

CHUKA



UNIVERSITY

**UNIVERSITY EXAMINATIONS**

**EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN  
BIOLOGY AND BACHELOR OF EDUCATION (SCIENCE)**

**BOTA 413: MOLECULAR AND MICROBIAL GENETICS**

**STREAMS: BSC BIO,BED(SC)**

**TIME: 2 HOURS**

**DAY/DATE: FRIDAY 24/09/2021**

**2.30 P.M – 4.30 P.M**

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**INSTRUCTIONS**

**Answer all questions in section A and any two in section B**

**Section A**

1. Explain the basic features of DNA that enable it to perform its functions. [3 marks]
2. Below is a DNA sequence of a gene section.  
5' ..... GAC TGC TTA CGC TTA CGA TCC AGT CCT TGA TTT TTA TAT ...3'
  - (a) Determine the sequence of RNA that would be formed after transcription of the DNA section. [2 marks]
  - (b) Identify the most probable position of the section on the gene. Explain. [2 marks]
3.
  - (a) Describe the general protocol for isolation of DNA. [3 marks]
  - (b) Describe the types of plasmids found in bacteria. [2 marks]
4. Following the order in which the process occurs, describe the enzymes that are involved DNA replication. [4 marks]
5. Describe the characteristics of the genetic code. [5 marks]
6. Using a well labelled drawing illustrate the structure of a Eukaryotic gene. [4 marks]
7. Draw an appropriate scheme to illustrate the stages of the polymerase chain reaction (PCR) [5 marks]

**SECTION B**

8. (a) Describe the regulation of lactose metabolism in *Escherichia coli*. [10 marks]  
(b) Discuss post translational modification of proteins in eukaryotic microbes.

[10 marks]

9. Explain how bacteria acquired new genes. [20 marks]

10. (a) Discuss how the application of recombinant DNA technology has benefited the society. [10 marks]

- (b) Discuss the classification of genetic mutations. [10 marks]
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