



THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

A. M. E. C. E. A

MAIN EXAMINATION

JANUARY – APRIL 2015 TRIMESTER

FACULTY OF SCIENCE

DEPARTMENT OF NATURAL SCIENCES (BIOLOGY)

REGULAR PROGRAMME

PU-BIO 102: BIOLOGY

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Date: April 2015	Duration: 2 Hours
Instructions: Answer Question ONE and any other THREE Questions.	

- Q1. a) Define the following terms
- i) A cell (1 mark)
 - ii) Nutrition (1 mark)
 - iii) Transpiration (1 mark)
 - iv) Respiration (1 mark)
 - v) Condensation reaction (1 mark)
- b) State any two characteristics of living things and their importance. (2 marks)
- c) State the functions of the following cell organelles. (3 marks)
- i) Lysosomes
 - ii) Ribosomes
 - iii) Golgi bodies.
- d) List FOUR adaptations of a leaf for photosynthesis. (4 marks)
- e) i) Briefly explain the THREE types of transpiration. (6 marks)
- ii) List FIVE beneficial effects of transpiration on plants. (5 marks)
- Q2. a) Differentiate between the following circulatory system terms and give an example of animals with each type:
- i) The open and closed circulatory system (2 marks)
 - ii) Single and double circulation (2 marks)
- b) Explain TWO ways in which the following blood vessels are adapted to transport blood.

- i) Arteries **(2 marks)**
 - ii) Veins **(2 marks)**
 - iii) The heart **(2 marks)**
- c) i) Who are the following people: A universal donor and a universal recipient? **(2 marks)**
- ii) State THREE functions of mammalian blood other than transport of substances. **(3 marks)**
- Q3. a) Explain how the following plant adaptations serve to minimize the rate of transpiration.
- i) Sunken stomata **(2 marks)**
 - ii) Leaf folding **(2 marks)**
- b) Give reasons why the respiratory surface has to be
- i) thin
 - ii) moist **(4 marks)**
- c) Make a comparison between aerobic and anaerobic respiration. **(4 marks)**
- d) Name the parts that carry out the excretory process in
- i) Fresh water protozoa,
 - ii) Insects and
 - iii) Mammals **(3 marks)**
- Q4. a) State two reasons why homeostasis is important in living things. **(2 marks)**
- b) i) Draw a well labeled diagram of a kidney nephron. **(6 marks)**
- ii) In which two ways is the nephron adapted to carry out its functions? **(2 marks)**
- c) Differentiate between mitosis and meiosis in three ways. **(3 marks)**
- d) What TWO adaptive features enable the sperm cell to carry out its reproductive functions. **(2 marks)**
- Q5. a) Attempt a classification of neurons based on their functions. **(2 marks)**
- b) i) List THREE types of muscles and their functions. **(3 marks)**
- ii) Differentiate between a tendon and a ligament. **(2 marks)**
- c) A homozygous black male mouse was mated with a homozygous brown female mouse. All their offsprings were black coloured.

- i) Give a reason for this observation. **(1 mark)**
- ii) Using the letter B to represent the dominant gene for colour black and b to represent recessive gene for colour brown, write the genotypes of the parents. **(2 marks)**
- iii) Use a punnet square to show the resulting genotypes when two heterozygous black mouse (i.e male and female) are mated. Give the genotypic and phenotypic ratios resulting from this test cross. **(4 marks)**

END