

CHUKA UNIVERSITY
UNIVERSITY EXAMINATIONS 2020/2021
SECOND SEMESTER EXAMINATION
BIOC 351: BIOCHEMISTRY OF GENE EXPRESSION

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INSTRUCTIONS: *Answer question one and any other two questions*

Questions

1. Question 1 (Compulsory) (30 marks)

- a) Briefly describe four major modes in which trans- acting proteins contact DNA (4 marks)
- b) Explain how mutation of proto oncogenes and tumour suppressor genes lead to cancer (5 marks)
- c) Using flagella formation as an example, explain how prokaryotes use sigma factors to regulate gene expression. (6 marks)
- d) Explain the link between DNA methylation and X-chromosome inactivation in female mammalian cells and tissue specific expression of genes (5 marks)
- e) Describe the link between viral infection and cancer development (5 marks)
- f) State the different mechanisms of action of repressors in gene regulation. (5 marks)

2. Question 2 (20 marks)

- a) Describe the general transcription factors involved in eukaryotic transcription. (10 marks)
- b) Describe how short interfering RNA (siRNA) regulates DNA expression. (10 marks)

3. Question 3 (20 marks)

- a) Explain the major differences between eukaryotic and prokaryotic gene expression (8 mark)
- b) (i) Describe post transcriptional modification (PTM) in eukaryotes (6 marks)
(ii) Explain how the modifications in 2b (i) above influence gene expression. (6 marks)

4. Question 4 (20 marks)

- a) Explain in details how the Lac operon works and its regulation (10 marks)
- b) Describe chromatin remodelling and its role in regulation of gene expression (10 marks)