



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE & TECHNOLOGY

SCHOOL OF BIOLOGICAL AND PHYSICAL SCIENCES

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

THIRD YEAR FIRST SEMESTER 2018/2019 ACADEMIC YEAR

MAIN CAMPUS - REGULAR

COURSE CODE: SBI 3314
COURSE TITLE: MOLECULAR BIOLOGY
EXAM VENUE: STREAM: (BIO)

DATE: EXAM SESSION:

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**
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SECTION A: SHORT ANSWER QUESTIONS

1. Describe the structure of a ribonucleotide. (3 marks)
2. The genetic material of a virus contains 10% adenine, 24% thymine, 30% guanine, and 36% cytosine. Is the genetic material in this virus double stranded DNA, single-stranded DNA, double-stranded RNA, or single-stranded RNA? Support your answer. (3 marks)
3. Explain the roles of the below listed enzymes in DNA replication. (3 marks)
 - i) DNA gyrase
 - ii) DNA helicase
 - iii) Single stranded binding proteins
4. Explain the contribution of the Meselson & Stahl experiment towards the understanding of DNA replication. (3 marks)
5. Explain Beadle and Tatum's "one gene – one enzyme" concept of gene function.(3 marks)
6. Explain the molecular basis of mutations. (3 marks)
7. List and state the functions of the three classes of ribonucleic acid. (3 marks)
8. Outline three attributes of plasmids that make them potential vectors for carrying cloned DNA. (3 marks)
9. Outline the three main steps in polymerase chain reactions. (3 marks)
10. Highlight the pros and cons of the shotgun sequencing approach to DNA sequencing. (3 marks)

SECTION B: ESSAY QUESTIONS

11. Discuss the mechanisms of DNA repair. (20 marks)
12. Discuss the process of protein synthesis in prokaryotes. (20 marks)
13. Using the *trp* operon as an example, describe the regulation of transcription in prokaryotes. (20 marks)
14. Discuss the application of recombinant DNA technology in crop improvement and animal production. (20 marks).