



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

**SPECIAL EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN
HORTICULTURE**

2019/2020 ACADEMIC YEAR

RESIT EXAMINATION

COURSE CODE: AHT 3412

COURSE TITLE: MOLECULAR PLANT BREEDING

EXAM VENUE:

STREAMS: BSc. Horticulture,

DATE:

EXAM SESSION:

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).