



MACHAKOS UNIVERSITY

University Examinations for 2021/2022 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

FIRST YEAR SECOND SEMESTER EXAMINATION FOR
BACHELOR OF EDUCATION (SPECIAL NEEDS EDUCATION)

BACHELOR OF EDUCATION (SCIENCE)

BACHELOR OF SCIENCE (BIOLOGY)

SZL 101: BIONANALYSIS AND ECOLOGY

DATE: 27/5/2022

TIME: 8.30-10.30 AM

INSTRUCTIONS

Answer question one and any other two questions

QUESTION ONE (30 MARKS)

- a) Differentiate between
- i. Stenothermal and euryhaline species (2 marks)
 - ii. Mutualism and commensalism (2 marks)
 - iii. iterparous and semelparous organisms (2 marks)
- b) Explain how the environment influences an organism's biotic potential. (2 marks)
- c) Describe three mechanisms by which organisms deal with competition in their environments. (3 marks)
- d) Explain why geometric growth is not common in natural populations. (2 marks)
- e) The data below was collected from a population of grasshoppers:

Month	Number
1	56
2	98
3	203
4	421

- i. Based on the data, describe the population growth (2 marks)
- ii. Predict and explain the growth of this population in future. (3 marks)
- iii. Describe a method that the researcher possibly used to determine the numbers. (3 marks)

- iv. Describe two challenges the researcher may have faced in the exercise. (2 marks)
- f) Explain the ecological relationship between pollinator bees and flowering plants. (3 marks)
- g) Explain the role of pioneer species in the development of a community. (2 marks)
- h) An ecology student went out to study the diversity of species in a savannah grassland. Describe two factors he should determine for this study. (2 marks)

QUESTION TWO (20 MARKS)

- a) The ever-increasing human population is a threat to its sustainability. Discuss. (15 marks)
- b) Explain possible ways by which humans could manipulate the carrying capacity of their environment to enhance their sustainability. (5 marks)

QUESTION THREE (20 MARKS)

Describe the:

- a) Main processes in the global cycling of carbon. (14 marks)
- b) Significance of increased concentrations of carbon dioxide in the atmosphere. (6 marks)

QUESTION FOUR (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 established ecosystem. (10 marks)

QUESTION FIVE (20 MARKS)

- a) Describe ecological techniques used to study nature. (14 marks)
- b) Discuss challenges an ecologist may encounter in the undertaking of ecological studies. (6 marks)