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# KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS  
2016/2017 ACADEMIC YEAR

THIRD YEAR FIRST SEMESTER  
SPECIAL/SUPPLEMENTARY EXAMINATIONS

FOR THE DEGREE OF B.ED (SCIENCE)

**COURSE CODE:** SCH 330

**COURSE TITLE:** ORGANIC SYNTHESIS

**DURATION:** 2 HOURS

**DATE:** 15<sup>TH</sup> SEPTEMBER 2017 **TIME:** 11:30 AM – 1:30 PM

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### 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.

This paper consists of 3 printed pages. Please Turn Over



KIBU observes ZERO tolerance to examination cheating

**SECTION A (30mks)**

1 a. State the meaning of the following symbols as used in organic synthesis.

i TM

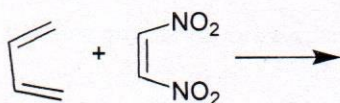
ii  $\rightleftharpoons$

b. Define the following terms

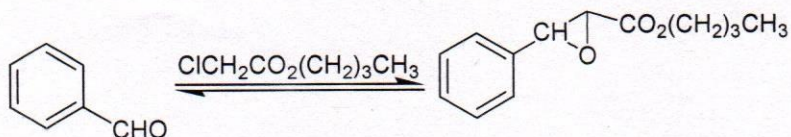
I Retrosynthetic analysis

li Synthron

c. Using arrows show how the various bonds lead to the formation of the product in the process below.



d. Write a mechanism to show the conversion below is carried out. (4mks)



e. Explain how ylides are prepared and give an example of a ylide. (4mks)

f. Explain why a synthetic route with the lowest number of steps should be preferred. (3mks)

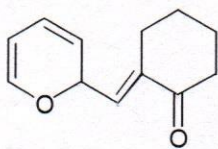
g. Carry out retrosynthesis of cyclohexanol giving the synthons and synthetic equivalents. (4mks)

h. Carry out a retrosynthesis and give synthetic write up of aminocyclohexanone. (5mks)

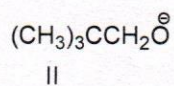
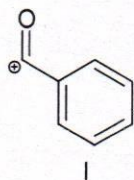
**SECTION B (CHOOSE TWO QUESTIONS FROM THIS SECTION)**

Question two (20mks)

2 a. Write the mechanism involved in the synthesis of the following compound in presence of an excess base. (10mks)

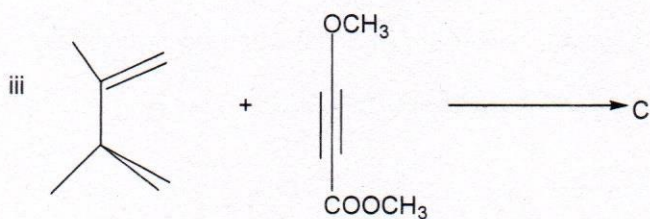
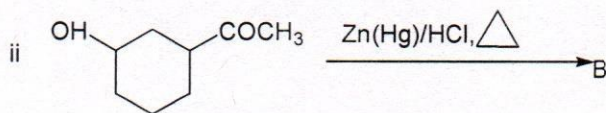


Provide synthetic equivalents to the following synthons (2mks)



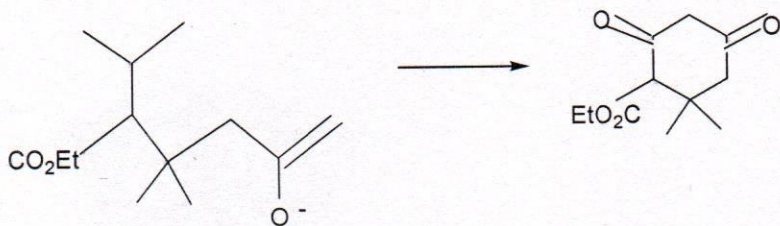
b. Using an illustration, explain how Grignard reagent is prepared. (5mks)

c. Complete the following reactions



Question three (20mks)

3 a. Using curly arrows, write the reaction mechanism for the following conversion.



b.

i. Define a protecting group (2mks).

ii. Name two reagents used to protect alcohols and carboxylic acids. (2mks)

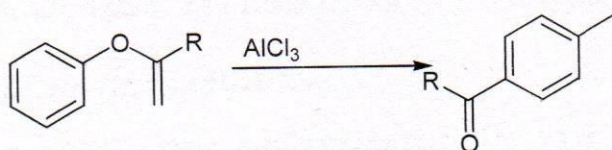
iii. State two qualities of a good protecting group. (2mks)

c. Differentiate between linear synthesis from convergent synthesis. (4mks)

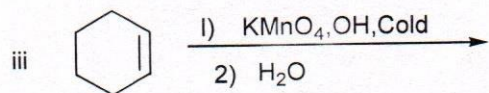
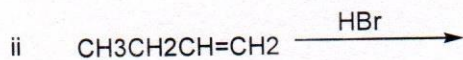
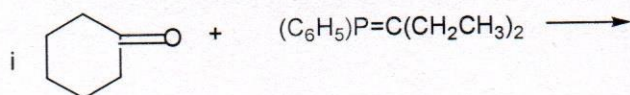
Question four (20mks)

4 a. Write a mechanism and draw the product of the reaction below. (4mks)

b. Write the mechanism for the rearrangement below. (6mks)



c. Give the products of the following reactions (6mks)



d. List four theoretical considerations before designing a synthesis. (4mks)