



MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

P.O. Box 972-60200 – Meru-Kenya

Tel: +254(0) 799 529 958, +254(0) 799 529 959, + 254 (0) 712 524 293,

Website: info@must.ac.ke Email: info@must.ac.ke

University Examinations 2024/2025

THIRD YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF EDUCATION SCIENCE AND BACHELOR OF SCIENCES

SCH 3301: SYNTHETIC ORGANIC CHEMISTRY I

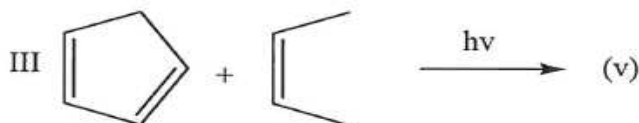
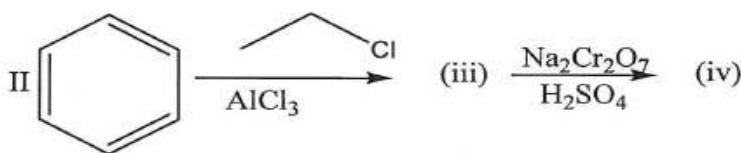
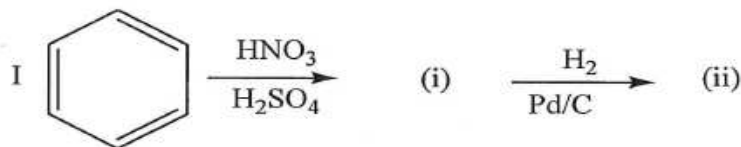
DATE: JANUARY 2025

TIME: 2 HOURS

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

QUESTION ONE (30 MARKS)

- a) State three reasons why chemist synthesis organic compounds (3 marks)
- b) Predict the major product for each reaction shown below (10 marks)



- c) i) Define the term protecting group (1 mark)

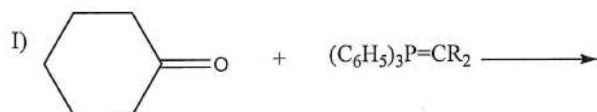
- ii) State three criteria of good protecting group (3 marks)
- d) Illustrate the difference between linear and convergent synthesis (3 marks)
- e) Starting with 1-butyne and any other organic and inorganic reagents, how could you make the following ketone (5 marks)



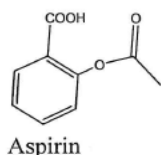
- f) Discuss the chemistry of carbonyl functional group (5 marks)

QUESTION TWO (20 MARKS)

- a) Explain the following terms as used for an ideal synthesis
- Highly efficient (2 marks)
 - Greenest route (2 marks)
 - Robust (2 marks)
 - atom economy (2 marks)
- b) Give the product formed under the given reaction condition (4 marks)



- c) Outline step by step, the synthetic protocol of the pain reliever Aspirin shown below starting from benzene. (8 marks)



QUESTION THREE (20 MARKS)

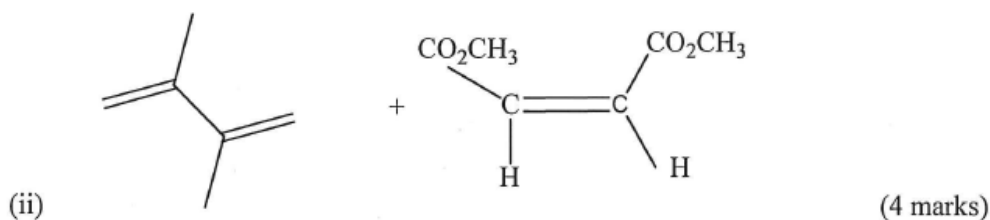
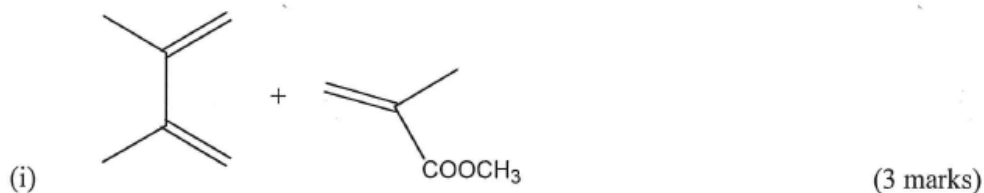
- a) Briefly explain the following types of reactions

i) Diels-Alder reaction (2 marks)

(ii) concerted reaction (2 marks)

iii) Wittig reaction (2 marks)

b) By describing the reaction mechanism, give the product of the following

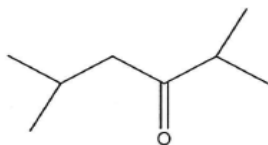


c) Describe the conformation requirements of the diene during cycloaddition (4 marks)

QUESTION FOUR (20 MARKS)

a) Define the term Retrosynthesis (2 marks)

b) Using an alcohol of no more than four carbon atoms as your only organic starting material, outline a synthesis of **A**:



(i) Carry out its retrosynthesis (3 marks)

(ii) Write its synthesis (5 marks)

c) i) Define organometallic compounds (1 mark)

ii) Give two examples of organometallic reagents employed in organic synthesis (2 marks)

- iii) Describe how one of the organometallic reagents named in (ii) is prepared (4 marks)
- d) Identify reagents A, B and C in the scheme below (4 marks)

