CHUKA UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN BIOCHEMISTRY

BIOC 436: APPLIED BIOTECHNOLOGY

STREAMS: BSC BIOC **TIME: 2 HOURS**

DAY/DATE: MONDAY 29/03/2021 **11.30 A.M. – 1.30 P.M.**

INSTRUCTIONS:

- **Answer question ONE and any other TWO questions.**
- **Do not write on the question paper.**

QUESTION ONE (30 MARKS)

(a) Define the following terms (8 marks)

(a) Nucleotide
(b) Applied biotechnology
(c) Gene expression
(d) Transcription
(e) Central dogma of molecular biology
(f) Genetically Modified Organism

(b) Explain what you understand by the terms alternative splicing. (2 marks)

(c) Describe an experiment that could be used to demonstrate that DNA is the genetic material. (10 marks)

(d) List five applications of biotechnology in life. (3 marks)

(e) Briefly explain the reasons that makes *E. coli* a workhorse of applied biotechnology. (7 marks)

QUESTION TWO (20 MARKS)

(a) Highlight the different types of PCR currently used in the laboratory. (8 marks)

(b) Applied biotechnology is an emotional and controversial field of study in the public arena especially on the regulatory aspects. Explain briefly how it is globally regulated. (4 marks)

(c) Using illustrative diagrams, describe secondary and tertiary structure of DNA as visualized using X-Ray diffraction data and models. (8 marks)

QUESTION THREE (20 MARKS)

(a) Describe an experiment that would be used to demonstrate the molecular nature of the defect in a protein caused by a genetic mutation. (8 marks)

(b) Explain how modern applied biotechnology has influenced agriculture and health sectors in the world. (12 marks)

QUESTION FOUR (20 MARKS)

(a) Describe the function of each of these enzymes indicating when and why they are used in the laboratory. (10 marks)

(i) DNA polymerase
(ii) Ligase
(iii) Endonucleases

(b) Highlight the differences between Northern and Southern Blotting and how these two technologies are applied in the Molecular Biology Laboratory. (10 marks)
