



1ST SEMESTER 2017/2018

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UNIVERSITY OF SWAZILAND

SUPPLEMENTARY EXAMINATION PAPER

**PROGRAMMES: BACHELOR OF SCIENCE IN AGRONOMY YEAR THREE
BACHELOR OF SCIENCE IN HORTICULTURE YEAR THREE**

COURSE CODE: CP 301

TITLE OF PAPER: CROP BREEDING

TIME ALLOWED: TWO (2) HOURS

**INSTRUCTIONS: ANSWER QUESTION 1 AND ANY OTHER THREE (3)
QUESTIONS OF YOUR CHOICE**

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CHIEF INVIGILATOR**

QUESTION 1 (COMPULSORY QUESTION)

Discuss the strategy of a typical crop breeding programme. Your discussion with relevant examples should highlight the different activities at each implementation stage. [25 MARKS]

QUESTION 2

- a) Discuss how sexual gametes are formed in crop plants and also state how the diploid sporophyte is formed thereafter. Support your answer with well labelled diagrams.
- b) State the importance of crop reproduction systems in crop breeding programmes. (5 Marks)

[25 MARKS]

QUESTION 3

The following data on flowering dates were obtained by third year agronomy and horticulture students in a maize breeding practical at Luyengo Campus. The data were obtained from an F_2 maize population.

Variability parameter	Value
V_A	48.7
V_D	11.3
V_I	1.1
V_E	17.8
$V_{G \times E}$	0.0
Population mean (days)	56.6
K-Value at 10% Selection intensity	1.8

- a) Define the variability parameters; V_A , V_D , V_I , V_E , $V_{G \times E}$ (10 Marks)
- b) Calculate the number of days to maturity in the F_3 progeny population based on the following breeding objectives;
 - i. Breeding for early maturity (9 Marks)
 - ii. Breeding for late maturity (2 Marks)
- c) For both breeding objectives above, support your answer with well labelled normal distribution curves. (4 Marks)

[25 MARKS]

QUESTION 4

- a) Hybridization is one of the important activities in conventional crop breeding programmes. Define hybridisation and its significance. (10 Marks)
- b) In terms of selection, what are the main differences between the pedigree and bulk breeding methods? (15 Marks)

QUESTION 5

Write a paper for a seminar presentation on the application of plant biotechnology in modern crop breeding programmes. [25 MARKS]