THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

A. M. E. C. E. A

P.O. Box 62157
00200 Nairobi - KENYA
Telephone: 891601-6
Ext 1022/23/25

MAIN EXAMINATION

SEPTEMBER –DECEMBER 2021

FACULTY OF SCIENCE

DEPARTMENT OF BIOLOGY

REGULAR PROGRAMME

BIO 106: BIOCHEMISTRY 1

Date: DECEMBER 2021	**Duration: 2 Hours**
INSTRUCTIONS: Answer Question ONE and any TWO Questions	

Q1. a) (i) Define the following terms as used in biochemistry **(3Marks)**
Buffer capacity
Catalyst
Reduction

(ii) Illustrate the structures of the following saccharides **(3Marks)**
Glucose
Galactose
Fructose

(iii) Explain the Zwitter ion nature of amino acids **(3Marks)**

(iv) What information can nucleotide sequence give? **(2Marks)**

b) Differentiate between the following terms **(4Marks)**
(i) Exergonic & Endergonic reactions
(ii) Aldose and ketose
(iii) Nucleoside and nucleotide
(iv)Catabolic and anabolic reactions

(iv)What are the functions of the following proteins? **(2Marks)**
-Antibody
-Ferritin

c) (i)Name two biological effects of prostaglandins **(2Marks)**

(ii) What is the advantage of cyclic over linear forms of saccharides? **(1Mark)**

(iii) How many isomers can a molecule with three chiral centers form? **(1Mark)**

(iii) With illustrations differentiate between D and L isomer configurations **(1Mark)**

(iv) Which biochemical disorder is likely to occur when LDL level is higher than that Of HDL in the blood? **(1Mark)**

d) (i) Briefly explain the cause of the following conditions **(4Marks)**
- Galactosemia
- Sickle cell anaemia

(ii)How do drugs like aspirin and ibuprofen manage to alleviate pain? **(2Marks)**

(iii) Demonstrate how respiration is a reverse of photosynthesis **(1Mark)**

Q2. (a)(i) Briefly describe three types of steroids **(6Marks)**

(ii) Outline two types of lipoproteins **(4Marks)**

(b) (i)What is glycolysis **(1Mark)**

(ii)Explain how energy is invested and yielded in the glycolytic pathway **(2Marks)**

(iii) What is the main function of magnesium ions in the glycolytic process **(1 Mark)**

(iv) What is the fate of the end product (molecule) of the glycolytic process **(3Marks)**

(v) With illustrations, demonstrate the glycolytic stage catalyzed by enzyme Aldolase **(3 marks)**

Q3. (i) A group of students presents an argument to you as to whether PH and temperature have any effects on enzyme action, with some agreeing while others on the contrary. In an attempt to cool down the argument, demonstrate to them with illustrations whether these two parameters have any effect on enzymatic activity. **(10Marks)**

(ii) A research team has recently discovered a virus which could have an adverse effect on the storage of lipids in both plants and animals. What could be the consequence of such a biological catastrophe in life? **(10Marks)**

Q4.(i) Briefly describe three types of steroids **(6Marks)**

(ii) Outline two types of lipoproteins **(4Marks)**

(iii)Discuss the functions of the following cell organelles **(10Marks)**

Mitochondrion
Ribosome
Nucleus
Cell membrane
Golgi bodies

Q5. (i)Discuss four levels of protein structure and name the interactions that are responsible for each **(8Marks)**

(i)Explain the role Watson-crick and Chargaff played in relation to DNA structure understanding **(6Marks)**

(ii)Outline three physical properties of water. **(3Marks)**

(iii)How can you isolate an acid from other chemical compounds **(3Marks)**

END