MACHAKOS UNIVERSITY

University Examinations for 2018/2019 Academic Year

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF AGRICULTURAL EDUCATION AND EXTENSION

THIRD YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION AND EXTENSION

KST 305:/AGR 305 PLANT BREEDING

DATE: 29/7/2019 **TIME: 11.00-1.00 PM**

INSTRUCTIONS;

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

SECTION A: COMPULSORY: (30 MARKS)

QUESTION ONE

a) i) Using two appropriate examples, explain the role of Mendelian genetic in plant breeding **(5 marks)**

ii) Explain two roles of apomixis in plant breeding **(2 marks)**

b) Explain two methods used in preservation of germplasms by plant breeders **(2 marks)**

c) i) Explain three conventional methods used by researchers in breeding new sorghum varieties **(3 marks)**

ii) With relevant examples, explain four differences between self and cross pollinated crops **(4 marks)**

d) i) Explain steps used by plant breeders in developing new varieties **(6 marks)**

ii) Explain two differences between vertical and horizontal disease resistance **(2 marks)**

e) i)Explain the following in relation to genetic inheritance and the role it plays in developing new cultivars **(3 marks)**

$$P = G + E + GE$$

ii) Explain three factors affecting heritability of genes in breeding new cultivars **(3 marks)**

SECTION B: Answer any TWO questions (40 Marks)

QUESTION TWO

a) With specific examples, explain the role of plant breeding in crop improvement and sustainable agriculture **(10 marks)**

b) Explain five ways a maize breeder can employ to generate variation in development of superior genotypes **(10 marks)**

QUESTION THREE

a) Explain five ways a plant breeder can use in breeding for improved varieties in field beans **(15 marks)**

b) Explain the two approaches in minimizing undesirable effects of male sterile cytoplasm **(5 marks)**

QUESTION FOUR

a) With an illustration, explain how a breeder can develop rice varieties that are resistant to leaf rust disease **(11 marks)**

b) Explain three mechanisms of disease resistance exploited in plant breeding **(9 marks)**

QUESTION FIVE

a) Explain four forms of intellectual property rights (IPR) that a plant breeder can sought to be protected **(8 Marks)**

b) Explain four modern methods of plant breeding researchers have adopted to enhance breeding process **(12 marks)**