



**TECHNICAL UNIVERSITY OF MOMBASA**

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FACULTY OF APPLIED AND HEALTH SCIENCES  
DEPARTMENT OF PURE & APPLIED SCIENCES

**UNIVERSITY EXAMINATION FOR:**  
**DIPLOMA IN ANALYTICAL CHEMISTRY**  
**DAC 15S**

**ACH 2107: ORGANIC CHEMISTRY I**  
**END OF SEMESTER EXAMINATION**  
**SERIES: APRIL 2016**  
**TIME: 2 HOURS**

**DATE:** Pick Date Select Month Pick Year

**Instructions to Candidates**

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.

**Do not write on the question paper.**

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**Question ONE**

- (a) Explain three important properties of carbon that enable it to form many stable compounds (9marks).
- (b i) Define double bond equivalent (DBE). (2marks).
- (ii) Calculate DBE of a compound with the following molecular formulae  $C_{16}H_{18}N_2O_4Cl_2$ . (4marks).
- (c) Using hybridization predict the shapes of the following molecules. (9marks).
- CH<sub>4</sub>, BF<sub>3</sub>, and BeCl<sub>2</sub>,
- (d) Write and name structural isomers of a compound with the following molecular formulae. (6marks)
- C<sub>5</sub>H<sub>12</sub>

## Question TWO

- (a) Explain
- (i) how sigma-bond and pi-bonds are formed. (4marks)
  - (ii) Why Alkanes don't react with ions or polar molecules. (5marks)
- (b) Differentiate between homolytic fission and heterolytic fission. (6marks)

## Question THREE

- (a) List three types of intermolecular forces of attraction. (3marks).
- (b) (i) Draw and name cis and trans isomers of  $C_2H_2Br_2$ . (2marks)
- (ii) with reason classify them as polar and non polar. (4marks)
- (c) Explain three factors that influence electronegativity. (6marks)

## Question FOUR

- (a) Explain why crystals of anhydrous  $CaSO_4$  are very hard and very difficult to cleave while crystals of  $CaSO_4 \cdot 2H_2O$  are soft and easy to cleave. (5marks)
- (b) State two conditions for Hydrogen-bond formation. (2marks)
- (c) (i) Draw structures of 1-butyne and 2-butyne molecules. (2marks)
- (ii) How would you distinguish between the above two organic compounds in the Laboratory. (6marks)

## Question FIVE

- (a) Cracking is a reaction that is carried out in alkanes.
- (i) How is cracking of alkanes done. (4marks)
  - (ii) Discuss TWO important uses of cracking of alkanes in petrochemical industries. (4marks)
- (b) Define the following terms.
- (i) Enantiomer. (2marks)
  - (ii) Racemic mixture. (2marks)
  - (iii) Free radical. (2marks)
  - (iv) isomer. (1mark)