



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE & TECHNOLOGY
SCHOOL OF BIOLOGICAL, PHYSICAL, MATHEMATICS AND ACTUARIAL SCIENCES
UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF EDUCATION
SCIENCE

1stYEAR 1st SEMESTER 2022/2023 ACADEMIC YEAR

MAIN CAMPUS - REGULAR

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| COURSE CODE: | SBB 1105 |
| COURSE TITLE: | INTRODUCTION TO GENETICS AND EVOLUTION |
| EXAM VENUE: ZOO LAB | STREAM: (BSC) |
| DATE: 16/12/2022 | EXAM SESSION: 15.00-17.00PM |
| 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 (30 MARKS)

1. Define the following theories of heredity:
 - a. Preformationism (1 mark)
 - b. Pangenesis (1 mark)
 - c. Lamarckism (1 mark)
2. Define the following terminologies
 - a. Genotype (1 mark)
 - b. Phenotype (1 mark)
 - c. Allele (1 mark)
3. Explain the chromosomal theory of inheritance (3 marks)
4. Describe the contribution of Gregor Mendel to our present day understanding of heredity (3 marks)
5. Describe the importance of adaptations in evolution (3 marks)
6. Describe three causes of genetic variation in populations (3 marks)
7. Define the following types of mutations: (3 marks)
 - a. Silent mutations
 - b. Neutral mutations
 - c. Deleterious mutations
8. List any three preconditions for natural selection (3 marks)
9. Outline three major factors that prevent gene flow between species (3 marks)
10. Using a specific example, explain the process of sympatric speciation (3 marks)

SECTION B: ESSAY QUESTIONS (40 MARKS)

11. Discuss how Neo-Darwinism bridged the gap between the Darwinism and Mendelism schools of thought (20 marks)
12. In corn, purple kernels are dominant over yellow kernels, and full kernels are dominant over shrunken kernels. A cross is made between a true breeding plant with purple full kernels and a true breeding plant with yellow shrunken kernels.
 - a. Illustrate the cross and predict the F1 genotypic and phenotypic frequencies (6 marks)
 - b. Illustrate an inter-cross of the F1 progeny and predict the genotypic and phenotypic frequencies of the F2 generation (14 marks)
13. Give a synthesis on the role of adaptive radiation in speciation (20 marks)
14. Discuss molecular techniques applied in the study of evolution (20 marks)