



*(Knowledge for development)*

**KIBABII UNIVERSITY**  
**SECOND YEAR SECOND SEMESTER**  
**MAIN EXAMINATIONS**  
**FOR THE DEGREE OF BACHELOR OF SCIENCE**  
**AGRICULTURE AND BIOTECHNOLOGY**

**COURSE CODE: SBT 223**

**COURSE TITLE: MICROBIAL GENETICS**

**DATE: 22/09/2017**

**TIME: 3:00 - 5:00 P.M**

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**INSTRUCTIONS TO CANDIDATES**

Answer Question one (1) and any other two (2) Questions. Question one is compulsory and carries 30 marks, the other Questions carry 20 marks each.

TIME: 2 Hours

This paper consists of 2 printed pages. Please Turn Over



**KIBU observes ZERO tolerance to examination cheating**

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### QUESTION 1:

- a. Briefly describe three fundamental differences of Gram-negative and Gram-positive bacteria in the anatomy of their bacterial envelope. (3 Marks)
- b. Describe three types of transposable elements present in prokaryotes (3 Marks)
- c. Define complementation and identify the importance of complementation test (3 Marks)
- d. Differentiate among Hfr, F+ and Resistant Plasmid Conjugations in bacteria. (3 Marks)
- e. Identify and describe three groups of RNA viruses (3 Marks)
- f. Using a diagram, briefly describe the organization of the viral genome (3 Marks)
- g. Define a retrotransposon and describe how it moves (3 Marks)
- h. Describe the process of replicative transposition through DNA intermediates and identify the enzymes are involved. (4 Marks)
- i. Draw and label the structure of a typical composite transposon in bacteria. (3 marks)
- j. Identify three enzymes which take part in recombination in *E. coli* and the roles they play (3 Marks)

### QUESTION 2:

Discuss the applications and importance of transformation, transduction, conjugation and complementation. (20 Marks)

### QUESTION 3:

Discuss the different proteins and enzymes that take part in bacterial replication. Give the function of each in the replication process.

### QUESTION 4:

Using well labelled diagrams, describe the organization of microbial genomes (20 Marks)

### QUESTION 5:

Describe the steps that HIV virus follows as it infects a cell and reproduces. (20 Marks)