UNIVERSITY OF SWAZILAND

SUPPLEMENTARY 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 QUESTIONS 1 AND 2, WHICH ARE COMPULSORY AND ANY OTHER TWO QUESTIONS OF YOUR CHOICE.

NOTE: STUDENTS SHOULD BE GIVEN RANDOM NUMBER TABLE

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QUESTION 1

(THIS IS A COMPULSORY QUESTION)

Write on the following terms. Each answer carries four marks.

(a) Neighbour effects in field experimentation.
(b) Gross plots and net plots
(c) The nature of agricultural research.
(d) Types of research
(e) Replication.
(f) List 8 components of a concept note
(g) Choice of experimental sites

(28 marks)

QUESTION 2

(THIS IS ALSO A COMPULSORY QUESTION)

A maize research experiment at Crop Production Department Farm at Luyengo, has three rates of nitrogen in a randomized block design.

(a). What is the minimum number of replicates needed for the experiment?

(5 marks)

(b). Write a skeletal ANOVA table for source of variation and degrees of freedom for the experiment.

(3 marks)

(c). If each gross plot is 5 rows and 6 m long, with no space between plots and 1 m between replicates, how much land will you need for the experiment?

(8 marks)

(d). Draw a field plan for the experiment and indicate the position of plot labels in each plot.

(8 marks)

(e) List four materials that you can use for plot labeling.

(4 marks)

(28 Marks)

QUESTION 3

From the information below, complete the ANOVA table.
(a) Title: Effects of five bean varieties at four planting densities on seed yield at Crop Production Department, Luyengo campus.

(b) The researcher has no prior knowledge on the performance of the varieties nor of their response to planting population.
(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.

(i) Complete the table from information above (Reproduce this table in your answer script)

Source of variation	Degrees of freedom

(11 Marks)

(ii) If the researcher wishes to apply 300 kg/ha of a compound fertiliser (2-3-2 (38) as basal fertilizer and 25 kg/ha of nitrogen as side dressing. How many grams of the compound fertiliser should he apply per row? If the source of nitrogen is urea, how many grams of urea should the researcher apply per row?

(11 Marks)

[22 Marks]

QUESTION 4

(a) A trial has eight treatments replicated four times in a randomised block design. The site is sloppy from west to east. Draw a field plan for the experiment demonstrating how you would minimise the effects of the slope with respect to soil fertility and moisture content.

(12 marks)

WEST ➡️➡️➡️➡️➡️➡️➡️➡️➡️ EAST

(b) A researcher has a trial with eight treatments replicated three times, He has a choice of (i) first planting all the eight treatments in replicate I before going to plant replicates II, III and IV or a choice of (ii) planting one treatment at a time in all the

replicates before going to plant treatments 2, 3, 4, 5, 6, 7, and 8. Which method of planting would you recommend and why?

(10 marks)

[22 marks]

QUESTION 5

A researcher plans to find the effects of nitrogen fertiliser on maize growth, development and yield. The treatments are four nitrogen levels: 0, 30, 60 and 120 kg/ha). The design of the experiment is randomized block design. Each treatment is replicated five times.

(a) If the researcher plans to sacrifice five plants for growth analysis and plans a total of five such sequential sacrificial harvests, indicate the row for sequential growth analysis for the five times and also indicate and calculate the area for the net plot.

(10 Marks)

(b) If the source of nitrogen is urea, how many grams of urea will the researcher need per plant at the rate of nitrogen of 120 kg/ha?

(8 Marks)

(c) What other nutrients should the researcher apply to the plots that receive nitrogen?

(2 Marks)

(d) Should the control plot (no nitrogen applied) also receive the other nutrients? If yes, why?, If not yes, Why not?

(2 Marks)

[22 Marks]