JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF AGRICULTURAL AND FOOD SCIENCES

FOURTH YEAR FIRST SEMESTER UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN HORTICULTURE

2016/2017 ACADEMIC YEAR

REGULAR

COURSE CODE: AHT 3412

COURSE TITLE: MOLECULAR PLANT BREEDING

EXAM VENUE: LR 4 **STREAM: BSc. Horticulture**

DATE: 14/12/16 **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 a. Define Transcription (1 mark)

b. By 1966 the search for the genetic code was over. State three principles of the genetic code (3 marks)

c. State the applications of molecular markers in cereal breeding (3 marks)

d. What are the current limitations of genetic engineering in maize research (3 marks?)

2 a. State the factors involved in transcriptional regulation (3 marks)

b. Explain northern blotting procedure (3 marks)

c. Briefly explain different types of restriction enzymes clearly stating what is distinct about them (4 marks)

3. a. State and explain applications of genetic engineering in plant breeding (4 marks)

b. What are the major advantages of using segregating populations for quantitative trait loci (QTL) mapping analysis (4 marks)

c. Explain how molecular information may improve the efficiency of backcross breeding schemes (2 marks)

SECTION B [40 MARKS]

Answer any TWO QUESTIONS from this Section.

Q4. It is possible to introduce genes which code for character of interest from unrelated plant species, lower plants, mammals, fish, bacteria, fungi and many more using either vector dependent or vector independent (direct) gene transfer. Discuss vector independent (direct) gene transfer methods (20 marks).

Q5. Discuss polymerase chain reaction (PCR) in details and its applications in plant breeding and other fields (20 marks)

Q6. Concerns about transgenic crop plants fall into two broad categories: (1) environmental impacts, and (2) health and safety issues. Discuss (20 marks).