



# MACHAKOS UNIVERSITY

University Examinations for 2018/2019 Academic Year

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF AGRICULTURAL EDUCATION AND EXTENSION

..... YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION AND EXTENSION SBT

450: AGRICULTURAL BIOTECHNOLOGY

DATE:

TIME:

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## **INSTRUCTIONS:**

Answer *ALL* questions from Section A and any other *TWO* from Section B:

**SECTION A: COMPULSORY: (30 MARKS)**

### **QUESTION ONE**

- a) What are the nucleic acids (1 mark)
- b) Describe the following:-
  - i. Components of RNA molecule (3 marks)
  - ii. The three types of RNA and their functions (3 marks)
- c)
  - i State the two types of chromosomes (1 mark)
  - ii Explain the functions of Chromosomes (2 marks)
- d) State applications of polymerase chain reaction (PCR) (3 marks)
- e) Describe the following techniques, indicating the applications of each:
  - i. Gel electrophoresis (5 marks)
  - ii. Recombinant DNA technology (5 marks)
- f) State the Important biological tools used in recombinant DNA technology (4 marks)
- g) Describe the DNA ligases applied in biotechnology (3 marks)

**SECTION B: ANSWER ANY TWO QUESTIONS (40 MARKS)**

**QUESTION TWO (20 MARKS)**

- a) Describe the restriction enzymes applied in biotechnology (10 marks)
- b) Describe the requirements and steps involved in polymerase chain reactions (10 marks)

**QUESTION THREE (20 MARKS)**

- a) Discuss the central Dogma in molecular biology (10 marks)
- b) Describe the process of recombinant DNA technology (10 marks)

**QUESTION FOUR (20 MARKS)**

- a) Discuss the applications of biotechnology in Agriculture (10 marks)
- b) Discuss the molecular markers used in biotechnology (10 marks)

**QUESTION FIVE (20 MARKS)**

- a) Discuss the media components of plant tissue/cell culture (15 marks)
- b) Describe the protoplast fusion techniques (5 marks)