



# MACHAKOS UNIVERSITY

University Examinations 2019/2020 academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

FIRST YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE IN BIOLOGY

BACHELOR OF EDUCATION (SCIENCE)

SZL 101: INTRODUCTION TO ECOLOGY AND BIOANALYSIS

DATE: 22/1/2021

TIME: 2.00-4.00 PM

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## INSTRUCTIONS

1. Answer Question one (compulsory) and **any two** questions in Section B.
2. Use clean well labelled diagrams wherever appropriate.

## SECTION A

### QUESTION ONE (30 MARKS)

- a) Distinguish between:
  - i. Gross primary production and net primary production (2 marks)
  - ii. Interspecific and intraspecific associations (2 marks)
  - iii. Law of tolerance and concept of limiting factors (2 marks)
  - iv. Niche and habitat (2 marks)
- b) Describe three (3) ways in which populations may be distributed (3 marks)
- c) Explain three (3) mechanisms by which plants may avoid/overcome the negative effects of interspecific interrelations on their populations (3 marks)
- d) Describe three (3) factors that may promote ecological succession (3 marks)
- e) Outline two (2) characteristics of each of the following (4 marks)
  - i. Edges
  - ii. Ecotone
- f) Explain why geometric growth is not common in natural populations (2 marks)

- g) Outline three (3) methods that could be used to obtain samples of different aquatic invertebrates (3 marks)
- h) An ecology student went to a national park which was 1800 km<sup>2</sup>. He slowly drove through the middle of the park observing and counting all the gazelles in his sight from both side of the drive way. He realized that he was able to see animals that were as far as 2.5 km away and he was able to drive 20km. In total, he counted 300 gazelles during his drive
  - i. Explain the aim of the students activity (1 mark)
  - ii. Estimate the number of gazelles in that park (2 marks)
  - iii. Outline a possible source of error in his estimate (1 mark)

## **SECTION B**

### **QUESTION TWO (20 MARKS)**

Explain how man's activities affects the cycling of matter

### **QUESTION THREE (20 MARKS)**

- a) Give an example of an ecosystem and describe how it sustains itself (10 marks)
- b) Explain possible implications of introducing a new species in an existing ecosystem (10 marks)

### **QUESTION FOUR (20 MARKS)**

Describe:

- a) possible trends of growth in world populations (10 marks)
- b) Five (5) factors that would affect the growth of the Zebra population in Nairobi national park (10 marks)

### **QUESTION FIVE (20 MARKS)**

Describe:

- a) possible interactive mechanisms within community members in a given ecosystem (10 marks)
- b) Adaptive mechanisms for co-existence of community members (10 marks)