



Post Graduate Teaching Department of Chemistry
Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur
Master of Science (M.Sc.) CHEMISTRY Examination (CBCS)
Second Semester Organic Chemistry
Paper – VI (2T2)

Time: Three Hours]**[Max Marks: 60**

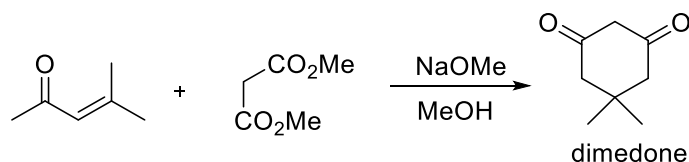
N.B.: 1. All questions are compulsory.

2. Figures to the right indicates marks allotted to the question.

1. a) Predict the major products [X] and [Y] formed in the following reactions with suitable mechanism. (4)



- b) Write a suitable mechanism for the following reaction. (4)



- c) Predict the major products [X] and [Y] formed in the following reactions with suitable mechanism. (4)

**OR**

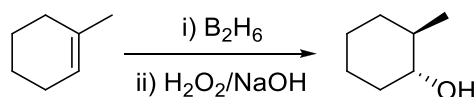
1. d) Predict the major products [X] and [Y] formed in the following reactions with suitable mechanism. (4)



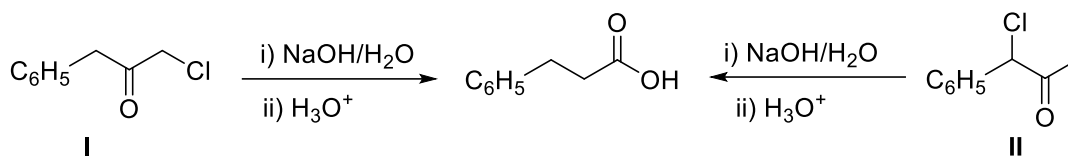
- e) Identify the structures of [W] and [X] in the following transformations. (4)



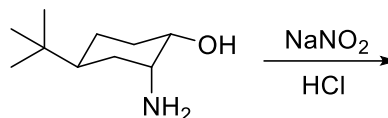
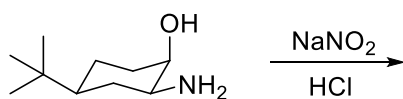
- f) Write a suitable mechanism for the following reaction. (4)



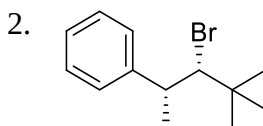
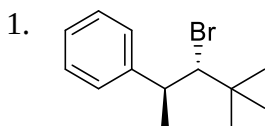
2. a) Provide an explanation for the observation that both I and II produce the same rearrangement product when treated with aqueous base. (4)



b) Predict the products of the following reactions. (4)

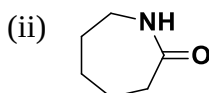
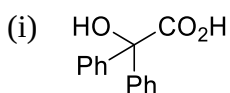


c) For the following chiral molecules, draw the products of E2: (4)

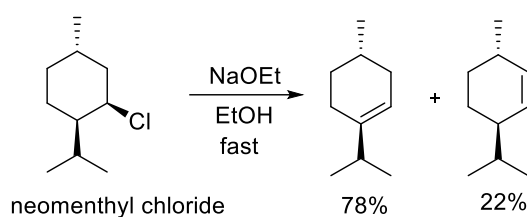
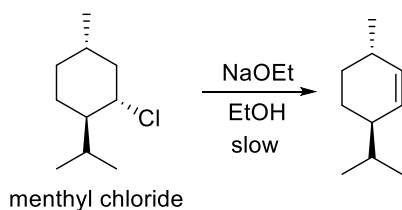


OR

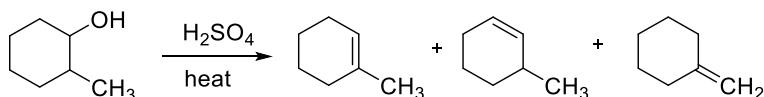
2. d) Outline routes involving rearrangement reactions to the following: (4)



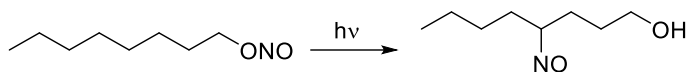
e) Explain the following experimental observation for stereoisomers of menthyl chloride: (4)



f) Draw a stepwise, detailed mechanism for the following reaction. (4)

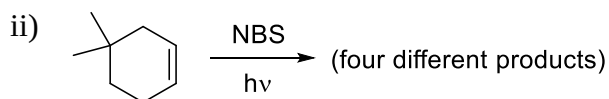
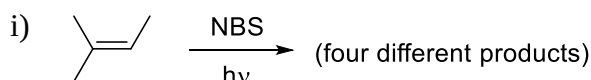


3. a) Write a suitable mechanism for the following reaction. (4)



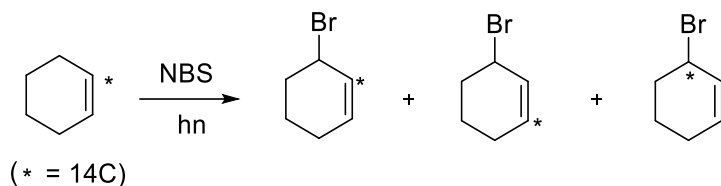
b) Show the initiation, propagation, and termination steps for the monochlorination of cyclohexane. (4)

c) Draw the products formed when each alkene is treated with NBS under photochemical conditions (no mechanism). (4)

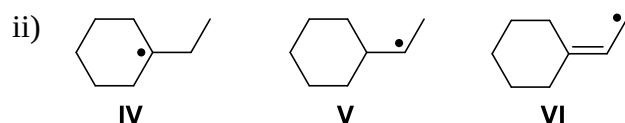
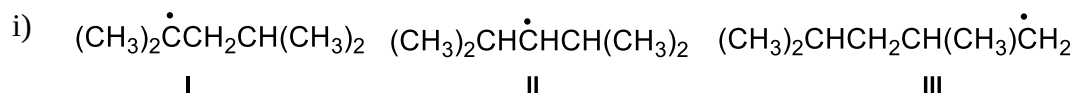


OR

3. d) How will you account for the formation of the following products on treatment of labeled (* = ^{14}C) cyclohexene with NBS. (4)



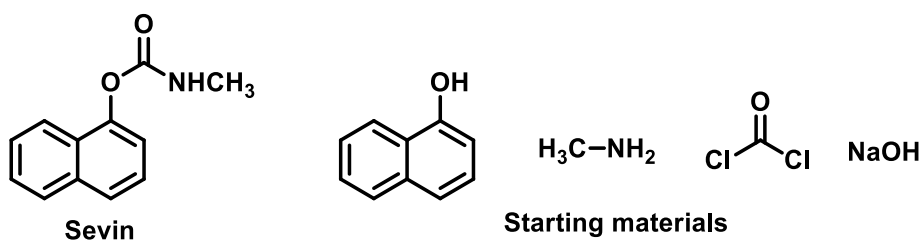
- e) Rank each group of radicals in order of increasing stability. (4)



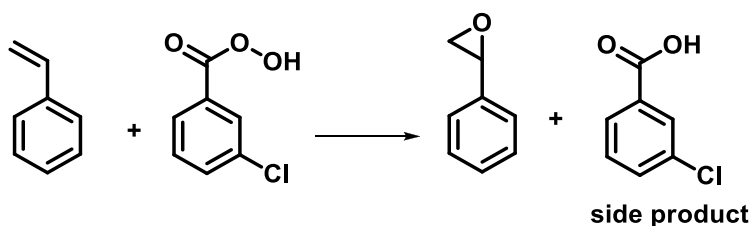
- f) Predict the products for each reaction. In each case, be sure to consider whether a chirality center is being generated and then draw all expected stereoisomers. (4)



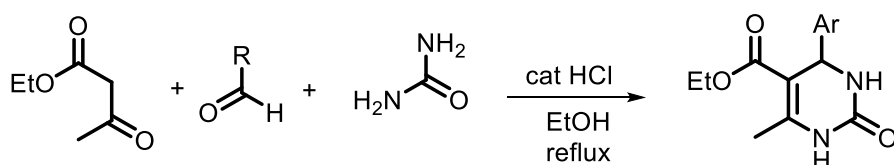
4. a) Sevin, an insecticide can be prepared from the following indicated starting materials using two different pathways. Write the complete sequence of reactions for its synthesis with the involvement of the intermediate, if any in both the pathways. Identify which one has resulted in the Bhopal Gas Tragedy while another one is a safer chemistry. (4)



- b) Explain the significance of atom economy of a chemical reaction in Green Chemistry. (4)
- Calculate the atom economy of the following reaction.

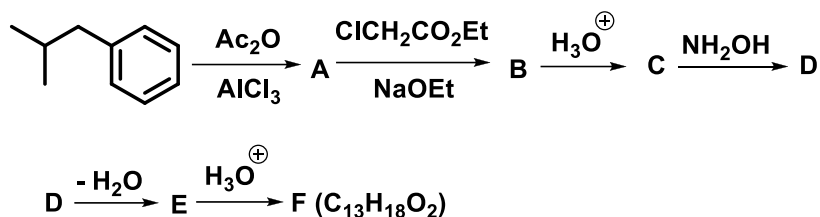


- c) Write a suitable mechanism for the following multi-component reaction. (4)



OR

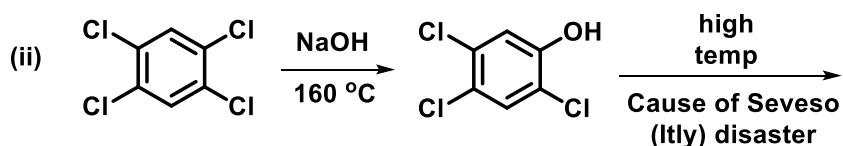
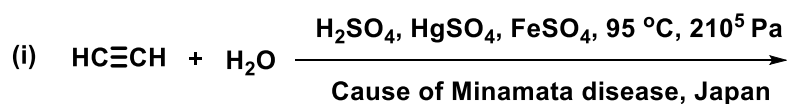
4. d) Complete the following reaction sequence: (4)



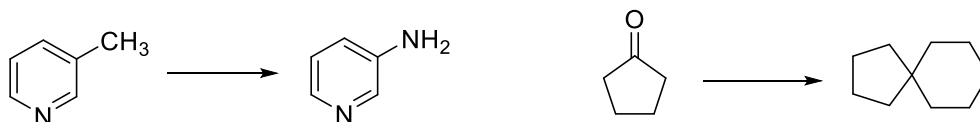
- e) Write a synthesis of following involving aspects of green chemistry. (4)

(i) paracetamol and (ii) adipic acid

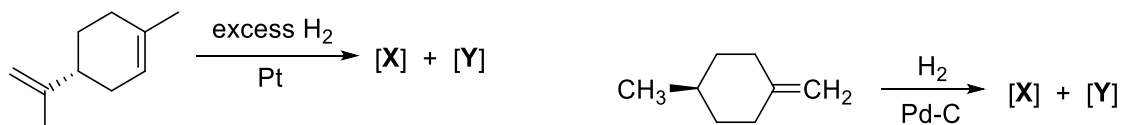
- f) Predict the product of following reactions. (4)



5. a) How will you bring about the following transformations? (3)



- b) Predict the product of following reactions with suitable stereochemistry. (3)



- c) Give the major product(s) of the reaction of 1-methylcyclohexene with the following reagents, ignoring stereoisomers: (3)

(i) NBS/heat/peroxide (ii) HBr and (iii) HBr/peroxide

- d) State and explain basic twelve principles of Green Chemistry. (3)