



TECHNICAL UNIVERSITY OF MOMBASA

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.

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).
- CH₄, BF₃, and BeCl₂,
- (d) Write and name structural isomers of a compound with the following molecular formulae. (6marks)
- C₅H₁₂

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)