



THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

A. M. E. C. E. A

P.O. Box 62157
00200 Nairobi - KENYA
Telephone: 891601-6
Fax: 254-20-891084
E-mail: academics@cuea.edu

MAIN EXAMINATION

MAY – JULY 2015 TRIMESTER

FACULTY OF SCIENCE

DEPARTMENT OF CHEMISTRY

CHEM 101: ORGANIC CHEMISTRY I

SCHOOL FOCUSED PROGRAMME

Date: JULY 2015

Duration: 2 Hours

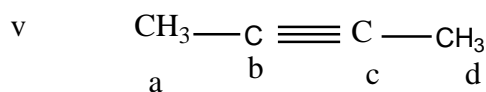
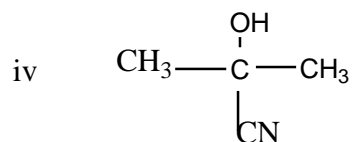
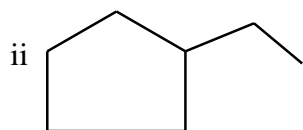
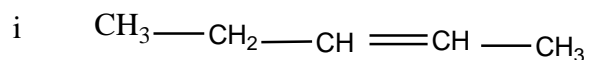
INSTRUCTIONS: Answer Question ONE and ANY OTHER TWO Questions

Q1. a) Draw the structures of the following compounds.

- i Trans-2-butene
- ii Pentan-2-one
- iii Propylethanoate
- iv 3-iodocyclopentene
- v 4-(1-methylethyl) – 5,5 -dimethylnonane

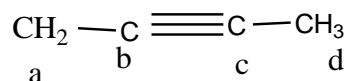
(5 marks)

b) Give the IUPAC names of the following



(5 marks)

- c) Indicate the type of hybridization of each carbon atom in the following compound.



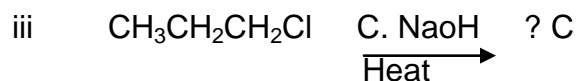
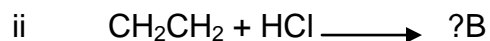
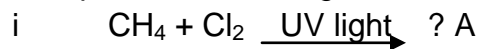
(2 marks)

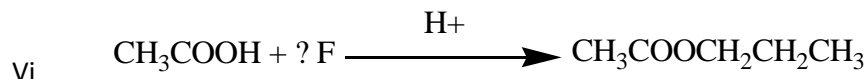
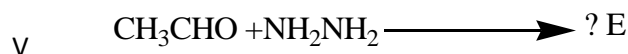
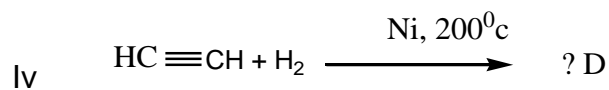
- d) Draw structures of molecules with the formula $\text{C}_4\text{H}_8\text{O}$ that contain

- i An alcohol
- ii An ether
- iii A ketone
- iv An aldehyde.

(4 marks)

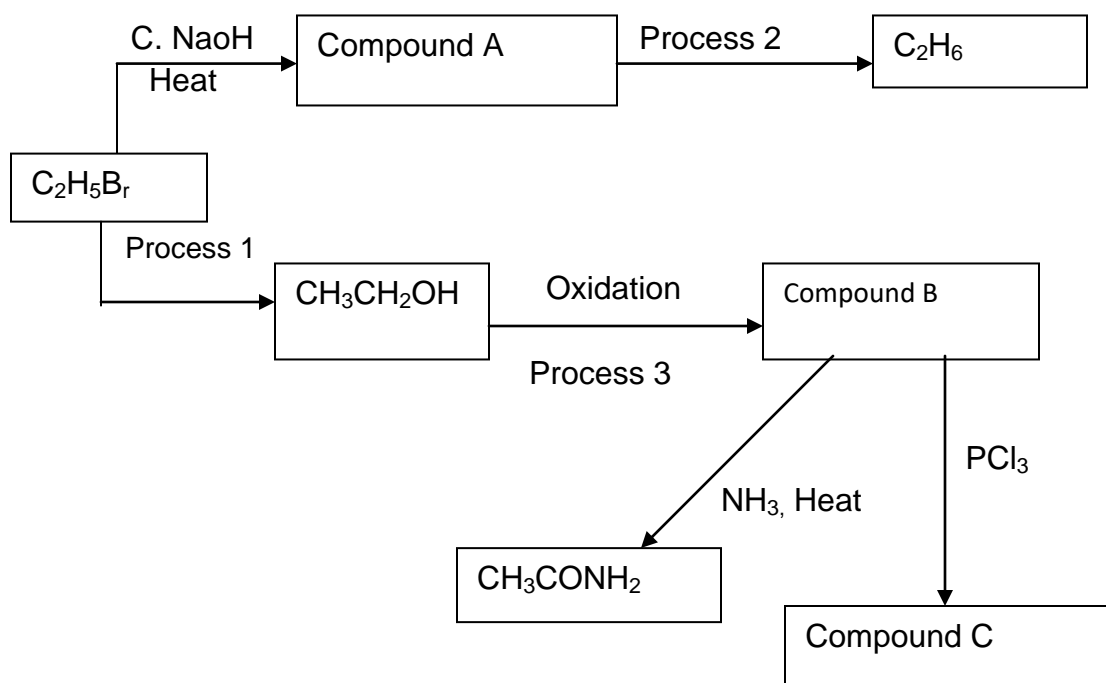
- e) Complete the following reactions by writing the missing structures A-F





f) Show all the hydrogen bonds that will form in an aqueous solution of ethanoic acid. **(2 marks)**

g) Study the flow chart below and answer the questions that follow



i Draw structures of compound A, B, and C. **(3 marks)**

ii Name processes 1, 2 and 3 **(3 marks)**

Q2. Aldehydes and Ketones are carbonyl compound and have a general formular $\text{C}_n \text{H}_{2n}\text{O}$. Discuss the chemistry of carbonyl compounds under the following sub headings

i Structure and nomenclature. **(4 marks)**

- ii Preparation. (3 marks)
- iii Chemical reactions (10 marks)
- iv Uses. (2 marks)
- Q3. Discuss the chemistry of alkyhalides and alcohols under the following subheadings;
- i Isomerism and classification. (6 marks)
- ii Preparation (4 marks)
- iii Chemical reactions and test. (10 marks)
- Q4. a) Discuss the chemistry of alkynes under the following subheadings
- i Preparation (3 marks)
- ii Chemical reactions that are similar to alkenes. (8 marks)
- iii Chemical reactions that are different from alkenes. (4 marks)
- b) Describe the fractional distillation process of crude oil. (5 marks)
- Q5. a) Compare the chemistry of carboxylic acids to that of alcohols. (Give similarities and differences). (10 marks)
- b) Discuss the chemistry of hybridization in hydrocarbons (alkanes, alkenes and alkynes) (10 marks)

END