



MACHAKOS UNIVERSITY

University Examinations 2018/2019
SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

FIRST YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR
BACHELOR OF ENVIRONMENTAL RESOURCE CONSERVATION

ERC 104: PRINCIPLES OF BIOLOGY

DATE: 24/7/2019

TIME: 2.00-4.00 PM

INSTRUCTIONS

- (a) Answer ALL questions in section A
(b) Answer ANY TWO questions in section B

SECTION A – 30 Marks

QUESTION ONE

- a) 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
- b) Differentiate between:
- i) Gross primary production and net primary production (2 marks)
 - ii) Edge and ecotone (2 marks)
 - iii) Niche and habitat (2 marks)
- c) An ecology student went to a national park and randomly caught 150 gazelles. He put some tags on them and left them free. After a month, he went back to the park and caught 300 gazelles. He found that of the 300 gazelles caught in his second visit, 50 had also been caught and tagged in his first visit. Based on the information given:
- i) Explain the aim of the students activity (1 mark)
 - ii) Estimate the number of gazelles in that park (3 marks)

- d) Explain why:
- i) Different populations of animals come together and live in the same geographical area (2 marks)
 - ii) biomass varies from one level to the other in an ecological pyramid (2 marks)
- e) Outline two (2) characteristics of each of the following organisms: (2 marks)
- i) R- selected
 - ii) K selected
- f) Briefly describe five (5) mechanisms by which community members deal with competition (5 marks)
- g) Explain the movement of energy in an ecosystem (5 marks)

SECTION B: ANSWER ANY OTHER TWO QUESTIONS (40 Marks)

2. Explain:
- a) processes by which atmospheric nitrogen becomes available to the biosphere (8 marks)
 - b) the significance of increased concentrations of carbon dioxide in the atmosphere (8 marks)
 - c) how man affects the cycling of phosphorus (4 marks)
3. Describe:
- a) the term 'ecological succession' (5 marks)
 - b) the process of ecological succession (15 marks)
- 4.
- a) Describe ecological techniques used by ecologists to study nature (14 marks)
 - b) Discuss challenges an ecologist may encounter in the undertaking of ecological studies (6 marks)
- 5.
- a) Describe:
 - i) Characteristics of a desert biome (4 marks)
 - ii) Adaptations of fauna and flora of desert biomes (6 marks)
 - b) Outline:
 - i) different types of aquatic biomes (4 marks)
 - ii) the diversity of habitats in marine biomes (6 marks)