MACHAKOS UNIVERSITY

University Examinations for 2016/2017

SCHOOL OF AGRICULTURE AND NATURAL RESOURCES MANAGEMENT

DEPARTMENT OF ENVIRONMENTAL STUDIES

THIRD YEAR SECOND SEMESTER EXAMINATION FOR BACHALOR OF SCIENCE IN AGRICULTURAL EDUCATION AND EXTENSION

KST 305: PLANT BREEDING

Date: 5/12/2016 **Time: 8:30 – 10:30 am**

INSTRUCTION:

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

SECTION A: COMPULSORY:

QUESTION ONE (30 MARKS)

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 (MARKS)

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 (20 MARKS)

a) Explain five methods 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 (20 MARKS)

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 (20 MARKS)

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)