



1<sup>ST</sup> SEMESTER 2016/2017

PAGE 1 OF 2

UNIVERSITY OF SWAZILAND

SUPPLEMENTARY EXAMINATION PAPER

PROGRAMME: 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)**

Describe the main contributions of the following scientists in study of crop breeding.

- a) Gregor Mendel (1822 – 1884) (10 marks)
- b) N. I. Vavilov (1887 – 1943) (5 marks)
- c) W.L. Johannsen (1857 – 1927) (5 marks)
- d) G.H. Shull (1874 – 1954) (5 marks)

**[25 MARKS]**

**QUESTION 2**

- a) Discuss the different systems of homomorphic self-incompatibility in crop plants with examples of crops under each type. (20 marks)
- b) What is the significance of self-incompatibility in crop breeding programmes? (5 marks)

**[25 MARKS]**

**QUESTION 3**

- a) Discuss the phenotypic variance and its components. (12 marks)
- b) Define heritability, types and state its uses in crop breeding programmes. (13 marks)

**[22 MARKS]**

**QUESTION 4**

- a) What is the purpose of progeny testing in pure line selection breeding programmes? (5 marks)
- b) Describe how hybridization is achieved in self-pollinated crops. (5 marks)
- c) Give the criteria of selecting parents in the pedigree and bulk breeding methods. (4 marks)
- d) In terms of selection, what are the main differences between the pedigree and bulk breeding methods? (4 marks)
- e) In the pedigree breeding method, explain why the preliminary testing of experimental cultivars normally begins in the F<sub>7</sub> generation. (2 marks)
- f) Define backcrossing and give its main objective. (5 marks)

**[25 MARKS]**

**QUESTION 5**

Write a paper for a presentation at a UNISWA departmental seminar entitled “molecular and classical plant breeding as complementary approaches in modern crop breeding programmes”.

**[25 MARKS]**