (5)



18. Discuss umpolung formation with dithiane. Give the reaction of 1,3-dithiane anion with ethanal and cyclohexanone. (5)

19. Giving suitable examples discuss the use of phase transfer catalysts in the following reactions: (5)
(i) Alkylation
(ii) Oxidation
(iii) Heck reaction
(iv) Wittig reaction
(v) Aldol and related reactions

20. What are stereospecific reactions? Briefly discuss any *two* of their examples. (5)