

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

**EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE
IN AGRICULTURAL EDUCATION AND EXTENSION**

AGRI 322: PLANT BREEDING

STREAMS: BSC (AGED) Y2S1

TIME: 2 HOURS

DAY/DATE: WEDNESDAY 06/12/2017

2.30 P.M. – 4.30 P.M.

INSTRUCTIONS:

- Answer all the questions in section I and TWO questions in section II
- Use of calculators and statistical tables is allowed
- Do not write anything on the question paper

SECTION I (30 MARKS)

1. (a) Explain the following terms: [6 marks]
 - (i) Mutation breeding
 - (ii) Genomic selection
 - (iii) Breeder seed
2. Explain the type of gene action found in quantitative trait. [6 marks]
3. Explain the main objectives in any given plant breeding program. [8 marks]
4. (a) Explain the term biotechnology and list the three discoveries that marked the advancement of biotechnology. [4 marks]
 - (b) Define molecular marker and list any four classes of DNA markers. [4 marks]
 - (c) Describe the steps in DNA cloning. [4 marks]

SECTION II (40 MARKS)

5. (a) Kitale is an area described as having homogenous environment with large scale farmers. Recommending the best type of maize variety for Kitale, and give a detailed procedure for developing such variety. [10 marks]
 - (b) Discuss the major activities involved in Ex-situ germplasm conservation method. [10 marks]

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6. (a) Discuss the sources of genetic variation. [10 marks]
(b) Discuss five applications of biotechnology in plant breeding. [10 marks]

7. The following data was obtained from an experiment conducted to investigate effects of anthropogenic increase in carbon dioxide on plant defense against invasive insects using five varieties of maize

Varieties	Replications			
	1	2	3	4
Variety 1	22	8	8	10
Variety 2	12	8	6	12
Variety 3	16	12	8	22
Variety 4	28	54	16	36
Variety 5	14	8	18	28

Perform analyze of variance and test if the five varieties of maize are significantly different in their defense compromise against invasive insects at 5% probability level.

[20marks]

8. (a) Describe the procedures in production of double haploid (DH) maize.[10marks]
(b) Using a hypothetical case study, explain the theory of pure lines. [10marks]
