



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE & TECHNOLOGY
SCHOOL OF BIOLOGICAL AND PHYSICAL SCIENCES
UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR SCIENCE IN
BIOLOGICAL SCIENCE
4TH YEAR 2ND SEMESTER 2018/2019 ACADEMIC YEAR
MAIN CAMPUS - REGULAR

COURSE CODE: SBI 3441
COURSE TITLE: BASIC TECHNIQUES IN GENETIC ENGINEERING
EXAM VENUE: BIO LAB **STREAM: (BIO)**
DATE: 01/05/2019 **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. Explain the significant difference in protocols used for extracting nucleic acids from plant and animal materials. (3 marks)
2. Describe the two main challenges that can be encountered in DNA transformation research. (3 marks)
3. Outline the nucleic acid blotting techniques used for DNA and RNA. (3 marks)
4. Describe the key difference between conventional PCR and reverse transcriptase PCR. (3 marks)
5. Explain the nomenclature system used for restriction endonucleases. (3 marks)
6. Describe how host-controlled restriction and modification systems by restriction enzymes is achieved in bacteria. (3 marks)
7. Determine the frequency of occurrence for restriction sites in a DNA fragment comprised of 50% G+C content if the recognition site for restriction endonucleases is:
 - a. 4 base pairs long
 - b. 6 base pairs long
 - c. 8 base pairs long
8. Describe any three types of naturally occurring plasmids in bacteria. (3 marks)
9. Outline the steps involved in the construction of genomic libraries. (3 marks)
10. Describe the potential role of protoplasts in recombinant DNA technology

SECTION B: ESSAY QUESTIONS**(30 MARKS)**

11. Give an account of the conventional polymerase chain reaction citing its theoretical principal, key steps, possible resultant DNA fragments and challenges that can be encountered. (20 marks)
12. Discuss the different ways through which DNA fragments can be joined in recombination experiments. (20 marks)
13. Discuss the use of *Agrobacterium tumefaciens* mediated transformation in plants.
14. Discuss the transformation techniques in bacteria other than *E. coli*. (20 marks)