



THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

A. M. E. C. E. A

MAIN EXAMINATION

AUGUST - DECEMBER 2015 TRIMESTER

FACULTY OF SCIENCE

DEPARTMENT OF BIOLOGY

PRE- UNIVERSITY PROGRAMME

PU BIO 102: BIOLOGY

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Date: DECEMBER 2015

Duration: 2 Hours

INSTRUCTIONS: Answer ALL Questions

- Q1. a) State why the following processes are essential in living organisms
- i) Reproduction
 - ii) Excretion
 - iii) Respiration
 - iv) Irritability
 - v) Locomotion
- b) Illustrate the levels of biological organization below the cell. **(3 marks)**
- c) List THREE fundamental differences between man and a tree. **(3 marks)**

Q2. The figure below is a diagram of a light microscope.

- a) Name the parts labeled A – E **(5 marks)**
- b) A student was observing a specimen using the high power objective but the image was not clear. Which part of the microscope can he use to get a sharp image? **(2 marks)**
- c) What parts of a microscope should be held when it is being moved from one place to another. **(2 marks)**
- d) A cell was magnified 1000 times using a light microscope whose objective was x 40 what was the magnification of the ocular lens. **(4 marks)**
- e) State FOUR differences between the light and electron microscopes. **(4 marks)**

Q3. With reference to plant cells, complete the table below by filling in column II in the name of the structure that corresponds with the statement in column I

Column I	Column II
1. Contains the pigment that traps solar energy	
2. Contains the chemical compound that is responsible for transmitting hereditary information	
3. Acts as a selective barrier between the cell and its surroundings	
4. Is composed mainly of a high molecular weight polysaccharide	
5. Contains the enzymes responsible for synthesis of most of the cellular ATP	
6. Contains most of the cellular solutes.	

Q4. State one major function of the following organelles

- i Mitochondrion
- ii Golgi body
- iii Smooth Endoplasmic reticulum
- iv Ribosomes
- v Chloroplast
- vi Cell membrane
- vii Lysosome
- viii Nucleus.

(8 marks)

Q5. The figure below is an electron micrograph at an animal cell

- a) Identify the structures labeled A – D **(4 marks)**
- b) If this was a mature cell from the inside at a plant stem list FOUR additional structures you would expect to see. **(4 marks)**
- c) Name THREE structures found in all eukaryotic cells. **(3 marks)**

- Q6. a) The table below shows the concentration at sodium and iodine ions in pond water and in cell sap of an aquatic plant.

ion	Conc. In pond water (ppm)	Conc. In sap (ppm)
Sodium	120	70
Iodine	0.2	400

- i Suggest the process through which each of the ions is taken up by the plant and give your reasons. **(6 marks)**
- ii Which ion would cease being taken up if the plant is treated with a metabolic poison that inhibits ATP synthesis? Give a reason for your answer. **(4 marks)**
- iii Name FOUR processes in living things that depend on simple diffusion. **(4 marks)**

- Q7. Match each of the present tissues in column A with its major function in column B.

Column A	Column B
a) Meristematic	1. To make food for the plant
b) Photosynthetic	2. To fill spaces between other tissues
c) Parenchyma	3. To protect the inner most delicate tissues
d) Epidermal	4. To transport water and food substances
e) Vascular	5. To support and strengthen the plant
f) Supportive	6. To make new tissues

- Q8. a) Classify the following carbohydrates into monosaccharides, disaccharides and polysaccharides
- i Starch
 - ii Sucrose
 - iii Maltose
 - iv Fructose
 - v Glucose

vi Cellulose

(6 marks)

- b) Name the carbohydrate that is
- i Found in abundance in mammalian blood.
 - ii Stored in mammalian liver
 - iii Transported in plants
 - iv Stored in plant seeds.

(4 marks)

END