CHUKA UNIVERSITY

UNIVERSITY EXAMINATIONS

THIRD YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN BIOCHEMISTRY

BIOC 309: BIOCHEMISTRY OF GENE EXPRESSION

STREAMS: BSC (BIOC) Y3S2 **TIME: 2 HOURS**

DAY/DATE: THURSDAY 04/08/2016 **8.30 AM – 10.30 AM**

INSTRUCTIONS:

- **Answer Question One and any other Two Questions**
- **Do not write on the question paper**

Question One (30 Marks)

(a) Explain the different ways through which gene regulation can occur. [6 marks]

(b) Describe the structure and role of RNA polymerase in transcription. [4 marks]

(c) Explain why coupled transcription and translation can occur in bacteria and not in eukaryotic cells. [5 marks]

(d) Differentiate between an operon and a regulon. [5 marks]

(e) Provide a molecular explanation as to how the lac operon is activated by cyclic AMP and CAP protein. [10 marks]

Question Two (20 Marks)

(a) Describe the structure of the tryptophan operon and the enzymatic activities encoded by tryptophan genes. [10 marks]

(b) Describe how attenuation of tryptophan operon occurs. [10 marks]

Question Three (20 Marks)

(a) Cells respond to an abrupt increase in temperature by inducing synthesis of a specific group of proteins to cope with this stress. Discuss this statement with regard to *E.coli*. [10 marks]

(b) Describe the Weigle reactivation phenomenon. [10 marks]

Question Four (20 Marks)

Explain the mechanisms for activation of proto-oncogenes under following topics.

(a) Gene amplification [10 marks]

(b) Insertional mutagenesis. [10 marks]
