

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF SCIENCE IN
BIOCHEMISTRY

BIOC 452: DNA TECHNOLOGY

STREAMS: BSC (BIOC)

TIME: 2 HOURS

DAY/DATE: FRIDAY 26/03/2021

8.30 A.M. – 10.30 A.M.

INSTRUCTIONS: Answer question ONE and any other TWO questions

QUESTION ONE (COMPULSORY) – 30 MARKS

- (a) Give the rationale why scientists are shifting to Next Generation Sequencing (NGS) techniques as appose to First Generation Sequencing (FGS) techniques. [5 marks]
- (b) Explain the importance of mapping human genome [5 marks]
- (c) (i) Define a probe [2 marks]
(ii) State the key advantages of using type II restrictions enzymes in genetic engineering. [3 marks]
- (d) Describe how DNA technology is applied in diagnosis of sickle cell anaemia. [5 marks]
- (e) Explain the basic steps in polymerase chain reaction (PCR). [5 marks]
- (f) Describe the features of Yeast Artificial Chromosome (YAC) as cloning vectors. [5 marks]

QUESTION TWO (20 MARKS)

- (a) Describe Sanger sequencing technique clearly giving the principle behind it. [10 marks]
- (b) Compare and contrast blunt ends and sticky ends produced by restriction enzymes. [4 marks]
- (c) Describe briefly how DNA technology is applied in vaccine development and state its advantage over the conventional way of vaccine development. [6 marks]

QUESTION THREE (20 MARKS)

- (a) With the aid of a suitable diagram, illustrate Southern blotting. [10 marks]
- (b) Describe briefly cloning with bacteriophage lambda. [10 marks]

QUESTION FOUR (20 MARKS)

- (a) Define proteomics. [2 marks]
 - (b) Describe a step-wise procedure for the production of cDNA library and state its importance in DNA technology. [10 marks]
 - (c) Explain the features of modified Ti plasmid and its application in plant genetic engineering. [8 marks]
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