



# 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 (SPECIAL NEEDS)

BACHELOR OF SCIENCE (BIOLOGY)

BACHELOR OF EDUCATION (SCIENCE)

SZL 304 EVOLUTIONARY BIOLOGY

DATE:

TIME :

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## INSTRUCTIONS

1. Answer 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) Describe the term allelic replacement. (3 marks)
- b) Discuss fitness landscape. Use graphs where possible. (3 marks)
- c) Explain the reasons for mutations. (3 marks)
- d) Evaluate the significance of natural selection. (3 marks)
- e) Define and describe founder effects Using a small lake. (3 marks)
- f) Describe 3 barriers to speciations due to reproductive isolations. (3 marks)
- g) Describe geographic isolation and its effects on speciation. (3 marks)
- h) Distinguish between gradualism and punctuated model of Evolutionary. (3 marks)
- i) Describe three facts to support the statement: Mating among relatives could lead to "poor" progeny. (3 marks)
- j) Define and describe gene flow Using Galapagos Island. (3 marks)

## SECTION B: ANSWER ANY OTHER TWO QUESTIONS

### QUESTIONS TWO (20 MARKS)

- a) Discuss the limitations of Hardy – Weinberg theory to locus with many alleles. (6 marks)
- b) Discuss the assumptions of the Mendelian rules. (14 marks)

**QUESTION THREE (20 MARKS)**

Predict and discuss the outcome of crosses involving two independently assorting genes.

**QUESTION FOUR (20 MARKS)**

A population has 200 individuals in total. In a simple count of the individual showing different phenotypes, following were found: 45 were homozygous AA, 130 were heterozygous Aa, while 25 were homozygous aa. Calculate the allelic frequency in the populations.

**QUESTION FIVE (20 MARKS)**

- a) Discuss the applications of Hardy-Weinburg theory. (6 marks)
- b) Discuss the principle and calculation modification of the frequencies of genotypes with many locus. (14 marks)