



# MACHAKOS UNIVERSITY

University Examinations 2017/2018

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

SECOND YEAR FIRST SEMESTER EXAMINATION FOR BACHELOR OF SCIENCE IN  
AGRICULTURAL EDUCATION AND EXTENSION

SBC 100: INTRODUCTION TO GENETICS

DATE: 11/12/2017

TIME: 8.30-10.30 AM

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## INSTRUCTIONS

Answer Question One and Any Other Two Questions

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

## SECTION A

1.
  - a) State the significance of cytoplasmic inheritance (3 marks)
  - b) Explain what inborn errors of metabolisms are and state their cause (3 marks)
  - c) Explain what is a genetic code and why it is said to be redundant (3 marks)
  - d) Describe the endosymbiotic hypothesis for formation of eukaryotic cells (3 marks)
  - e) Outline exhibition of multiple alleles in humans (3 marks)
  - f) Explain the use of model organisms in genetics research (3 marks)
  - g) Differentiate between the two types of nucleic acids (3 marks)
  - h) Identify the complementary DNA sequence, Given the mRNA sequence AUGCCAUAUGUAUAA. (3 marks)
  - i) Explain the Hardy-Weinberg equilibrium (3 marks)
  - j) Describe three sources of genetic variation (3 marks)

## SECTION B

### QUESTIONS TWO (20 MARKS)

Explain how diversity and variation in relation to environment affect populations (20 marks)

**QUESTION THREE (20 MARKS)**

- a) Define genetic recombination (2 marks)
- b) Describe mechanisms of genetic recombination in bacteria. (18 marks)

**QUESTION FOUR (20 MARKS)**

- a) Define multiple allelism and explain its importance (6 marks)
- b) Explain the action and interaction of genes in organisms (14 marks)

**QUESTION FIVE (20 MARKS)**

- a) Describe the three broad categories characterising cytoplasmic inheritance (5 marks)
- b) Explain the heredity characteristics that determine variegation in *Mirabilis jalapa*. (15 marks)