

**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND  
TECHNOLOGYSCHOOL OF HEALTH SCIENCES**

**KISII LC**

**MSc. BIOMEDICAL SCIENCE & TECHNOLOGY (MEDICAL MICROBIOLOGY)**

**HMM 5124: MICROBIAL GENETICS**

**SECTION A: Answer ALL questions in this section**

1. Explain briefly the three stages of translation in bacterial cells. (3 marks)
2. Briefly describe how to identify mutant colonies in culture. (2 marks)
3. Distinguish between the following terms: (3 marks)
  - a) Base-pair substitutions and base-pair-deletions/insertions
  - b) Transposons and insertion sequences
4. List three mutagens and their effects on DNA function in microbial cells. (3 marks)
5. Giving examples, define what point mutations are. (2 marks)
6. Briefly describe the role of plasmids in a bacterial cell. (2 marks)

**SECTION B: Answer ANY THREE questions in this section (15 marks each).**

1. Explain how gene regulation occurs in bacteria under the following:
  - a) *Lac* operon (9 marks)
  - b) *Trp* operon (6 marks)
2. Describe in detail the three mechanisms of genetic transfer in bacteria. (15 marks)
3. Discuss the Ames test and its importance. (15 marks)
4. Describe in detail the process of DNA replication in bacteria. (15 marks)
5. With the aid of a diagram, describe how transcription occurs in a microbial cell. (15 marks)