

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

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

BMED 347: MOLECULAR BIOLOGY OF THE GENE

STREAMS: BSC (BMED)

TIME: 2 HOURS

DAY/DATE: FRIDAY 07/12/2018

2.30 P.M. – 4.30 P.M.

INSTRUCTIONS:

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

QUESTION ONE (30 MARKS)

- (a) In natural DNA, Adenine (A) almost always hydrogen bonds with Thymine (T) and Cytosine (C) with Guanine (G). Demonstrate this phenomena in a double stranded DNA molecule containing the sequence 5' – tgca-3' [8 marks]
- (b) Explain giving an example the difference between nucleosides and nucleotides [6 marks]
- (c) Describe the biological process of transcription [8 marks]
- (d) Describe six properties that the vector must possess to perform its functions as a cloning vector [6 marks]
- (e) Give four types of cloning vectors in DNA technology [2 marks]

QUESTION TWO (20 MARKS)

- (a) In vitro experiments provided the definitive evidence of semiconservative mode of DNA replication process in cells. Describe this process [10 marks]
- (b) Describe the biological process of protein synthesis in prokaryotes [10 marks]

QUESTION THREE (20 MARKS)

- (a) A molecular biologist intends to clone a gene using a plasmid P^{BR322} as a cloning vector and BamHI as the restriction enzyme. He also intends to use E.coli DH5 α as the host cell. Discuss the strategies for cloning such a gene of interest [10 marks]
- (b) Discuss screening for the recombinant bacteria (DH5 α) using antibiotic resistance marker strategy from the example in question 3a [10 marks]

QUESTION FOUR (20 MARKS)

- (a) Discuss control of gene expression in prokaryotes (E.coli) using LAC OPERON as an example [10 marks]
- (b) Using the sequence TACTATGCCAGA, describe the manual and automated sanger deoxy chain-termination sequencing of the DNA [10 marks]
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