CHUKA UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN HORTICULTURE

HORT 371: AGRICULTURAL EXPERIMENTATION

STREAMS: BSC HORT Y3S2 **TIME: 2 HOURS**

DAY/DATE: FRIDAY 17/04/2020 **2.30 P.M. – 4.30 P.M.**

INSTRUCTIONS:

- **The paper contains section A and B**
- **Answer all questions in section A and any two from section B**
- **Marks for each question are indicated in parenthesis ( )**
- **Total marks = 70**

SECTION A (TOTAL MARKS 30): ANSWER ALL QUESTIONS

QUESTION ONE

(a) What is replication in agricultural experimentation? (2 marks)

(b) Why replicate in agricultural experiments? (4 marks)

QUESTION TWO

(a) Name the stages of scientific inquiry. (4 marks)

(b) The weight in grams of nine randomly selected orange fruits are shown in the table below

SN_0	Weights (g)
1	6
2	7
3	10
4	11
5	11
6	13
7	16
8	18
9	25

Find:

(i) Sample variance (2 marks)

(ii) Sample Standard Deviation (2 marks)

QUESTION THREE

(a) Enumerate the elements of descriptive and inferential statistical problems. (4 marks)

(b) Briefly outline the differences between a research proposal and a project proposal. (4 marks)

QUESTION FOUR

An experiment consisted of five (5) treatments in three (3) replications in a completely randomizes design (CRD). There were three (3) samples per experimental unit. On the basis of this information.

(a) Provide a linear model for this experiment and define the terms. (4 marks)

(b) Show the analysis of variance (ANOVA) with sources of variation and degrees of freedom. (4 marks)

SECTION B: (TOTAL MARKS 40): ANSWER TWO QUESTIONS

QUESTION FIVE

An experiment was conducted to determine the effect of three (3) methods of soil preparation in the first year growth of Mango seedlings. Four locations (Farm land) were selected and each location was divided into three (3) plots. A Randomized Complete Block Design(RCBD) was employed using locations as blocks. The method of soil preparation was: A (No fertilizer), B (light fertilization) and C (burning). The observations recorded were the average first year growth of seedlings on each plot. The analysis of variance (ANOVA) for the data was as follows:

Sources of variation	Degree of freedom	Sum of squares	Mean squares	F Cal
Treatment (Soil Preparation)	2	38.0		
Blocks (locations)	3	61.6667		
Error	6	11.333		
Total	11	111.0		

On the basis of the data in the table above,

(a) Determine the mean of squares and F calculated. (10 marks)

(b) (i) Do the data provided sufficient evidence to indicate a difference in the mean growth for the 3 soil preparations? (use $F_{2,6,}\alpha = 0.05 = 5.14$) (5 marks)

(ii) Is there evidence to indicate a difference in the mean rates of growth for the 4 locations? $F_{3,6}, \alpha = 0.05 = 4.76$) (5 marks)

QUESTION SIX

The price of the standard family farm and the farm selling company shares was recorded for a random sample of 12 farm buying and selling agencies

Selling price (£000)(X)	Market Share % (Y)
137	14
138	15
125	10
142	8
168	9
145	7
135	11
145	5
160	3
146	5
136	7
160	2

(a) Calculate the product moment correction coefficient. (10 marks)

(b) Test to see if the correlation coefficient differs significantly from zero at 95% confidence level given the critical T value is $t_{0.025} = 2.23$ (10 marks)

QUESTION SEVEN

(a) What is hypothesis testing? (2 marks)

(b) Enumerate the characteristics of good hypothesis (7 marks)

(c) Explain the steps in hypothesis testing (8 marks)

(d) The mean contents of a carton of cereal should weigh not less than 750 g. A random sample of 33 cartons surveyed showed that the sample mean weight is 742 g, with a sample standard deviation of 18 g. Test as a significance level of 10% whether the mean weight is less than 750 g. (3 marks)
