



1ST SESTER 2009/2010

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UNIVERSITY OF SWAZILAND

SUPPLEMENTARY EXAMINATION

**PROGRAMME: BACHELOR OF SCIENCE IN AGRONOMY YEAR 3
HORTICULTURE YEAR 3**

COURSE CODE: CP 301

TITLE OF PAPER: CROP BREEDING

TIME ALLOWED: TWO (2) HOURS

INSTRUCTIONS: ANSWER ANY FOUR (4) QUESTIONS

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THE CHIEF INVIGILATOR**

QUESTION 1

Explain fully, the following terms and their importance in crop breeding:

- a) Diallel analyses [5 Marks]
- b) Gene action [5 Marks]
- c) Deoecy [5 Marks]
- d) Gametophytic apomixes [5 Marks]
- e) Molecular marker assisted plant breeding [5 Marks]

[25 Marks]

QUESTION 2

- a) Define crop breeding and its overall objectives. [15]
- b) What was the contribution of the following scientists to crop breeding:
 - i. Nikolai Ivanovich Vavilov [5]
 - ii. W.L. Johannsen [5]

[25 Marks]

QUESTION 3

- a) Define mass selection and discuss its disadvantages in self pollinated crops. [10]
- b) Using any quantitative trait of your choice, describe in details the selection procedure in a backcross breeding program. Your discussion should indicate why four (4) back cross generations are enough to transfer the trait of interest. [15]

[25 Marks]

QUESTION 4

Assuming you are an assistant tomato breeder interested in developing lines that have an **increased** shelf life. Given the data below from an F_2 population;

Parameter	Variances
δ^2G	11.73
δ^2D	4.32
δ^2E	2.19
δ^2I	0.14
$\delta^2G \times E$	0.03
Population Mean (Days)	12.8

- a) Calculate the genetic advance at 2 % selection intensity (k-value =2.42). [15]
- b) What conclusions can you draw from using this population for breeding for increased shelf life in tomatoes? [10]

[25 Marks]

QUESTION 5

Describe how inbred lines are developed and utilized in both conventional and non conventional hybrid breeding programmes.

[25 Marks]