

ASSIGNMENT BOOKLET

Bachelor's Degree Programme (B.Sc.)

ORGANIC REACTION MECHANISM

(Valid from 1st January, 2013 to 31st December, 2013)

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
Maidan Garhi, New Delhi-110068
(2013)**

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, 2013 to 31st December, 2013.
 - 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.**

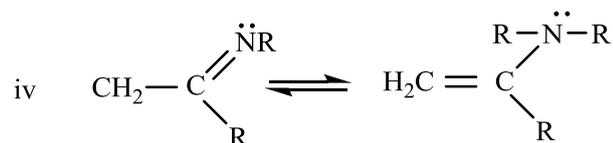
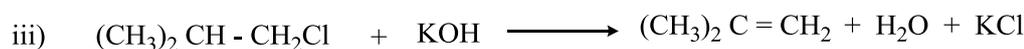
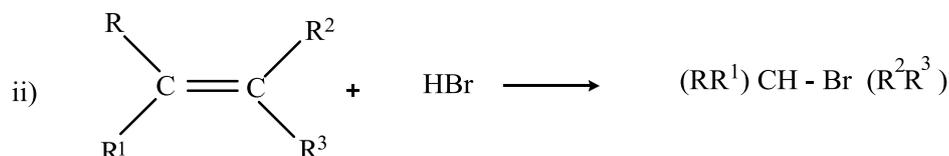
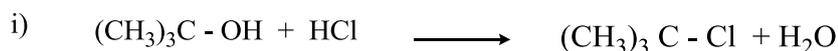
Wishing you all good luck.

Tutor Marked Assignment
Organic Reaction Mechanism

Course Code: CHE-06
Assignment Code : CHE-06/TMA/2013
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) Categorise the following reactions into various types you have studied in Unit 1 of the Organic Reaction Mechanism course. (4)



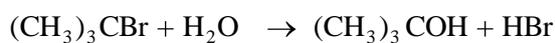
- b) Which of the following molecules or ions are electrophilic and which ones are nucleophilic? Give reasons for your answer. (3)



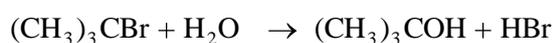
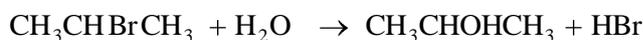
- c) Differentiate between nucleophilicity and basicity taking examples for each of these. (3)

2. a) Draw an energy diagram for a one step reaction that is fast and releases a large amount of energy. Explain the diagram in words. (4)

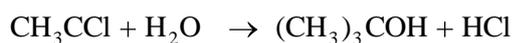
- b) Which in the following pairs would undergo a faster reaction by $\text{S}_{\text{N}}1$ mechanism and why?



i) Or



ii) Or

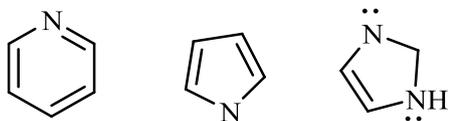


(3)

c) Which will undergo a faster reaction by S_N2 mechanism and why?



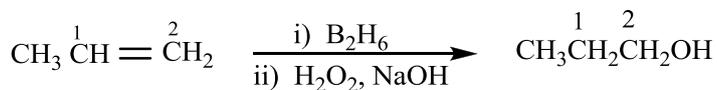
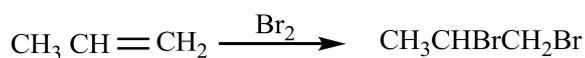
3. a) Out of the following compounds which would be considered aromatic by Hückel's rule and why?



(3)

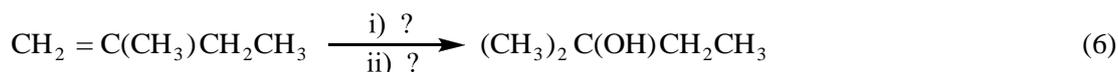
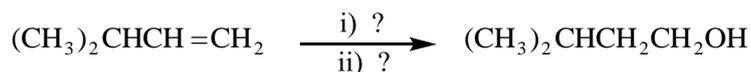
b) Propose the synthesis of 2-bromo-4-nitrotoluene from benzene. (3)

c) Indicate whether the carbon atoms in the following are oxidized or reduced. Also explain your answer.



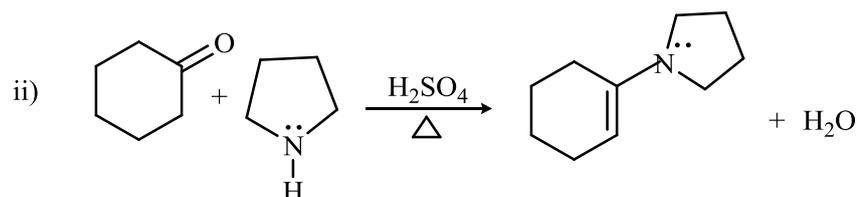
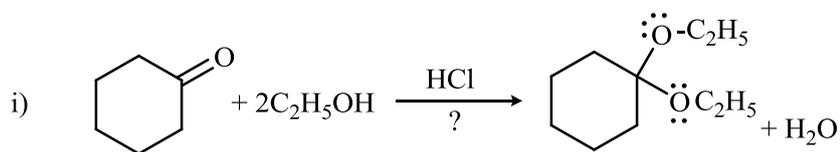
(4)

4. a) Write the reagents in the following to complete the reaction. Also give the mechanism of the reactions.

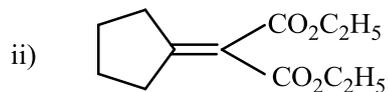
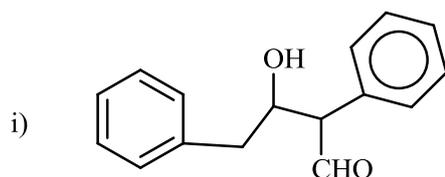


b) Explain the formation of both 1,2 and 1,4-addition products when 1,3-butadiene is treated with HCl or hydrogen. (4)

Q.5 a) Write the mechanism of the following reactions:



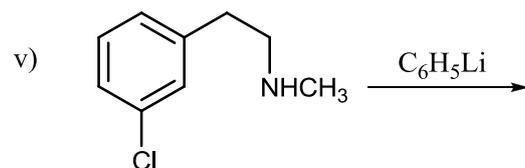
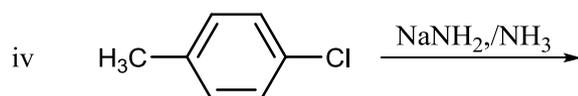
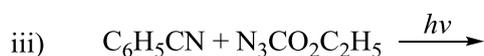
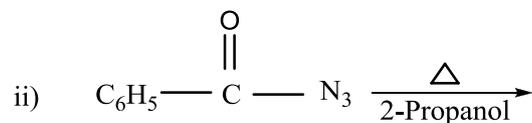
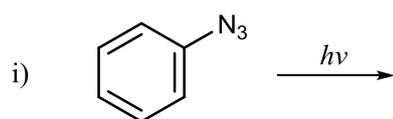
b) Aldol condensation proceeds by carbon-carbon bond formation between an enolate donor and a carbonyl acceptor. For the following aldol products write the donor and the acceptor and give the mechanisms for the reactions.



(4)

6. a) Why do the reactions of singlet carbenes with *cis*-2-butene give only *cis*-1,2-dimethyl cyclopropane and on the other hand triplet carbenes give both *cis* and *trans*-1,2-dimethyl cyclopropane? Explain. (5)

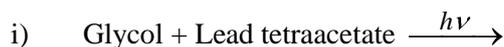
- b) Complete the following reactions:



(5)

7. a) What are the advantages of using NBS as brominating agent in place of molecular bromine? Explain. (5)

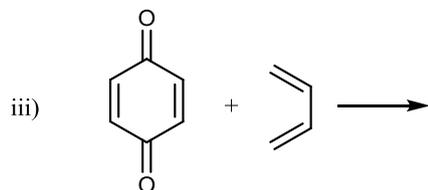
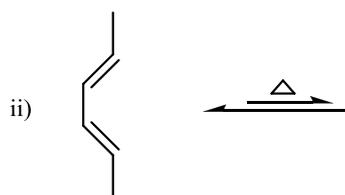
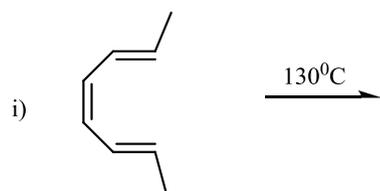
- b) Complete the following reactions and give their mechanism:



(5)

8. a) Explain, why does phenyl group migrate preferentially in 2, 3-diphenyl 2, 3 butanediol when it is treated with cold H_2SO_4 ? (4)

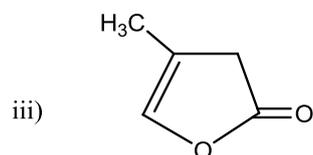
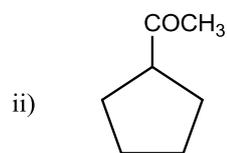
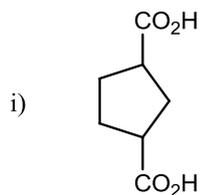
- b) Write the structure of the products including the type of rotation involved if any during for the following reactions:



(6)

9. a) What are the physical processes available to the electronically excited molecules to dissipate their energies? (5)
- b) Describe the photoreduction reaction of benzophenone. (5)

10. a) How the following compounds could be prepared from acetoacetic esters and malonic esters?



(6)

- b) Write short notes on the following:

i) Antacids

ii) Xanthene Dyes

(4)