MACHAKOS UNIVERSITY

University supplementary Examinations for 2018/2019 Academic Year
Second semester

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF AGRICULTURAL EDUCATION AND EXTENSION

FOURTH YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATON AND EXTENSION

SBT 420: AGRICULTURAL BIOTECHNOLOGY

TIME: **DATE:**

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

SECTION A: COMPULSORY: (30 MARKS)

QUESTION ONE

a. i) Differentiate between DNA and RNA (2 Marks)
   ii) Describe the three types of RNA and their functions (3 Marks)
   iii) Describe two functions of chromosomes (2 Marks)
b. i) Describe any four applications of Polymerase chain reaction (PCR) (4 Marks
   ii) Describe the three steps used in polymerase chain reaction (3 Marks)
c. Describe the gel electrophoresis technique, indicating its importance (4 Marks)
d. Describe the role of restriction enzymes and DNA ligases in biotechnology (2 Marks)
e. Explain the importance of Marker assisted selection (MAS) in breeding (3 Marks)
f. i) Describe the three techniques used in protoplast fusion (3 Marks)
   ii) Explain any four applications of protoplast in agriculture (4 marks)

SECTION B: ANSWER ANY TWO QUESTIONS (40 MARKS)

QUESTION TWO (20 MARKS)

a. Discuss the central Dogma in molecular biology (10 Marks)
   b. i) Describe the steps involved in gene cloning/ Recombinant DNA technology (7 Marks)
      ii) Explain any three applications of recombinant DNA technology (3 Marks)

QUESTION THREE (20 MARKS)

Discuss the application of biotechnology in Agriculture (10 Marks)

QUESTION FOUR (20 MARKS)

a. Describe the media components of plant tissue/cell culture (10 Marks)
b. Describe the applications of plant tissue culture in Agriculture (10 Marks)

QUESTION FIVE (20 MARKS)

a. Describe the restriction enzymes applied in biotechnology (10 Marks)
b. iscuss any five molecular markers used in biotechnology (10 Marks)