MACHAKOS UNIVERSITY

University Examinations for 2017/2018 Academic Year

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF AGRICULTURAL EDUCATION AND EXTENSION

THIRD YEAR FIRST SEMESTER EXAMINATION FOR BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATON AND EXTENSION

KST 305: PLANT BREEDING

DATE:18/12/2017 **TIME:8.30-10.30 AM**

Instructions:
Answer ALL questions in section A and ANY TWO questions in section B

SECTION A: COMPULSORY: (30 MARKS)

a) Describe the historical development of plant breeding to what it is currently (5 marks)

b) Explain three consequences of plant breeding in an effort to improve crop production (3 marks)

c) With an appropriate illustration, explain the following in relation to Mendel's experiment
   i) Principle of segregation (3 marks)
   ii) Principle of independent assortment (3 marks)

d) Explain why scientists are interested in germplasm conservation (2 marks)

e) With specific crop examples, explain three methods used in developing hybrids (3 marks)

f) i) Distinguish between horizontal and vertical resistance (2 marks)
   ii) Explain how a plant reacts to bacterial or fungal infection as a way of natural resistance (3 marks)

g) Explain the mechanism of self-incompatibility in plants (3 marks)

h) i) Distinguish between broad sense and narrow sense heritability (2 marks)
   ii) Explain two applications of heritability in maize breeding (3 marks)

i) Explain the importance of plant breeders protection rights (2 marks)

SECTION B: ANSWER ANY TWO QUESTIONS (40 MARKS)

QUESTION TWO

a) You have been employed by KALRO as a plant breeder and you are tasked with improvement of bean production at the centre. Explain the methods you will employ in developing a high yielding variety (14 marks)

b) During the development of the above bean variety, explain how you would create variation (6 marks)

QUESTION THREE

a) Explain how you will develop resistance to a disease that is controlled by recessive genes, support your answer diagrammatically (15 marks)

b) Explain five means of overcoming self-incompatibility in developing superior breeding lines (5 marks)

QUESTION FOUR

a) In an effort to enhance breeding process modern methods are being adopted. Explain any five applications of modern breeding methods. (15 marks)

b) Explain five advantages of apomictic lines in improvement of crop varieties (5 marks)

QUESTION FIVE

a) Explain four techniques a researcher can utilize in breeding cassava and sweet potato clones (12 marks)

b) Explain the steps you will follow as a breeder in develop a new maize cultivar for farmers in Makueni County (8 marks)