UNIVERSITY OF SWAZILAND

SUPPLEMENTARY EXAMINTION 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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QUESTION 1

a) Define all the terms in the equation $V_P = V_A + V_D + V_I + V_E + V_{GxE}$ (12 Marks)

b) In an effort to develop an **early maturing** maize variety, initial selections were conducted on plants in an F_2 population, where 20% of early maturing plants were selected and planted for the next generation.

Given the following genetic parameters, calculate the days to maturity in the F_3 progeny population and support your answer with well labelled normal distribution curves. Keep your answers to 1 decimal place.

$V_A = 48.7$ $V_D = 11.3$ $V_I = 1.1$ $V_E = 17.8$ $V_{GxE} = 0.0$
Population mean of the original F_2 population = 56.6 days.
K value at 20% selection intensity = 1.4

       (13 Marks)

[25 MARKS]

QUESTION 2

a) Discuss the strategy of a typical crop breeding programme.   (13 Marks)

b) Give any six (6) crop breeding specific objectives, with relevant examples where applicable.

       (12 Marks)

[25 MARKS]

QUESTION 3

a) Compare and contrast, the pure line and mass selection breeding methods.   (16 Marks)

b) Discuss the crop breeding scenarios where the mass and pure line selection methods can be most applicable.

       (9 Marks)

[25 MARKS]

QUESTION 4

a) Discuss the main advantages and disadvantages of using hybrid varieties.   (12 Marks)

b) Discuss the main advantages and disadvantages of using synthetic varieties.   (13 Marks)

[25 MARKS]

QUESTION 5

Discuss the application of biotechnology in crop breeding programmes.   **[25 MARKS]**