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

AGR 305: PLANT BREEDING

DATE: 27/9/2019 **TIME:11.00-1.00 PM**

INSTRUCTIONS;

Answer question one and two other questions

QUESTION ONE

a) Define the following terms in relation to plant breeding

i. Heterogozity (2 marks)

ii. Polyploidy (2 marks)

iii. Apomixis (2 marks)

iv. Chasmogamy (2 marks)

b) Describe the history of plant breeding specifying special improvement in each stage of evolution (6 marks)

c) As a crop specialist in field of extension, crop improvement is one area of concern in an effort to fight food insecurity in the world, explain three reasons why Mendelian genetic is important in crop improvement (3 marks)

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

e) Explain four differences between vertical and horizontal disease resistance in crops (2 marks)

f) Explain two conventional methods used by researchers in breeding new maize varieties (2 marks)

g) Explain the role of the expression P = G + E + GE in plant breeding (1 mark)

h) You have been employed by KALRO as a plant breeder in charge of developing pulses, describe six steps you would follow in developing a new variety of green grams (6 marks)

SECTION B. ANSWER ANY TWO QUESTIONS (40 MARKS)

QUESTION TWO

a) Explain five breeding methods a plant breeder can utilize in improving mungbeans varieties (15 marks)

b) Explain five ways you would employ as a plant breeder to overcome self -incompatible crops such as Brassicas (5 marks)

QUESTION THREE

a) Describe with an illustration one appropriate method that you would use in combining high yield and disease resistance controlled by minor gene in beans (11 marks)

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

QUESTION FOUR

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

b) With an illustration, describe Marker assisted Recurrent Selection (MARS) method of breeding that you may apply in breeding of new varieties of chickpeas (12 marks)

QUESTION FIVE

a) With specific examples, explain the role of plant breeding in improving crops for various adaptive climatic conditions and usage (10 marks)

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