

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

FIRST YEAR EXAMINATION FOR THE AWARD OF DEGREE  
OF BACHELOR OF COMMERCE

**BIOC 309: BIIOCHEMISTRY OF GENE EXPRESSION**

**STREAMS: BCOM Y3S1**

**TIME: 2 HOURS**

**DAY/DATE: MONDAY 9/04/2018**

**2.30 P.M - 4.30 P.M.**

---

**INSTRUCTIONS:**

- Answer Question ONE and any other TWO Questions.
- Do not write anything on the question paper.

**QUESTION ONE [30 MARKS]**

- Differentiate between an operon and a regulon. [5 Marks]
- What are promoters? Describe the *E. coli* promoter [5 Marks]
- Explain the different ways through which gene regulation can occur. [5 Marks]
- Explain why coupled transcription and translation can occur in bacteria and not in eukaryotic cells. [5 Marks]
- Describe the structure and role of core RNA polymerase and the holoenzyme. [5 Marks]
- Briefly describe the identifiable steps during the chemical synthesis of RNA in prokaryotes. [5 Marks]

**QUESTION TWO [20 MARKS]**

- 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]
- cAMP and CAP protein are potential activators of the lac operon. Provide molecular explanation. [10 Marks]

**BIOC 309**

**QUESTION THREE (20 MARKS)**

a. Describe how replication occurs in retroviruses. [10 Marks]

b. Describe the structure of the Human Immunodeficiency Virus genome. [10 Marks]

**QUESTION FOUR (20 MARKS)**

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

a. Gene amplification. [10Marks]

b. Insertional mutagenesis. [10Marks]

.....