JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE & TECHNOLOGY

SCHOOL OF BIOLOGICAL, PHYSICAL, MATHEMATICS AND ACTURIAL SCIENCES

UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN BIOLOGICAL SCIENCES

3rd YEAR 1st SEMESTER 2022/2023 ACADEMIC YEAR

MAIN CAMPUS - REGULAR

COURSE CODE: **SBB 1307**
COURSE TITLE: **MOLECULAR BIOLOGY**

EXAM VENUE: **STREAM: (B.SC)**

DATE: 15/12/2022 **EXAM SESSION: 9.00-11.00AM**

TIME: 2 HOURS

Instructions:

1. **Answer ALL questions in Section A and Any two questions in Section B**
2. **Candidates are advised not to write on question paper**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room**

SECTION A: SHORT ANSWER QUESTIONS (30 MARKS)

1. Illustrate the structure of a nucleotide (3 marks)
2. List the different types of RNAs and state their functions (3 marks)
3. Describe the Hershey and Chase experiment highlighting the logic behind its conclusion that DNA and not protein is the genetic material (3 marks)
4. Explain the contribution of the Meselson & Stahl experiment towards the understanding of DNA replication (3 marks)
5. Explain the roles of the enzymes listed belowin DNA replication (3 marks)
   a) DNA gyrase:
   b) DNA helicase:
   c) Single stranded binding proteins
6. Explain the molecular basis of mutations (3 marks)
7. Describe Tatum and Beadle's "one gene – one enzyme" concept (3 marks)
8. Distinguish between the sense and antisense strands of DNA (3 marks)
9. List the modifications that eukaryotic mRNA undergoes during its processing (3 marks)
10. Outline the three main steps in polymerase chain reactions (3 marks)

SECTION A: ESSAY QUESTIONS (40 MARKS)

11. Discuss the mechanisms of DNA repair (20 marks)
12. Discuss the process of protein synthesis in prokaryotes (20 marks)
13. Discuss the application of recombinant DNA technology in crop improvement and animal production (20 marks)
14. Discuss the sequencing strategy used in the Human Genome Project (20 marks)