

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF SCIENCE IN BIOMEDICAL
TECHNOLOGY

BMET 341: MOLECULAR BIOLOGY OF GENE

STREAMS: BSC (BMET)

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
- Do not write on the question paper

QUESTION ONE (COMPULSORY) – 30 MARKS

- (a) Briefly explain the relationship between DNA, RNA and how they lead to protein synthesis [4 marks]
- (b) Below is the sequence of a complete mRNA from a bacterial cell:
ACUAGCAGGAGACGUAAGCGAUGUGCCAGUGCGCAGUCACACAUAACUGC
AAG 3'
- (i) Indicate the number of amino acids of the protein synthesized from this mRNA strand. [1 mark]
- (ii) How many tRNAs will bind to the ribosome to make this protein [2 marks]
- (iii) Using the genetic code provided, determine the sequence amino acids in the protein synthesized from the above mRNA sequence [4 marks]
- (c) Illustrate the formation of phosphotriester bond in the nucleic acids [5 marks]
- (d) Explain 5 causes of DNA damage [5 marks]
- (e) Outline the structure of the nucleosomes in eukaryotic chromosomes [5 marks]
- (f) Distinguish between RNA and DNA [4 marks]

QUESTION 2 (20 MARKS)

- (a) Compare and contrast prokaryotic and eukaryotic DNA replication [10 marks]
- (b) Discuss various forms of DNA mutations [10 marks]

QUESTION 3 (20 MARKS)

- (a) Using a suitable diagram, discuss the formation of a replication fork [10 marks]
- (b) Explain the steps of initiation of gene translation [10 marks]

QUESTION 4 (20 MARKS)

- (a) Discuss sequentially various stages of transcription clearly indicating various enzymes involved in each stage. [12 marks]
 - (b) Using suitable diagrams describe the structure of tRNA [8 marks]
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