

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF EDUCATION SCIENCE, BACHELOR OF SCIENCE

BOTA 102: FUNDAMENTALS OF MICROBIOLOGY AND BIOTECHNOLOGY

STREAMS: BED (SCI), BSC

TIME: 2 HOURS

DAY/DATE: TUESDAY 10/12/2019

11.30 AM – 1.30 PM

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. (a) Define the following terms as used in Molecular Biology. [2 marks]
 - (i) Recombinant DNA technology
 - (ii) Restriction enzymes

(b) State three harmful effects associated with presence of microorganisms in your residential area. [3 marks]
2. (a) Define intellectual property rights [1 mark]

(b) Highlight four roles of intellectual property rights in microbiology and biotechnology. [4 marks]
3. Discuss characteristic of a good vector for gene transfer in genetic engineering. [5 marks]
4. Outline five major discoveries and advancement in the field of biotechnology.

- [5 marks]
5. Discuss the structure and function of nucleus in an animal cell. [5 marks]
6. (a) State three benefits from microbial activity in the environment. [3 marks]
- (b) Give two types of selective media and their role. [2 marks]

SECTION B (40 MARKS)

7. (a) Define biosensor and describe different types of biosensor. [8 marks]
- (b) Describe key features that an effective biosensor must possess. [12 marks]
8. Discuss the application of biotechnology in medicine and agriculture. [20 marks]
9. Design a microarray experiment to describe how to achieve gene transfer from human to *Escherichia coli* in the production of human insulin. [20 marks]
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