

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF
DOCTOR OF PHILOSOPHY IN CHEMISTRY

CHEM 921: ADVANCED DEVELOPMENT IN ORGANIC SYNTHESIS

STREAMS: PHD (CHEM)

TIME: 3 HOURS

DAY/DATE: FRIDAY 24/04/2020

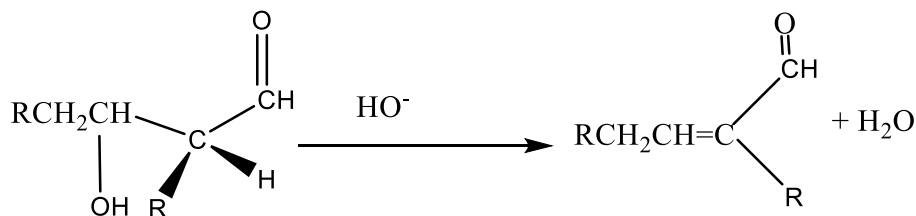
8.30 AM – 11.30 AM

INSTRUCTIONS:

ANSWER ALL QUESTIONS

QUESTION ONE (20 MARKS)

- a) Using an example write short notes on the following steps of planning an organic synthesis. (9marks)
- Construction of the carbon skeleton
 - Functional group interconversion
 - Control of relative stereochemistry
- b) Discuss two factors that affect the choices of a synthetic method in organic synthesis (4marks).
- c) Write notes on a protective groups and include the properties of a good protective group (4marks)
- d) Write the mechanism of the following base catalyzed Aldol condensation. (3marks).

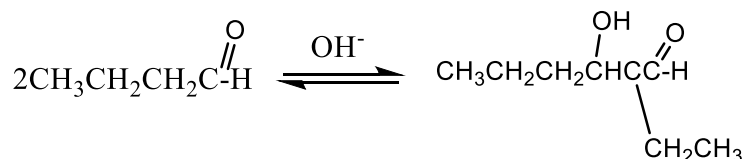


QUESTION 2 (20 MARKS)

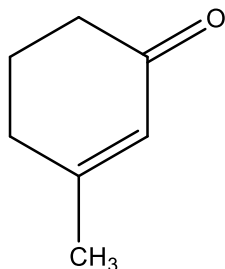
a) Write brief notes on protection and deprotection of the following groups using examples (9marks).

- i) Amino groups
- ii) Carboxylic acids
- iii) Alcohols

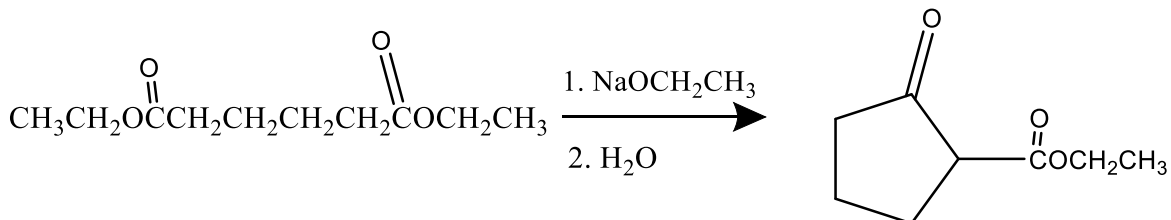
b) Write the mechanism of the following reactions (5marks)



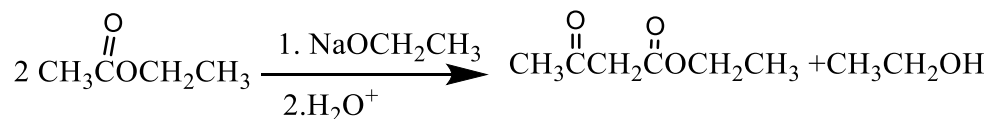
c) Applying retrosynthetic analysis show the reactant(s) and conditions for the synthesis of the following molecule. (3marks)



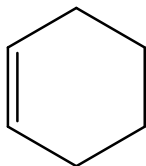
d) Write the mechanism for the following Dieckmann cyclization. (3marks)

**QUESTION 3 (20 MARKS)**

a) Write the mechanism of Claisen condensation of ethyl acetate (5marks)



- b) Write the reactants and mechanism of the Diels alder formation of the following molecule. (3marks).



- c) Using an example explain hydroformylation and why it is industrially important (3marks)
- d) Write short notes of synthetic design in organic synthesis. (4marks)
- e) Propose a retrosynthetic analysis for the synthetic of the following target molecule (5marks)

