JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF AGRICULTURAL AND FOOD SCIENCES

SECOND YEAR SECOND SEMESTER UNIVERSITY EXAMINATION

2017/2018 ACADEMIC YEAR

REGULAR

COURSE CODE: AHT 3223

COURSE TITLE: PRINCIPLES OF GENETICS

EXAM VENUE: -- **STREAMS: BSC. HORTICULTURE**

DATE: 21/12/17 **EXAM SESSION: 9.00 – 11.00 AM**

TIME: 2 HOURS

Instructions:

1. **Answer ALL questions in section A and ANY other 2 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 [30 MARKS]

Answer ALL questions from this Section.

1. Differentiate between anaphase I and anaphase II of meiosis (4 marks)

2. (i) Explain the process of cell cycle (4 marks)
   (ii) How is the cell cycle regulated? (2 marks)

3. With a specific example and with reference to monohybrid inheritance, describe a test cross in plants (4 marks)

4. In the garden peas, the gene for round seeds is dominant over the gene for wrinkled seeds while the gene for yellow seeds is dominant over the gene for green seeds. A cross between a plant that is homozygous for both characteristics (rryy) with a round yellow plant gave the following ratio RrYy : rrYy=1:1.What was the genotype of the round yellow parent? (4 marks)

5. Explain the following:
   (i) Incomplete dominance (2 marks)
   (ii) Gene locus (2 marks)

6. Explain Hardy-Weinberg theory and state its applications in the study of population genetics (4 marks)

7. Describe a lac operon and state its role in a prokaryotic gene (4marks)

SECTION B [40 MARKS]

Answer ANY TWO questions from this Section.

8. Describe various experiments that led to the discovery of DNA as the molecular basis of genetic inheritance (20 marks)

9. With well labeled cell diagrams, explain the process of mitosis in cell division (20 marks)

10. Describe gene expression pathway and how the process is regulated (20 marks)