MACHAKOS UNIVERSITY

University Examinations 2022/2023 academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

FOURTH YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (BIOLOGY)

SBT 418: MICROBIAL GENETICS

DATE: **TIME:**

INSTRUCTIONS

1. Anwer Question 1 (compulsory) and **any two** questions in Section B.
2. Use clean well labelled diagrams wherever appropriate.

SECTION A (COMPULSORY)

QUESTION ONE (30 MARKS)

a) Describe how replica plating method is used to select successful mutants (3 marks)
b) Relate the structure of a tRNA molecule to its role in translation (3 marks)
c) A missense mutation in a DNA strand does not affect the phenotype of an organism. Explain. (3 marks)
d) Explain the concept of "Quorum sensing" in bacteria (3 marks)
e) Illustrate a DNA nucleotide (3 marks)
f) Describe the nature and function of Okazaki fragment and leading strand (3 marks)
g) Explain the antiparallel and complementary nature of the DNA double helix. (3 marks)
h) Distinguish spontaneous from induced mutations (3 marks)
i) Describe limitations to gene transfer (3 marks)
j) Outline the structural differences between DNA and RNA (3 marks)

SECTION B: ANSWER ANY TWO QUESTIONS

QUESTION TWO (20 MARKS)

a) Design and describe an experiment to show that it is DNA and not RNA or proteins that cause transformation of cells (10 marks)
b) Compare and contrast the means by which the mutagen 5-bromouracil, methyl-nitrosoguanidine cause mutations (10 marks)

QUESTION THREE (20 MARKS)
Differentiate generalized transduction from specialized transduction

QUESTION FOUR (20 Marks)
a) Discuss the process of transcription in bacteria (10 marks)
b) Illustrate the difference between eukaryotic and prokaryotic genomes (10 marks)

QUESTION FIVE (20 MARKS)
a) Discuss and illustrate one inducible operon (10 marks)
b) Describe the events that occur when an F^+ cell encounters an F^- cell (10 marks)