



# MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)  
University Examinations for 2015/2016 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

FIRST SEMESTER EXAMINATION FOR DIPLOMA IN EDUCATION

SZL 0201: ECOLOGY AND BIOANALYSIS

DATE: 5/8/2016

TIME: 8.30-10.30 AM

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**Instructions:**

*Answer question 1 in section A (COMPULSORY) and select 2 questions in section B*

**SECTION A**

**QUESTION ONE**

- a) Briefly describe the process of Ecological Succession (5 marks)
- b) State the laws of population that relate to individual: (6 marks)
  - i) Body size and population density
  - ii) Body size and rate of population growth
  - iii) Fitness and population growth
- c) Illustrate the flow of energy along the various trophic levels (4 marks)
- d) State the three factors that are necessary to maintain a stable ecosystem (3 marks)
- e) Using the sigmoid curve explain how a normal population growth would respond to the following:
  - i. Predation (2 marks)

- ii. Natural catastrophe (2 marks)
- iii. Competition (2 marks)
- f) Explain the meaning of pyramid of biomass and pyramid of numbers with reference to trophic levels (3 marks)
- g) State how light and temperature influence the distribution of organisms in both terrestrial ecosystems (3 marks)

## **SECTION B**

### **QUESTION TWO**

- a) Describe the water cycle with reference to distribution of plants and animals in the biosphere (10 marks)
- b) With the aid of diagrams, discuss the relationship between foods chains and food webs (5 marks)
- c) Outline the concept of greenhouse gases in connection with global warming (5 marks)

### **QUESTION THREE**

- a) Describe a procedure that students of ecology would follow to estimate a grasshopper population in an open field (10 marks)
- b) Describe the concept of limiting factors with reference to population growth (5 marks)
- c) Explain, with examples, the following inter-specific relationships in an ecosystem
  - i. Mutualism (5 marks)
  - ii. Commensalism

### **QUESTION FOUR**

- a) Discuss the major abiotic differences between Terrestrial and Aquatic Biomes (10marks)
- b) Briefly describe the following population sampling techniques (10 marks)
  - i) Quadrant
  - ii) Line transect

### **QUESTION FIVE**

- a) Discuss the disruptive influence of human activities inthe environment with regard to water, soil and air pollution (12 marks)
- b) Outline the reasons for energy loss along food chains (8 marks)