JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF AGRICULTURAL AND FOOD SCIENCES

4TH YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN HORTICULTURE

2017/2018 ACADEMIC YEAR

REGULAR

COURSE CODE: AHT 3412:

COURSE TITLE: MOLECULAR PLANT BREEDING

EXAM VENUE: LR 5 **STREAMS**: BSc. Horticulture,

DATE: 19/12/17 **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 in this Section.

1 a. Define Transcription (1 mark)

b. Explain the importance of methylation state of DNA in gene expression (3 marks)

c. State and briefly explain the process pre-mRNA goes through to maturation (3 marks)

d. Using a diagram explain how genes are structured to ensure their expression (3 marks)

2 a. Explain polymerase chain reaction(PCR) highlighting the procedure involved (4 marks)

b. Name two types of plant genes, their regulation site and function (2 marks)

c. State and explain the vector independent gene transfers (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 in this Section.

Q4. (a) Agro bacterium-mediated gene transfer is a very important phenomenon in molecular biology. Discuss it and its application in plant breeding (20 marks).

Q5. Discuss the applications and benefits of molecular biology in plant breeding (20 marks).

Q6. Discuss molecular markers used in plant breeding; highlight their merits, demerits and applications (20 marks).