



# TECHNICAL UNIVERSITY OF MOMBASA

---

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF PURE & APPLIED SCIENCES

**UNIVERSITY EXAMINATION FOR:**

**BACHELOR OF TECHNOLOGY IN INDUSTRIAL MICROBIOLOGY &**

**BIOTECHNOLOGY**

**AAB 4108: INTRODUCTION TO GENETICS**

**END OF SEMESTER EXAMINATION**

**SERIES: APRIL 2016**

**TIME: 2 HOURS**

**DATE: Pick Date May 2016**

## **Instructions to Candidates**

You should have the following for this examination

*-Answer Booklet, examination pass and student ID*

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.

**Do not write on the question paper.**

---

## **Question ONE**

- a) Explain the genetic importance of mitotic cell division (2 marks)
- b) Explain how genetic recombination occurs (2 marks)
- c) Explain how Epistasis affects phenotypic traits (3 marks)
- d) Using an example, explain the effects of Pleiotropy on phenotypic traits in human beings (3 marks)
- e) Define the following aspects of the genetic code
  - i) Conserved (1 mark)
  - ii) Degenerate (2 marks)

- f) Describe DNA damage by the following
- i) Ultraviolet radiations (2 marks)
  - ii) Ionizing radiations (2 marks)
- g) Explain the process of DNA damage repair by Mismatch repair (3 marks)
- h) i) State the Hardy-Weinberg law (2 marks)
- ii) Outline the assumptions of the Hardy-Weinberg Law (4 marks)
- i) State and explain FOUR types of genetic determinism (4 marks)

### **Question TWO**

- a) In Squashes, striped fruit colour is dominant to green, while red pulp dominant to orange. If the genes were inherited in a normal Mendelian pattern. Determine the genotypic and phenotypic characteristics of the F1 and F2 if cross breeds breeding was made between striped water melon with red pulp and the green with orange pulp (8 marks)
- b) Discuss the types of non-Mendelian inheritance (12 marks)

### **Question THREE**

- a) Explain the concept of complementarity of nucleic acids (7 marks)
- b) Describe the steps involved in gene expression (13 marks)

### **Question FOUR**

Discuss

- a) The consequences of gene mutations on the individual organism (6 marks):
- b) The various abnormal conditions arising from chromosomal changes in man (14 marks)

### **Question FIVE**

- a) Discuss the factors that affect stability of gene frequencies (14 marks)
- b) Explain the mechanisms of balancing selection (6 marks)