



TECHNICAL UNIVERSITY OF MOMBASA

School of Applied and Health Sciences
DEPARTMENT OF PURE AND APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR:
BACHELOR OF SCIENCE IN ENVIRONMENTAL HEALTH

APH 4309: BIOTECHNOLOGY AND HEALTH
SPECIAL AND SUPPLEMENTARY EXAMINATION

SERIES: JULY 2025 SERIES

TIME: 2 HOURS

DATE: JULY 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) A suffering from Haemophilia marries a normal woman.
 - i) Identify different types of haemophilia (3 marks)
 - ii) Predict the likelihood of the father passing the defective gene to the offspring, if the mother is not a carrier for that gene (5 marks)
- b) Outline some of the uses of genetic testing (6 marks)
- c) Suggest the possible characteristics of autosomal dominant trait (6 marks)
- d) Outline any FOUR types of genetic polymorphism (4 marks)
- e) Identify the different types of RNAs involved in translation process and role they play (6 marks)

Question TWO

Discuss some of the techniques involved in carrying out genetic fingerprinting

(20 marks)

Question THREE

Discuss the human genome project and its implication in healthy (20 marks)

Question FOUR

Juma is color-blind. His mother and father both have normal vision, but his mother's father (Juma's maternal grandfather) is color-blind. All Juma's other grandparents have normal color vision. Juma has three sisters Sarah, Fatuma, and Khadija all with normal color vision. Juma's oldest sister, Sarah, is married to a man with normal color vision; they have two children, a 9-year-old color-blind boy and a 4-year-old girl with normal color vision.

- a) Using correct symbols and labels draw a pedigree of Juma's family.
(8 marks)
- b) Explain the most likely mode of inheritance for color blindness in Juma's family?
(3 marks)
- c) If Juma marries a woman who has no family history of color blindness, demonstrate the probability that their first child will be a color-blind boy?
(3 marks)
- d) If Juma marries a woman who is a carrier of the color-blind allele, what is the probability that their first child will be a color-blind boy? (3 marks)
- e) If Sarah and her husband have another child, what is the probability that the child will be a color-blind boy?
(3 marks)

Question FIVE

Outline some of the common reasons for seeking genetic counseling

(20 marks)