

THE NATIONAL UNIVERISTY OF LESOTHO

B.Sc. (Crop Science Examination) CPS 3503 – PRINCIPLES OF PLANT BREEDING

Date: August 2023 **Total Mark: 100** **Time allowed: 3
hours**

Instructions: Answer all three questions.

Question 1 carries 40 marks and the rest of the questions carry 30 marks each

Question 1

Explain in brief (*2-4 sentences for each*) the following terms:

- a) Inbreeding depression (4 Marks)
- b) Hybrid Vigor (4 Marks)
- c) Donor parent (4 Marks)
- d) Pollination (4 Marks)
- e) Gene (4 Marks)
- f) Phenotype (4 Marks)
- g) Clones (4 Marks)
- h) Nucleotide (4 Marks)
- i) Selection (4 Marks)
- j) Plant genetic resources (4 Marks)

Question 2

The following table shows measurements for maize grain weight and plant height for a maize variety planted in a field.

<u>Plant height(m)</u>	<u>Grain weight(kg)</u>	
1	9.7	7.9
2	5.6	4.5
3	10.7	8.3
4	6.8	5.4
5	11.0	9.1
6	4.5	4.9
7	7.4	6.0

- 1) Calculate the mean, variance and standard deviation for each trait (12 marks)
- 2) What is the covariance of the two traits? (4 marks)
- 3) What is the correlation coefficient? (4 marks)
- 4) Do you think grain weight is caused by plant height? Explain why. Would you use plant height to select for grain weight? (10 marks)

Question 3

Discuss the following terms as they apply in plant breeding

- a) Imperfect flowers (5 Marks)
- b) Sexual reproduction (10 Marks)
- c) Pollination (5 Marks)
- d) Marker assisted selection (10 Marks)