

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

**EXAMINATION FOR THE AWARD OF DEGREE OF
BACHELOR OF SCIENCE IN BIOCHEMISTRY**

BIOC 351: BIOCHEMISTRY OF GENE EXPRESSION

STREAMS: BSC (BIOC)

TIME: 2 HOURS

DAY/DATE: TUESDAY 14/04/2020

2.30 PM – 4.30 PM

INSTRUCTIONS:

Answer Question One and any other Two Questions

Question 1 (Compulsory) (30 marks)

- (a) Explain the link between DNA methylation and X-chromosome inactivation in female mammalian cells and tissue specific expression of genes. [5 marks]
- (b) Briefly describe four major modes in which trans-acting proteins contact DNA [4 marks]
- (c) (i) Explain how loss of function of tumour suppressor genes lead to cancer. [3 marks]
(ii) Does mutation of proto-oncogenes lead to cancer? Justify your answer. [3 marks]
- (d) (i) Describe the common features of cancers by viruses. [3 marks]
(ii) Define an operon [2 marks]
- (e) Describe the link between viral transformation and cancer development. [5 marks]
- (f) Distinguish between quenching and squelching as used in genetic regulation. [5 marks]

Question 2 (20 Marks)

- (a) Describe the two major mechanisms of chromatin remodeling and their effect on gene expression in eukaryotes. [10 marks]
- (b) Describe how short interfering (RNA) (siRNA) regulates DNA expression. [10 marks]

Question 3 (20 Marks)

- (a) Explain the major differences between eukaryotic and prokaryotic gene expression. [8 marks]
- (b) Explain three mechanisms of carcinogenesis. [6 marks]
- (c) Describe the three major classes of repressors in eukaryotic regulation. [6 marks]

Question 4 (20 Marks)

- (a) Explain in details how the Lac operon works and its regulation. [10 marks]
 - (b) Describe HIV replication giving clear details on how it manipulates the host genome. [10 marks]
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