

CHUKA



UNIVERSITY

**SUPPLEMENTARY/ SPECIAL EXAMINATIONS**

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

**BMET 341: MOLECULAR BIOLOGY OF GENE**

**STREAMS: BMET**

**TIME: 2 HOURS**

**DAY/DATE: MONDAY 01/02/2021**

**2.30 PM – 4.30 PM**

**INSTRUCTIONS:**

*Answer question one and any other two questions*

**Question 1 (Compulsory) (30 marks)**

a) On paper, replicate the following segment of DNA:

5' ATCGGCTACGTTAC 3'

3' TAGCCGATGCAAGTG 5'

- (i) Show the direction of replication of the new strands and explain what the lagging and leading strands are. (5 marks)
- (ii) Explain how this is semiconservative replication. Are the new strands identical to the original segment of DNA? (5 marks)

b) Describe the structure of the nucleosomes found in eukaryotic chromosomes. (5 Marks)

c) Explain any 5 mechanisms involved in DNA damage repair. (5 marks)

d) Explain differences between RNA and DNA. (6 Marks)

e) Explain 5 characteristics of plasmids makes them good cloning vectors. (5 Marks)

**Question 2 (20 marks)**

a) Explain the structure of the DNA double helix, including its subunits and the way in which they are bonded together. (10 marks)

- b) Explain the process of translation. (10 Marks)

**Question 3 (20 marks)**

- a) Discuss any 5 types of mutations. (10 Marks)

- b) Discuss the process of DNA replication. (10 Marks)

**Question 4 (20 marks)**

- a) Using a diagram, describe the structure of tRNA. (10 Marks)

- b) Discuss the relationship between genes and polypeptides. (10 Marks)
-