



MAASAI MARA UNIVERSITY

**REGULAR UNIVERSITY EXAMINATIONS
2018/2019 ACADEMIC YEAR
SECOND YEAR FIRST SEMESTER
EXAMINATION**

**SCHOOL OF SCIENCE
DEPARTMENT OF MATHEMATICS AND
PHYSICAL SCIENCES
DEGREE IN BACHELOR OF SCIENCE IN
CHEMISTRY**

**COURSE CODE: CHE 2216
COURSE TITLE: BIOCHEMISTRY**

DATE : 17TH APRIL 2019

TIME : 0830

-1030HRS

INSTRUCTIONS:

Answer question **ONE** and any other **TWO** questions

This paper consists of 4 printed pages. Please turn over.

(QUESTION ONE 30 MARKS)

1. (a) Differentiate between the following terms giving examples in each case

- i) Dextrorotatory molecules and Levorotatory molecules
- ii) Enantiomers and diastereomers
- iii) Epimers and anomers

(6

Marks)

(b) (i) Define electrophoresis and state its importance in Biochemistry **(1½ Marks)**

(ii) Draw the structure of starch showing the position of the glucosidic linkage **(2 Marks)**

(iii) Name the three components of nucleic acids **(1½**

Marks)

(c) (i) Draw the structures of Histidine, Valine, Phenylalanine, Tyrosine. **(4 Marks)**

(ii) State and explain the importance of Lipids

(1½ Marks)

(iii) State the three factors used when classifying carbohydrates

(1½ Marks)

(d) (i) State four characteristics of Glycogen **(2**

Marks)

(ii) Differentiate between the two major classes of nucleic acids

(2 Marks)

(e) (i) Which molecule is split to form two different 3 carbon molecules during glycolysis. **(1**

Mark)

- (ii) Explain why a blue colour is observed when reacting amylose with iodine **(2 Marks)**
- (iii) The specific optical rotation of pure alpha and beta-D-mannopyranose are $+29.3^\circ$ and -17.0° respectively. When either form is dissolved in water the observed rotation of the solution changes until a final rotation of $+14.2^\circ$ is observed. Calculate the percentage of each isomer at equilibrium assuming that only alpha and beta pyranose forms are present in the solution **(5 MARKS)**

QUESTION TWO (20 Marks)

2. (a) (i) List the four factors that would lead to protein denaturation **(2 Marks)**

- (ii) Starting from the Fischer projection, draw the cyclic hemiacetal forms of D-Galactose both as a chair conformation and Haworth projection. **(4 Marks)**

- (i) Write the chemical reaction of amino acid with ninhydrin and show the product Formed **(2 Marks)**

- (b) (i) State three factors that affects enzymes action **(1 ½ Marks)**

- (ii) List the codons to which the following anticodons would form base pairs:
Anticodon: GAC UGA GGG ACC **(1½**

Marks)

Codon:

- (iii) Give one of the nucleotide sequences that would translate to:
Leu-ala-val-glu-asp-cys-met-trp-lys **(2 Marks)**

- (c) (i) Distinguish between competitive and non competitive enzyme Inhibition **(2 Marks)**
- (ii) Write the Michaelis-Menten equation and describe the terms **(2 Marks)**
- (iii) Sucrose, lactose and maltose are three common disaccharides. Give the two monosaccharides units that make each of the above disaccharides . **(3 Marks)**

QUESTION THREE (20 Marks)

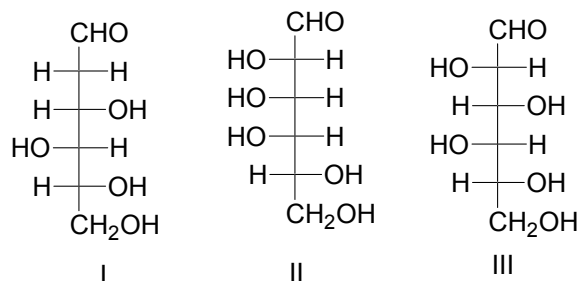
3. (a) (i) State three functions of Vitamin A **(1½ Marks)**
- (ii) Outline the process of blood clotting **(2½ Marks)**
- (iii) Describe the four steps of Gluconeogenesis **(4 Marks)**
- (iv) List the six classification of enzymes **(3 Marks)**
- (b) (i) Define a codon **(1 Mark)**
- (ii) Outline the Kreb's cycle (TCA) **(8 Marks)**

QUESTION FOUR (20 Marks)

4. (a) (i) Define glycolysis **(1 Mark)**
- (ii) Outline and explain in detail the two phases of glycolysis **(10 Marks)**

(iii) Write the chemical reaction of D-Glucose with phenylhydrazine and give the end products
(3 Marks)

(iv) Give the names of each of the following compounds



(3 Marks)

- (c) (i) Glycine is the simplest form of amino acids, give its Zwitterionic form **(1 Mark)**
- (ii) Explain the functions of the three classes of RNA **(3 Marks)**

END-----