



THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

A. M. E. C. E. A

MAIN EXAMINATION

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AUGUST – DECEMBER 2015 TRIMESTER

FACULTY OF SCIENCE

DEPARTMENT OF BIOLOGY

SCHOOL FOCUSED PROGRAMME

PU – BIO 102: BIOLOGY

Date: DECEMBER 2015

Duration: 2 Hours

INSTRUCTIONS: Answer ALL Questions

Q1. Match the description in column A with the appropriate group in column B.

A	B
a) Unicellular, no nuclear membrane, no membrane bound organelles	1. Fungi
b) Unicellular or multicellular cells have membrane bound nucleus and chloroplasts	2. Protozoa
c) Unicellular or multicellular cells have membrane bound nucleus cell wall and no chloroplasts	3. Algae
d) Unicellular, membrane bound nucleus no cell wall. Motile heterotrophic	4. Bacteria

Q2. The figure below is a diagram of a cell as seen under the light microscope

- a) Name THREE structures that show that this is a plant cell and not an animal cell. **(3 marks)**
- b) Name ONE chemical compound that is only bound in the structure labeled A and state its functions. **(3 marks)**
- c) Name the fluid in the part labeled B and state its functions. **(3 marks)**
- d) What is the main chemical compound found in the structure labeled C?
(2 marks)
- e) Name the structure that contains most of the cellular DNA. **(2 marks)**
- Q3. a) Distinguish between essential and non-essential amino acids. **(2 marks)**
- b) Name ONE element which is always present in proteins but not in carbohydrates. **(1 mark)**
- c) List THREE major functions of proteins in the mammalian body. **(3 marks)**
- d) What is the main difference between fats and oils? **(2 marks)**
- e) State THREE important functions of lipids in mammals. **(3 marks)**
- Q4. In an experiment equal volumes of blood were incubated for one hour with different salt concentrations. After the incubation the number of red blood cells in each set up was determined. The results were as follows

Set up	Final salt concentration	Number of red blood cells
A	0.9%	Cells after incubation
B	0.5%	Normal
C	0.3%	None

a) Account for the results in setup

i A

ii B

(8 marks)

b) In what way would you expect the cells in setup B to differ from those in set up A? **(3 marks)**

c) What observations would you expect to make with regard to the number and state of the red blood cells if the experiment was repeated with a salt solution at a final concentration of 1.4% **(4 marks)**

Q5. a) What is diffusion? **(2 marks)**

b) Describe a simple experiment to demonstrate diffusion of a solute.

(6 marks)

c) Name THREE processes in animals that depend on diffusion. **(3 marks)**

d) Differentiate between the following

i Simple diffusion and facilitated diffusion

ii Isotonic and hypotonic solution

iii Passive and active transport

(6 marks)

Q6. State the major function of the following organelles

i Mitochondria

ii Golgi body

iii Rough endoplasmic reticulum

iv Ribosomes

v Cell membrane

vi Lysosome

(6 marks)

- Q7. a) Arrange the following in the correct order from the smallest to the largest tissue, cell, organism, organelle, organ system, organ. **(6 marks)**
- b) How do plant cell walls differ from cell membranes? **(4 marks)**
- c) State the functions of the plant tissues below
- i Meristematic
 - ii Parenchyma
 - iii Vascular **(6 marks)**
- Q8. Identify the structure in a plant cell described by the following statements
- a) Contains the pigment that traps solar energy
 - b) Contains the chemical compound that is responsible for synthesizing ATP
 - c) Allows free movement of substances in or out of the cell
 - d) Mainly composed of cellulose
 - e) Contains hydrolytic enzymes
 - f) Contains hereditary material **(6 marks)**

END