

**MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY**

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**University Examinations 2015/2016**

THIRD YEAR, FIRST SEMESTER EXAMINATION FOR BACHELOR OF SCIENCE CHEMISTRY

**SCH 2303 : SYNTHETIC ORGANIC CHEMISTRY I**

**DATE: NOVEMBER, 2015 TIME:** $2 $**HOURS**

**INSTRUCTIONS:** *Answer question* ***one*** *and any other* ***two*** *questions.*

**QUESTION ONE – (30 MARKS)**

1. Define the following terms; (4 Marks)
2. Acyclic hydrocarbons
3. Cyclic compound
4. Mixed aldol reaction
5. Ylide
6. Briefly describe the conditions for synthesizing useful products in crossed aldol reactions. (4 Marks)
7. Using protecting groups, show how the following reaction can be achieved. (8 Marks)

 

1. Why are Grignard reagents prepared in anhydrous diethyl ether while organolithium reagents are not. (3 Marks)
2. (i) What is a directed aldol reaction? (2 Marks)

(ii) Describe the mechanism and indicate the product formed in the following reaction.

  (6 Marks)

1. Give the structure and the name of the product in the following reaction. (2 Marks)

 

1. What is an $∝, β-$unsaturated carbonyl compound? (1 Mark)

**QUESTION TWO (20 MARKS)**

1. Draw the structures of the products/ reactants in the following reactions and give their names. (8 Marks)
2. 
3. 
4. 
5. 
6. Briefly describe the mechanism of reacting pentaN-2-one with a wittig reagent.(4 Marks)
7. Name two carbonyl compounds that lack $∝$ hydrogen atoms. (2 Marks)
8. By use of a relevant equation, describe the application of di-imide in reduction of alkenes. (6 Marks)

**QUESTION THREE (20 MARKS)**

1. By indicating the mechanism of the reaction, draw the product of the following claisen reaction.

  (8 Marks)

1. What starting materials are required in each of the following compounds by Robinson annulation method. (8 Marks)



 

1. What is the significance of organic synthesis? (4 Marks)

**QUESTION FOUR (20 MARKS)**

1. Draw the resonance structures for the wittig reagent. (2 Marks)
2. Draw the structures of the following compounds; (5 Marks)
3. Lithium dimethyl cuprate
4. 3-hydroxybutanal
5. Butylmagnesiumbromide
6. 1,3- dinitrile
7. 2,5-hexanedione
8. Show the mechanism involved in the following Dieckmann reaction. (8 Marks)



1. Show the starting material used to synthesize 3-methyl hexan-3-ol by using the Grignard reagent. (5 Marks)