JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE & TECHNOLOGY

SCHOOL OF BIOLOGICAL AND PHYSICAL SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

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

1st YEAR FIRST SEMESTER 2016/2017 ACADEMIC YEAR

MAIN CAMPUS - REGULAR

COURSE CODE:	**SBI 3113**
COURSE TITLE:	**INTRODUCTION TO GENETICS AND EVOLUTION**
EXAM VENUE:	**STREAM:**
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

SECTION A: SHORT ANSWER QUESTIONS (30 MARKS)

1. Give any three reasons to explain why garden pea plant was a good choice for Gregory Mendel experiment. (3 Marks)
2. Define a test cross and describe with an example the kind of situation in which it is usually performed (3 Marks)
3. Outline three characteristics of discrete variation (3 Marks)
4. Define the following terms, population genetics, DNA fidelity and locus (3 Marks)
5. Briefly discuss the potential benefits and possible harmful effects of genetic modifications. (3Marks)
6. Outline the process of DNA profiling (3 Marks)
7. Distinguish between
    a) Acquired traits and inheritable traits
    b) Gene pool and allele frequency
    c) Missense mutation and Nonsense mutation (3 Marks)
8. Define genetic recombination and identify how it occurs in eukaryotes (3 Marks)
9. Distinguish among Allopatric, sympatric and parapatric hypotheses of speciation (3 Marks)
10. Briefly explain why a recessive sex-linked gene is always expressed in human males (3 Marks)

SECTION B: ESSAY QUESTIONS (40 MARKS).

11. Discuss the main forms of pre-zygotic and post-zygotic isolation mechanisms (20 Marks)
12. Discuss the various types of point and chromosomal mutations (20 Marks)
13. Describe with examples five evidences that provide support for the theory of evolution (20 Marks)
14. a) State Hardy-Weinberg principle (1 Mark)
    b) Identify two assumptions of Hardy-Weinberg equilibrium (5 Marks)
    c) Petal coloration of pea plants has a complete dominance relationship where purple petals are dominant over white petals. There are 276 plants of which 273 have purple petals. Determine the allele frequency of individuals per genotype, and number of individuals per genotype. The next generation of pea plants has 552 plants, 546 have purple petals. Is the population in Hardy-Weinberg Equilibrium? Solve for p and q. (14 Marks)