



MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

FIRST YEAR SECOND SEMESTER EXAMINATION FOR
BACHELOR OF EDUCATION (SCIENCE)

SZL 101: INTRODUCTION TO ECOLOGY AND BIOLOGY

DATE: 10/12/2020

TIME: 8:30 – 10:30 AM

INSTRUCTIONS

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

SECTION A: COMPULSORY

QUESTION ONE (30 MARKS)

- a) Differentiate between:
 - i) Resource partitioning and competitive exclusion (2 marks)
 - ii) Edge and ecotone (2 marks)
- b) Explain how the environment influences organisms' biotic potential (2 marks)
- c) Assuming that a 1st year ecology student was conducting an ecological study in a fish pond, give two possible examples of each of the following from his sampling unit: (4 marks)
 - i) Abiotic factors
 - ii) Producers
 - iii) Consumers
 - iv) Detritivores
- d) Explain why geometric growth is not common in natural populations (2 marks)
- e) Explain how ecosystems sustain themselves (4 marks)
- f) An ecology student went to a national park which was 3800 km². He slowly drove through the middle of the park observing and counting all the elephants 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 km away and he was able to drive 50 km. In total, he counted 500 elephants during his drive.
 - i) Estimate the number of elephants in that park (2 marks)
 - ii) Outline 2 possible sources of error in his estimate (2 marks)

- g) Describe two (2) measures of species diversity in an ecosystem (4 marks)
- h) Outline three (3) conditions that favour a clumped distribution in populations (3 marks)
- i) Explain how energy from the sun is distributed in the earth's ecosystems (3 marks)

SECTION B: ANSWER ANY TWO QUESTIONS (40 MARKS)

QUESTION TWO (20 MARKS)

Describe the following aspects of biological communities:

- a) Interactive mechanisms (10 marks)
- b) Adaptations for co-existence (10 marks)

QUESTION THREE (20 MARKS)

Discuss possible effects of introducing a new species in an established ecosystem

QUESTION FOUR (20 MARKS)

- c) Explain why ecological studies are important (10 marks)
- d) Discuss challenges ecologists may encounter when undertaking ecological studies (10 marks)

QUESTION FIVE (20 MARKS)

Explain how man's activities affect the cycling of matter