TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF PURE & APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR:

BACHELOR OF SCIENCE IN FOOD TECHNOLOGY AND QUALITY ASSURANCE

AAB 4203: INTRODUCTION TO GENETICS

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: JULY 2025

TIME: 2 HOURS

DATE: JUL., 2025

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) Describe the Chargaff's equivalence rule (3 marks)

b) Describe the stages of cell cycle (5 marks)

c) Explain detection of autosomal dominant inheritance in human pedigree (6 marks)

d) Contrast X and Y chromosomes (4 marks)

e) State any FIVE differences between oogenesis and spermatogenesis (5marks)

f) Explain the relationship between temperature and sex determination in turtles (4 marks)

g) Explain why replication of eukaryotic cells is a challenging process (3 marks)

Question TWO

a) Using appropriate diagrams, describe the processes involved in mitotic cell division (18 marks)

b) State the significance of meiosis (2 marks)

Question THREE

a) Explain how the choice of pea plant as the experiment material led to Mendel's success in his breeding work (6 marks)

b) Describe Mendel's crossing technique (6 marks)

c) Explain codominance in MN blood type (8 marks)

Question FOUR

a) In Plymouth rock chicken the gene for barred feathers is dominant and Z-linked and the gene for black or red unbarred feathers is recessive and Z-linked. Perform a cross between barred hen and unbarred cock and show;

i) F1 phenotypic and genotypic ratios (4 marks)

ii) F2 phenotypic and genotypic ratios (4 marks)

iii) Explain the results of F1 and F2 (4 marks)

b) Classify mutations on the basis of phenotypic effects (8 marks)

Question FIVE

Using a diagram, describe the mechanism of semi-discontinuous DNA synthesis in E. coli cells (20 marks)