



# MACHAKOS UNIVERSITY

University Examinations for 2021/2022 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

FOURTH YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF EDUCATION (SCIENCE)

SZL 412: APPLIED ECOLOGY

DATE: 2/9/2022

TIME: 11.00-1.00 PM

---

## INSTRUCTIONS

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

## SECTION A

### QUESTION ONE (COMPULSORY) (30 MARKS)

- a) i. Contrast between population number and population density. (1 mark)  
ii. Explain the effect of death rate on population density. (2 marks)
- b) Describe ways by which an ecologist can determine the age of animals and plants in the field? (4 marks)
- c) Illustrate the three types of survivorship curves. (4 marks)
- d) A population of a country X has been shown to have a constrictive population pyramid.
  - i. Explain characteristics of the population of country X? (2 marks)
  - ii. What concerns would policy makers of country X have in regards to this population. (2 marks)
- e) Describe factors that affect species richness. (3 marks)
- f) Explain the importance of socialization in a population. (3 marks)
- g) Describe the three levels of biodiversity. (3 marks)
- h) Describe method currently being implemented to save endangered species. (3 marks)
- i) Describe any three types of interspecific interactions. (3 marks)

## SECTION B

### QUESTION TWO (20 MARKS)

- a) Discuss population growth models (8 marks)
- b) Discuss density dependent and density independent factors that affect population growth. (12 marks)

### QUESTION THREE (20 MARKS)

Age/class (years)	Number/age class	Survival rate	Fecundity	Offspring/ age class	Age weighted Fecundity
0	186		0.00		
5	141		0.00		
10	113		6.28		
15	82		9.60		
20	64		12.10		
25	52		13.60		

- a) Discuss the two types of life tables (4 marks)
- b) Using the table above, calculate; the survival rate for each age classes, Offspring per age class, Age weighted fecundity for each age class, Net reproductive rate ( $R_0$ ), Mean generation time ( $G$ ), and the intrinsic growth rate ( $r$ ). (16 marks)

### QUESTION FOUR (20 MARKS)

Discuss the benefits of biodiversity.

### QUESTION FIVE (20 MARKS)

- a) Discuss the types and stages of ecological succession (14 marks)
- b) Describe types of successional communities (6 marks)