(Knowledge for Development)

KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS

2021/2022 ACADEMIC YEAR

SECOND YEAR SECOND SEMESTER

MAIN EXAMINATION

FOR THE DEGREE OF BACHELOR OF SCIENCE IN AGRICULTURE AND BIOTECHNOLOGY

COURSE CODE: ABI 222

COURSE TITLE: MICROBIAL GENETICS

DATE: 10TH MAY 2022 **TIME: 2 – 4 PM**

INSTRUCTIONS TO CANDIDATES

Answer Question One and Any other TWO (2)

TIME: 2 Hours

This Paper Consists of 2 Printed Pages. Please Turn Over.

KIBU observes ZERO tolerance to examination cheating

QUESTION ONE: (COMPULSORY) **(30 MKS)**

a) In a cross between two heterozygous Tt (for tall), what would be the resulting genotypic ratio? (4 MARKS)

b) Outline any TWO objectives of bioinformatics (4 MARKS)

c) List any THREE bacteria species that have been used for DNA replication studies (3 MARKS)

d) In some viruses DNA is synthesized from RNA by aid of an enzyme. Name the enzyme. (1 MARKS)

e) Briefly outline the characteristics of the following groups of microorganisms.

i. Bacteria (2 MARKS)

ii. Algae (2 MARKS)

iii. Viruses (2 MARKS)

f) Outline any THREE differences between DNA and RNA (6 MARKS)

g) Define the following terms as used in genetics;

i. Translocation (1 MARKS)

ii. Polyploidy (2 MARKS)

iii. Trisomy (2 MARKS)

iv. Oligonucleotides (2 MARKS)

QUESTION TWO

a) Using diagrams, describe the THREE steps of gene cloning (12 Marks)

b) A gram-negative bacterium that was susceptible to most common antibiotics suddenly becomes resistant to several of them. It also appears to be spreading this resistance to others of its kind. Describe the mechanism that most likely accounts for this. (8 MARKS)

QUESTION THREE

Using diagrams, describe any FOUR types of Vectors used in gene transfer methods (20 MARKS)

QUESTION FOUR

a) Differentiate between DNA replication in Eukaryotes and Prokaryotes (10 MARKS)

b) Outline any FOUR vector mediated gene transfer methods used in eukaryotes (10 MARKS)

QUESTION FIVE

a) Outline the THREE steps of Polymerase Chain Reaction (PCR) (9 MARKS)

b) Discuss the following classes of mutation;

c) Chromosomal mutation (6 MARKS)

d) Point mutation (5 MARKS)