



120

KIBABII UNIVERSITY

**UNIVERSITY EXAMINATIONS
2017/2018 ACADEMIC YEAR**

**THIRD YEAR FIRST SEMESTER
MAIN EXAMINATIONS**

FOR THE DEGREE OF B.ED (SCIENCE)

COURSE CODE: SCH 330

COURSE TITLE: ORGANIC SYNTHESIS

DURATION: 2 HOURS

DATE: 16TH JANUARY 2018 TIME: 2 – 5PM

INSTRUCTIONS TO CANDIDATES

- Answer **QUESTION ONE** (Compulsory) and any other two (2) Questions.
- Indicate **answered questions** on the front cover.
- Start every question on a new page and make sure question's number is written on each page.

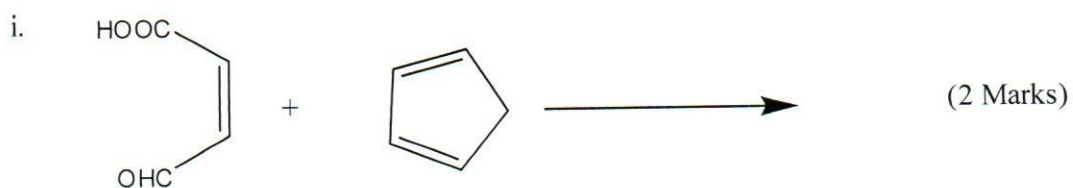
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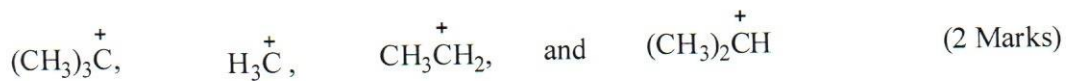
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Question One

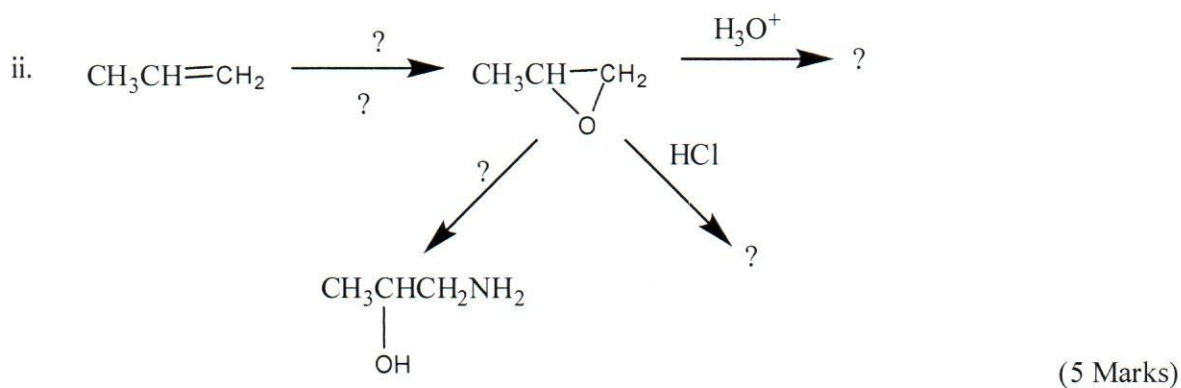
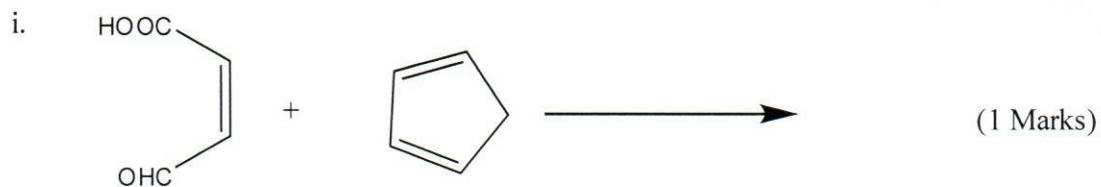
- (a) Define the following terms as used in organic synthesis
- (i) Functional group Addition (1Mark)
 - (ii) Disconnection (1Mark)
 - (iii) Adduct (1Mark)
- (b) Distinguish between the following
- (i) Synthons and synthetic equivalent (2Marks)
 - (ii) Synthesis and retrosynthesis (2Marks)
- (c) Using suitable examples where necessary illustrate the importance of organic synthesis (5Marks)
- (d) Using Curly arrows show how the breaking of various bonds leads to the formation of the products in the reaction below. (2Marks)



- (e) State five guidelines that may be used when choosing a disconnection in retrosynthetic analysis. (5 Marks)
- (f) Arrange the following species in order of increasing stability.



- (g) Complete the reaction schemes below by identifying the missing reagents/ products

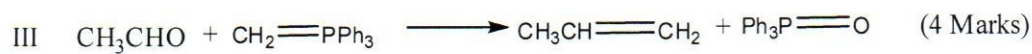
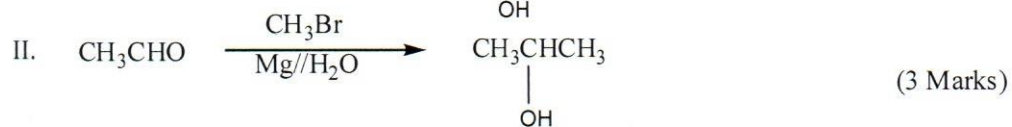
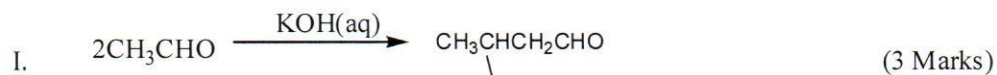


Question two

(a) (i) What do you understand by the term "Mixed Aldol Condensation"? (1Mark)

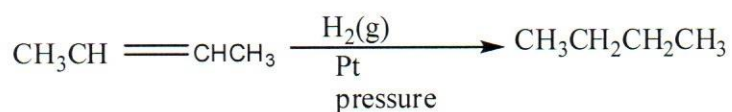
(ii) State one limitation of the process mentioned in 2 (a) (i) above, with a suitable illustration. (2Mark)

(b) Write a mechanism for the reactions below:

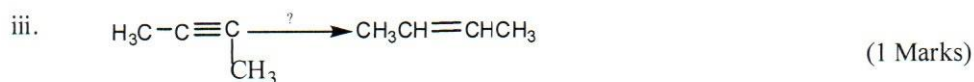
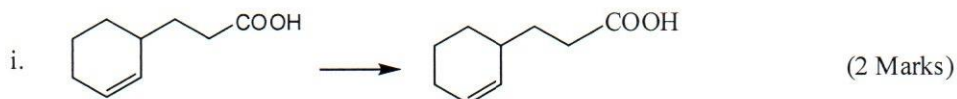


Question three

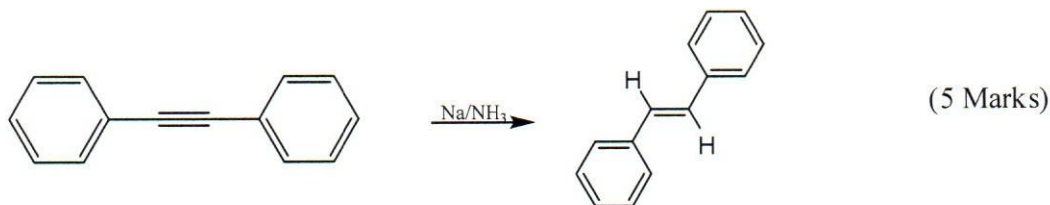
(a) Study the reaction below and answer the questions that follow



- (i) Name the process represented by the above reaction (1Mark)
(iii) State and explain the regioselectivity of this reaction. (2Marks)
- (b) Indicate the missing reagents in the following reactions



(c) Write plausible mechanisms for the reactions below



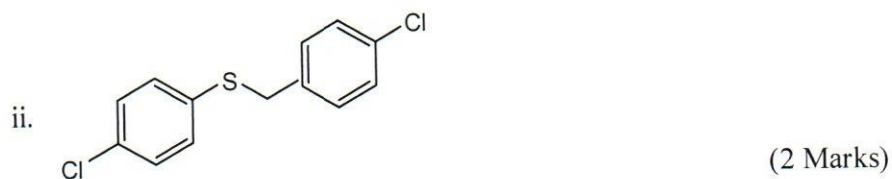
(d) (i) State Saytzeff's rule (1 Mark)

(ii) Write the names and structures of the products formed when the following reagents are treated with alcoholic sodium hydroxide.

- (I) Tert-butylbromide (2 Marks)
(II) Isopropyl chloride (2 Marks)

Question four

- (a) Starting with a suitable dicarboxylic acid, outline the synthesis of cyclohexane.
(b) Identify the missing reagents and/or products in the reaction scheme below.



(c) State four advantages of synthesising organic compounds. (4Marks).

(d) Distinguish between Linear synthesis and Convergent synthesis. (2Marks)

(e) (i) What is a protecting group? (1Mark)

(ii) Give two protecting groups for the following functionalines

(I) Carbonyl compounds (2Marks)

(II) Amines (2Marks)