TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF PURE & APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR:

BACHELOR OF TECHNOLOGY IN INDUSTRIAL MICROBIOLOGY AND BIOTECHNOLOGY

AAB 4206: MICROBIAL GENETICS PAPER I

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2024

TIME: 2 HOURS

DATE: Dec., 2024

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) State reasons for earlier suggestions that DNA is the genetic material in living organisms (5 marks)

b) Explain the functions of the following factors in DNA replication

i) DNA Polymerase δ (1 mark)

ii) Single strand binding protein (1 mark)

iii) Geminin protein (1 mark)

c) Differentiate between the following;

i) Transduction and transformation (2 marks)

ii) Sense and antisense DNA strands (2 marks)

d) Explain the process of chain termination during prokaryotic RNA synthesis (5 marks)

e) Contrast eukaryotic and prokaryotic translation mechanisms (4 marks)

f) Highlight factors affecting frequency of point mutations in cells of living organisms (3marks)

g) Outline the steps involved in a lytic bacteriophage infection (6 marks)

Question TWO

a) Describe Meselson and Stahl's experiment proving semi-conservative DNA replication model (14marks)

b) Explain the specialized sequences within the eukaryotic promoter (6 marks)

Question THREE

(a) Using illustrations, describe mechanism of insertion sequences transposition into target DNA (12 marks)

(b) Explain the FOUR major importance of transposable elements (8 marks)

Question FOUR

(a) Describe the nucleotide excision repair mechanism of DNA damage in human cells (14 marks)

(b) Explain the mutagenic effect of 5-bromouracil on DNA molecule (6 marks)

Question FIVE

With an aid of a diagrams, discuss lac operon system of gene regulation in *E. coli* cells (20 marks)