JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF BIOLOGICAL AND PHYSICAL SCIENCES

UNIVERSITY EXAMINATIONS FOR THE DEGREE OF BACHELOR OF EDUCATION SCIENCE WITH IT.

3RD YEAR 2 SEMESTER 2015/2016 ACADEMIC YEAR.

MAIN CAMPUS-REGULAR RESIT

COURSE CODE: **SBT 303**

COURSE TITLE: **GENERAL GENETICS**

EXAM VENUE: LAB 1 **STREAM: (BED)**

DATE: 04/05/16 **EXAM SESSION: 9.00 – 11.00 AM**

TIME: 2 HOURS

INSTRUCTIONS:

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

SECTION A

1. Distinguish between cytoplasmic inheritance and genetic maternal effect. (3 marks)
2. Illustrate the structure of a eukaryotic chromosome. (3 marks)
3. Distinguish between autopolyploidy and allopolyploidy. How does each arise? (3 marks)
4. Make a distinction between dominant and recessive epistasis. (3 marks)
5. Describe the phenotypic effects of the following chromosomal rearrangements.
    a. Inversions (1 marks)
    b. Translocations (1 marks)
    c. Duplications (1 marks)
6. Distinguish between positive and negative control in gene regulation mechanisms. (3 marks)
7. Explain how alternative messenger RNA processing can be used to achieve gene regulation in eukaryotes. (3 marks)
8. Describe the mechanism of heredity for polygenic traits. (3 marks)
9. Distinguish between threshold and meristic characters. (3 marks)
10. Explain the effect of temperature on the Himalayan allele in rabbits.

SECTION B

11.
    a. Give a detailed description of the operon structure. (8 marks)
    b. Discuss the differences between negative inducible and negative repressible operons. (12 marks)
12. Using examples, discuss three types of epistatic gene interactions. (20 marks)
13. Explain the gene regulation mechanisms evidenced by the *lac* operon. (20 marks)
14. Give a detailed account of the following chromosomal variations:
    a. Aneuploidy
    b. Polyploidy