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UNIVERSITY OF SWAZILAND

MAIN EXAMINATION PAPER

PROGRAMME: BACHELOR OF SCIENCE
IN AGRONOMY YEAR 3

COURSE CODE: CP 307

TITLE OF PAPER: FIELD EXPERIMENTATION

TIME ALLOWED: TWO (2) HOURS

INSTRUCTION: ANSWER ALL QUESTIONS

<u>NOTE</u>: STUDENTS SHOULD BE PROVIDED WITH GRAPH PAPER AND
RANDOM NUMBER TABLE OF 10

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BY THE CHIEF INVIGILATOR**

QUESTION 1

Write on the following terms/phrases [a to e]. Use examples to illustrate your answers. Each question carries four marks.

(a) Concept notes.
(b) Randomisation and replications .
(c) The nature of agricultural research.
(d) Hypothesis.
(e) Least significant difference.

[20 Marks]

QUESTION 2

From the information below [a-f], complete the ANOVA Table.

(a) Title: Effects of four maize varieties at five plant densities on seed yield
(b) The researcher has no prior knowledge on the performance of the varieties nor of their response to plant densities
(c) Number of replicates: 4
(d) Plot size: Five rows each 6 m long
(e) Inter- and intra-row spacing: As recommended for Luyengo community

(f) Complete the table below from information above.

Source of variation	Degrees of freedom

(6 Marks)

(ii) Which experimental design would you use and why?

(4 Marks)

(ii) How much phosphorus (g) will each maize plant receive if a researcher applied 300 kg/ha of a compound fertiliser (2-3-2 [37])?
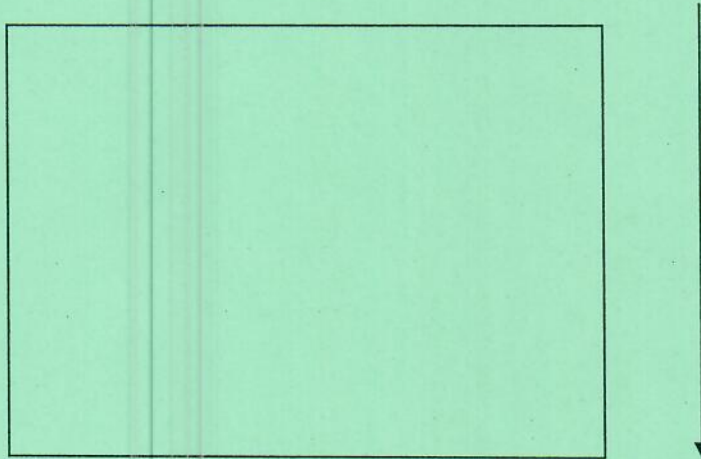
(10 Marks)

[20 marks]

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QUESTION 3

The Figure below shows a piece of land with a 25% slope in the direction of the arrow.

(a) With the random number Table provided, draw a field plan for an experiment with four replicates and eight treatments, giving reasons for your location of replicates.

(12 Marks)

(b) Indicate the position of plot label in each plot.

(8 Marks)

[20 Marks]

QUESTION 4

With the use of a Table, list two advantages and two disadvantages of the following experimental designs. Each question carries five marks.

(a) Completely randomised block
(b) Randomised complete block
(c) Split- plot design
(d) Latin square

[20 Marks]

QUESTION 5

The Table below shows the results of a two-factor experiment on three nitrogen sources at five levels each in a dry bean trial at the Crop Production Department at the Luyengo Campus of the University of Swaziland. The net plot was one row, 5 m long. The seed yields are presented in column three of the Table below.

(a) Calculate seed yield (kg/ha) for each plot

(10 Marks)

(b) Using the graph paper provided, draw figures for each of the two main effects and the interaction.

(5 Marks)

(c) Draw conclusions for the main effects and the interaction.

(5 Marks)

Source of nitrogen fertiliser	Rates of nitrogen fertilisers (kg/ha)	Seed yield (g/plot)
LAN	0	125
LAN	20	267
LAN	40	389
LAN	80	498
LAN	100	760
Urea	0	136
Urea	20	265
Urea	40	360
Urea	80	487
Urea	100	812
Nitrate of soda	0	154
Nitrate of soda	20	245
Nitrate of soda	40	370
Nitrate of soda	80	500
Nitrate of soda	100	989

[20 Marks]