

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: FRIDAY 13/12/2019

2.30 P.M. –4.30 P.M.

INSTRUCTIONS:

- Answer question one and any other two questions.
- Don not write on the question paper.

QUESTION ONE (30 MARKS)

- (a) Define the following terms (8 marks)
- (a) Gene expression
 - (b) Transcription
 - (c) Applied biotechnology
 - (d) Translation
 - (e) Central dogma of molecular biology
 - (f) Genetically modified organism
- (b) Elucidate the following statement. “Describing a gene strictly as an information store for polypeptides is far too narrow of a definition”. (3 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 medicine. (3 marks)
- (e) Briefly explain the reasons that makes *E. coli* a workhorse of applied biotechnology. (6 marks)

QUESTION TWO (20 MARKS)

- (i) Why is the Ti plasmid from *Agrobacterium tumefaciens* well suited for developing a vector to transfer foreign genes into plant chromosomal DNA. (4 marks)
- (ii) Highlight the different types of PCR currently applied in the laboratory. (10 marks)
- (iii) 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. (6 marks)

QUESTION THREE (20 MARKS)

Discuss in details how the modern applied biotechnology has influenced;

- (i) Agriculture
- (ii) Manufacturing industry
- (iii) Environment (20 marks)

QUESTION FOUR (20 MARKS)

- (a) Describe the functions and use of each of the following enzymes in molecular biology techniques. (10 marks)
 - (i) DNA polymerase
 - (ii) Ligase
 - (iii) Endonucleases
 - (b) Highlight the differences between Northern and Southern Blotting highlighting the application and relevance in molecular biology. (10 marks)
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