



**TECHNICAL UNIVERSITY OF MOMBASA**  

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**FACULTY OF APPLIED AND HEALTH SCIENCES**  
**DEPARTMENT OF PURE & APPLIED SCIENCES**  
**UNIVERSITY EXAMINATION FOR:**

BACHELOR OF SCIENCE FOOD TECHNOLOGY AND QUALITY ASSURANCE AND BACHELOR OF SCIENCE ENVIRONMENTAL  
PUBLIC HEALTH

ABT 4201: BIOCHEMISTRY 1.

**END OF SEMESTER EXAMINATION**

**SERIES: APRIL 2016**

**TIME: 2 HOURS**

**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) State the functions of the following cell organelles (3mrks)

- i. Mitochondria
- ii. Lysosome
- iii. Nucleus

b) Differentiate nucleotide and nucleoside (2mrks)

c) Define the following terminologies (3mrks)

- i. Prosthetic group
- ii. Holoenzymes
- iii. Apoenzyme

d) List the properties of monosaccharides (5mrks)

e) Draw the structures of the following molecules (3mrks)

- i. D-glucose
- ii. D-galactose
- iii. D-fructose

f) Outline the distinguishing features between the monosaccharides in above  
(4mrks)

g) The following data was obtained after titration of glycine was carried out  
 $Pk_1=2.34$  and  $pk_2= 9.6$

- i. Define isoelectric point of an amino acid (2mrks)
- ii. Calculate the PI of glycine (2mrks)

h) Draw structures of the fatty acids represented by short hand notation below and give their systematic and common names

- i.  $18:2(\Delta^{9,12})$
- ii.  $16:0$  (6mrks)

## Question TWO

Discuss the factors that affect enzyme catalyzed reactions (20mrks)

## Question THREE

Describe the following mechanisms as used to explain enzyme catalysis:-

- i. General acid-base catalysis (7mrks)
- ii. Covalent catalysis (7mrks)
- iii. Metal ion catalysis (6mrks)

## Question FOUR

- I. Discuss the structure and state the functions of starch and glycogen (12mrks)
- II. Compare and contrast the structural differences between glycogen and cellulose (8mks)

## Question FIVE

- (i) Platelet-activating factor is an ether lipid that plays an important role in molecular signaling.
  - a) Draw the structure of platelet-activating factor (5mrks)

b) Give two other functions of this lipid (2mrks)

c) Give another example of ether lipid (1mk)

(ii) Indicate in the blank provided the match between the molecules and their biological roles (4mrks)

a) Peptidoglycan -----homopolysaccharide of glucose in animals

b) Starch -----homopolysaccharide glucose in plants

c) Chitin-----exoskeleton of lobsters

d) Glycogen-----structural component of bacterial cell walls

(iii) Briefly discuss the structure of keratin and collagen (10mrks)