



UNIVERSITY OF EMBU

2016/2017 ACADEMIC YEAR

FIRST SEMESTER EXAMINATION

SECOND YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE

SCH 202: ORGANIC CHEMISTRY II

DATE: DECEMBER 7, 2016

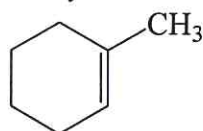
TIME: 11:00AM-1:00PM

INSTRUCTIONS:

Answer Question ONE and ANY Other TWO Questions

QUESTION ONE (30 MARKS)

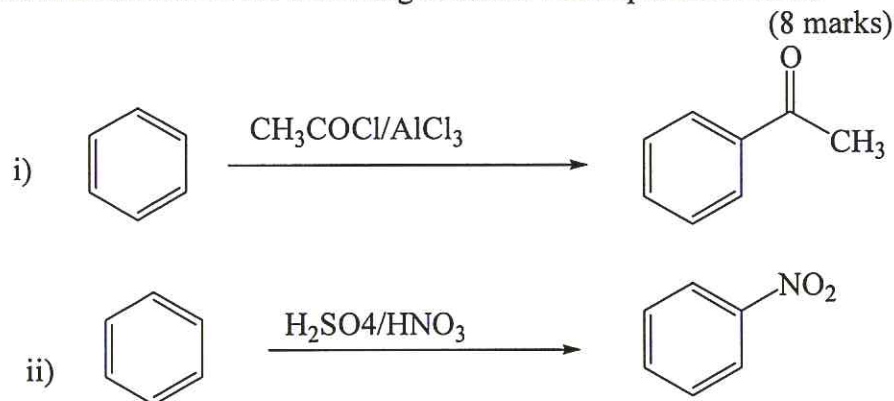
- a) Alkylhalides are polar compounds. Explain (3 marks)
- b) Compare the dipole moment in methylchloride and methylflouride (3 marks)
- c) Using a reaction of molecular chlorine and ethane in presence of UV light as an example, show the mechanism of how peroxides slow the rate of free radical reactions (6 marks)
- d) Using a specific example, explain the effect of polar protic solvent on the rate of substitution unimolecular reactions (SN^1) (4 marks)
- e) Hydration of 1-methylcyclohexene (1) in presence of an acid results to formation of two products (A & B) in the ratios of 80% and 20% respectively.



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- i) (i) Give the structures of A and B (2 marks)
ii) Predict the mechanism leading to formation of A (4 marks)

f) Show the mechanisms of the following aromatic electrophilic reactions



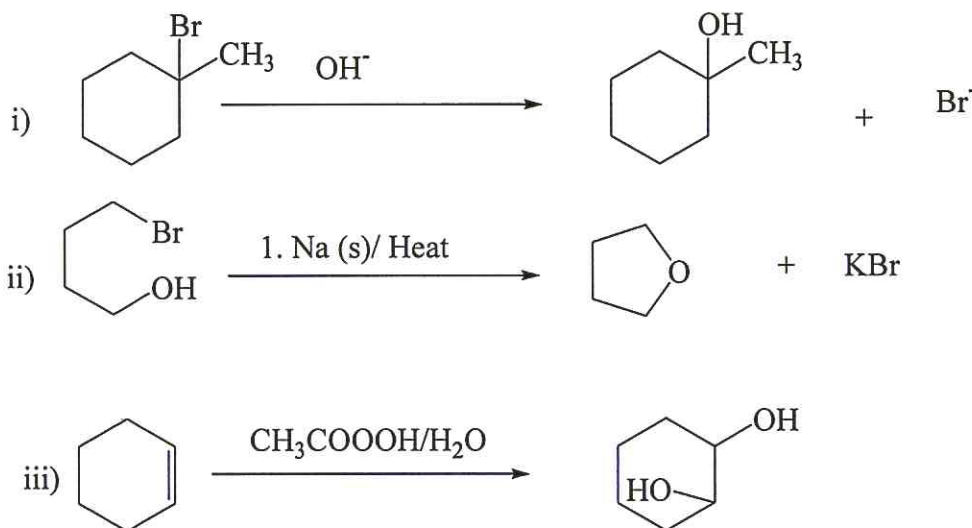
QUESTION TWO (20 MARKS)

a) Alkylhalides have higher boiling points compared to alkane counterparts. Explain.

(3 marks)

b) Predict the mechanisms of the following reactions

(9 marks)



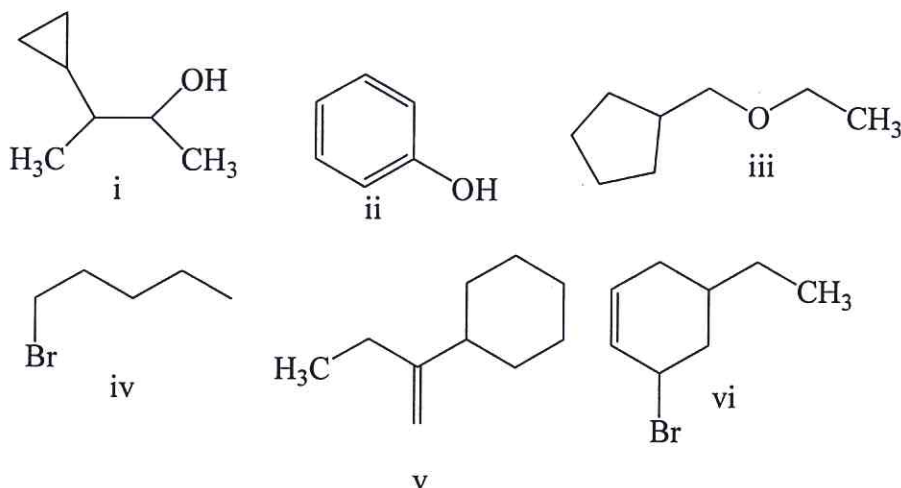
c) Describe an analytical test in the lab to differentiate between an alkane and alkylhalide (4 marks)

d) Explain the concept of aromaticity (2 marks)

e) List two industrial applications of alkylhalides (2 marks)

QUESTION THREE (20 MARKS)

a) Provide systematic IUPAC names of the following compounds (12 marks)

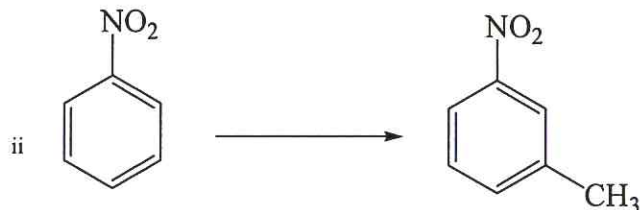


b) Compare the effect of the following factors on the rates of SN^1 and SN^2 reactions (8 marks)

- Structure of substrate
- Polarity of solvent
- Nature of nucleophile
- Concentration of substrate

QUESTION FOUR (20 MARKS)

- a) In reactions of aromatic compounds, ring activators are ortho/para directors while ring deactivators are meta directors. Illustrate this fact with a specific example (8 marks)
- b) List two industrial applications of aromatic compounds (2 marks)
- c) Give the reagents and reaction conditions of the following reactions (8 marks)



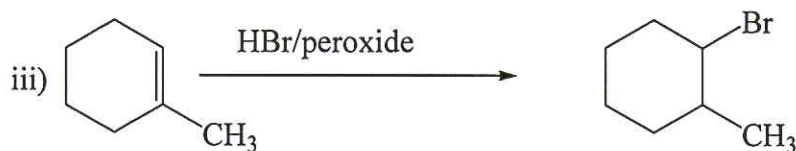
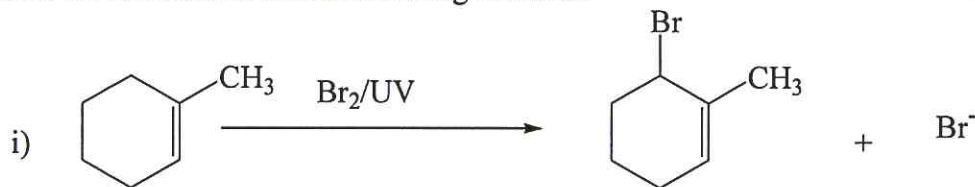
(d) Explain an analytical test for alkynes

(2 marks)

QUESTION FIVE (20 MARKS)

a) Predict the mechanism of the following reactions

(9 marks)



- b) State one industrial use of alkynes (1 mark)
- c) Explain the following chemical observations (10 marks)
- i) Free radical reactions only take place in presence of UV or any other form of energy
 - ii) Cis/trans isomerism is possible in cyclic but not linear chain alkanes
 - iii) Non-protic polar solvents are ideal for carrying out SN^1 reactions
 - iv) Alkanes are the most unreactive hydrocarbons
 - v) Alcohols are liquid at room temperature

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