



1ST SEM 2011/2012

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**UNIVERSITY OF SWAZILAND
FINAL EXAMINATION PAPER**

**PROGRAMME: B.Sc. IN AGRONOMY YEAR 3
B.Sc. IN 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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CHIEF INVIGILATOR**

QUESTION 1

Write short notes on the following plant breeding terms:

- a) Primary centers of plant diversity (5 Marks)
 - b) Sporophytic apomixes (5 Marks)
 - c) Gametophytic self incompatibility (5 Marks)
 - d) Reciprocal recurrent selection (5 Marks)
 - e) Bt crops (5 Marks)
- [25 MARKS]

QUESTION 2

- a) Compare and contrast the pedigree and the bulk population methods of plant breeding. (17 Marks)
 - b) Discuss the various methods that can be utilized by a reeder to shorten the selection period in both the pedigree and bulk population breeding methods. (8 Marks)
- [25 MARKS]

QUESTION 3

Describe in details the floral mechanisms that facilitates cross pollination in the following cultivated plants:

- a) Maize (*Zea mays* L.) (8 Marks)
 - b) Papaya (*Carica papaya* L.) (2 Marks)
 - c) Cauliflower (*Brassica oleracea* var. *botrytis* L.) (8 Marks)
 - d) What are the plant breeding implications of cross pollination? (7 Marks)
- [25 MARKS]

QUESTION 4

- a) Define a synthetic variety. Discuss how inbreeding depression and heterosis are utilized in a synthetic variety breeding program. (16 Marks)
 - b) Discuss the main advantages of synthetic varieties over hybrid varieties when used by resource poor farmers. (9 Marks)
- [25 MARKS]

QUESTION 5

You have been hired by a private seed company in Swaziland as a crop improvement consultant. The seed company is about to release a new maize hybrid variety which is high yielding but is susceptible to a new race of grey leaf spot (*Cercospora zae-maydis*) disease. The local gene bank at Malkerns Research Station has maize landraces that are resistant to all races of grey leaf spot. Explain in details how you can improve the new maize hybrid in tolerance to the disease using the gene bank landraces.

(25 MARKS)