

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF  
MICROBIOLOGY AND BIOTECHNOLOGY

BOTA 102: FUNDAMENTALS OF MICROBIOLOGY AND BIOTECHNOLOGY

STREAMS: BSC. BIOL, BSC. MICROBIOL AND BIOTECH, BSC. SCI

TIME: 2 HOURS

DAY/DATE: THURSDAY 19/12/2024

8.30 A.M. – 10.30 A.M.

**INSTRUCTIONS:**

- Answer all questions in section A and any two in section B
- Do not write anything on the question paper
- Use illustrations where appropriate to enhance your answer.

**SECTION A (30 MARKS)**

1. Define the following terms [5 marks]
  - i. Biosensor
  - ii. Cloning
  - iii. Trade marks
  - iv. Recombinant DNA
  - v. Fermentation
2. Describe Koch's postulates [5 marks]
3. a) State three methods that are used to detect the presence of microorganism from the environment. [3 marks]  
b) Give the reason why Gram +ve bacteria retain the purple crystal violet after the gram staining. [2 marks]
4. Discuss ethical considerations in biotechnology and microbiology [5 marks]
5. Discuss the risks that are associated with genetically modified organisms. [5 marks]

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6. Using diagrams, describe the structure and functions of plasma membrane in a prokaryotic cell. [5 marks]

**SECTION B (40 MARKS)**

7. a. Describe different types of biosensor. [8 marks]  
b. Describe key features that an effective biosensor must possess. [12 marks]
8. a) Discuss the applications of biotechnology in agriculture. [10 marks]  
b) Explain the importance of intellectual property rights in Kenya. [10 marks]
9. Discuss the applications of microorganisms in industries [20 marks]
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