MACHAKOS UNIVERSITY

University Examinations 2016/2017

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

FOURTH YEAR FIRST SEMESTER EXAMINATION FOR BACHELOR OF SCIENCE (BIOLOGY)

SBT 418: MICROBIAL GENETICS

DATE: 27/7/2017 **TIME: 11:00 – 1:00 PM**

INSTRUCTIONS

Answer Question One and Any Other Two Questions

SECTION A: QUESTION 1 (COMPULSORY)

QUESTION ONE

a) State three uses of plasmids in microorganisms. (3 marks)

b) List three areas in which quorum sensing has been observed in bacteria. (3 marks)

c) State three qualities of the primary genetic material which it must demonstrate for it to function. (3 marks)

d) State three properties of a transposable element. (3 marks)

e) Briefly describe the restriction enzyme nomenclature. (3 marks)

f) State three things that have to be done to isolate a gene from a collection of recombinant DNA sequences. (3 marks)

g) After generation of DNA fragments, describe other three steps does a genetic engineer follows in order to obtain a specific DNA sequence. (3 marks)

h) Explain the insecticidal activity of *Bacillus thuringiensis (*Bt). (3 marks)

i) Explain the location and role of a promoter in a gene. (3 marks)

j) Describe the use of PCR in genetic engineering and forensic sciences. (3 marks)

SECTION B: ANSWER ANY TWO QUESTIONS IN THIS SECTION

QUESTION TWO

a) Distinguish a lytic from a lysogenic cycle in viral replication. (10 marks)

b) Describe using a diagram the five areas of gene control in a cell during protein synthesis. (10 marks)

QUESTION THREE

a) Describe the mechanism of quorum sensing in bacteria. (10 marks)

b) With the aid of suitable diagrams, describe the processes of conjugation, transformation and transduction in transmitting genetic variation in microbes. (10 marks)

QUESTION FOUR

a) Describe the central dogma of molecular biology. (10 marks)

b) Describe and illustrate the gene organization in prokaryotes. (10 marks)

QUESTION FIVE

a) Discuss the various DNA modifying enzymes. (10 marks)

b) Explain the scientific explanation of the possibility of safely using GMO maize in Kenya for both livestock and humans. (10 marks)