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) Y3S2 **TIME: 2 HOURS**

DAY/DATE: THURSDAY 11/04/2019 **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 possible levels where expression of a gene can be regulated. [5 marks]

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

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

(d) Briefly explain how termination of transcription occurs in *E.coli* [5 marks]

(e) Describe the structure and role of core RNA polymerase and the RNA polymerase holoenzyme. [5 marks]

(f) Briefly describe the identifiable steps during the chemical synthesis of RNA in prokaryotes. [5 marks]

Question Two (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) cAMP and CAP protein are potential activators of the lac operon. Provide molecular explanation. [10 marks]

Question Three (20 Marks)

(a) Describe the structure of the Human Immunodeficiency Virus genome. [10 marks]

(b) Describe how replication occurs in retroviruses. [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]
