

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF MASTER OF SCIENCE
IN PLANT BREEDING AND MASTER OF SCIENCE IN CROP PROTECTION

AGRI 824: BREEDING FOR PEST AND DISEASE RESISTANCE

STREAMS: M. Sc.

TIME: 3 HOURS

DAY/DATE: TUESDAY 09/04/2024

11.30 A.M. – 2.30 P.M.

INSTRUCTIONS:

- Answer question ONE and any other TWO questions
- Do not write anything on the question paper

QUESTION ONE (20 marks)

- (a) Discuss the mechanism of resistance in plants against pests. (8marks)
- (b) Discuss the following factors with respect to insect resistance.
- Morphological features of the host plant. (4 marks)
 - Physiological features of the host plant. (4 marks)
 - Biochemical features of the host plant. (4 marks)

QUESTION TWO (20 marks)

- (a) Discuss the role of secondary metabolites in pest and disease resistance. (14 marks)
- (b) Assuming that resistance is completely dominant, in a cross between resistant maize lines (RR) and susceptible lines (IT), what proportion of F₅ will be resistant and what proportion of F₅ derived lines will be homozygous? (6 marks)

QUESTION THREE (20 marks)

- (a) Describe how to develop a wheat variety resistant to various wheat rust strains using mass selection. (8 marks)
- (b) Describe the evolution of R genes. (7 marks)
- (c) Discuss the considerations for the use of DNA markers in marker assisted selection. (5 marks)

QUESTION FOUR (20 marks)

Describe how you can incorporate a resistant gene controlled by a recessive gene in a common bean (*Phaseolus vulgaris*) variety susceptible to bacterial blight (*Xanthomonas axonopodis* pv. *phaseoli*). (20 marks)

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