

**CHUKA**



**UNIVERSITY**

**UNIVERSITY EXAMINATIONS**

**FOURTH YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN BIOLOGY AND BACHELOR OF EDUCATION SCIENCE**

**BOTA 413: MOLECULAR AND MICROBIAL GENETICS**

**STREAMS: B.Sc. (BIOL, CHEM) & BED (SCIENCE) Y4S2**

**TIME: 2 HOURS**

**DAY/DATE: TUESDAY 09/04/2019**

**2.30 P.M. – 4.30 P.M.**

**INSTRUCTIONS:**

- **Answer ALL questions in section A and any TWO questions in section B.**
- **Do not write anything on the question paper.**
- **Use illustrate where appropriate to enhance your answers.**

**SECTION A (30 MARKS)**

- State the central dogma of molecular biology. (1 mark)
  - Explain briefly the function of nonsense codons. (2 marks)
  - Describe the dual function of the codon **AUG**. (2 marks)
- Define transposable (elements TEs) (1 mark)
  - Spell out two ways in which retrotransposition of DNA transposons can negatively impact a genome. (2 marks)
  - What is the major advantage of using DNA transposons as genetics tools of transgenesis? (2 marks)
- Distinguish between forward and reverse mutations. (1 mark)
  - Deduce the effect of treating DNA with deoxyribonuclease during transformation. (1 mark)

- (c) Explain how uptake of DNA can be enhanced by manipulation in the laboratory of bacteria that are not competent. (3 marks)
4. (a) Name the most commonly used host organisms and cloning vector in molecular cloning experiments. (2 marks)
- (b) Explain the reason for this (in 4 (a) above). (3 marks)
5. With the aid of illustrations, explain the polarity of the DNA molecule. (5 marks)
6. (a) How does the pentose in DNA differ from that in RNA? (2 marks)
- (b) With the aid of illustrations, show the difference between purine and pyrimidine bases of DNA with regard to structure. (3 marks)

**SECTION B (40 MARKS)**

7. Describe in detail the process of replication of the genetic material in eukaryotes. (20 marks)
8. Citing examples, discuss the application of recombinant DNA technology. (20 marks)
9. Describe four methods generally used in transfection. (20 marks)
-