UNIVERSITY OF FORT HARE

AGB 312

DEGREE EXAMINATIONS

JUNE 2023

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Time: 3 Hours

Subject: Agricultural Biometry

Marks: 100

This paper consists of 4 pages including cover page

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Instructions

Answer all questions.

Statistical Table will be provided.

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Carryout all tests at α=0.05.

Question 1(25Marks)

The following data is the weight gain in kg of 12 chickens for 3 different tropical feedstuffs. Each feedstuff is fed to 4 chicks.

Feedstuff	Observation			
A	5	5	4	3
B	6	7	5	6
C	11	10	12	11

1.1 State the statistical linear model for the design. **[3]**

1.2 Analyse the data and draw conclusions **[10]**

1.3 Compute the Coefficient of variation, CV, and report your result. **[4]**

1.4 Determine the coefficient of determination, R^2, and comment on your result. **[3]**

1.5 What is the 95% confidence interval of the difference between means of Feedstuff A and Feedstuff C? **[5]**

Question 2(25Marks)

An experiment with 3 heifers was conducted using a Latin square design. The three treatments(A,B,C) were three different rations. Each animal ate the three rations sequentially, one week on each. The following are the kilogram(kg) dry matter consumed per 45kg body weight.

		Heifer		
Week	1	2	3	Total
1	2.7(A)	2.6(B)	1.9(C)	7.2
2	-	0.2(C)	2.3(A)	2.5
3	1.9(C)	2.1(A)	2.4(B)	6.4
Total	4.6	4.9	6.6	16.1

2.1 Estimate the missing value displayed in the data. **[3]**

2.2 State the statistical linear model for the design. **[3]**

2.3 Analyse the data and draw conclusions. **[10]**

2.4 Compute the Coefficient of variation, CV, and report your result. **[3]**

2.5 Obtain Relative efficiency, R.E., of the design as compared to RCBD:

2.5.1 With Rows treated as Block (Column efficiency). [3]

2.5.2 With Columns treated as Block (Row efficiency). [3]

Question 3(25Marks)

3.1 The means of six varieties of maize were compared under and the results are displayed below.

Use Fisher's Protected Least Significant Difference test to separate the means of the six varieties.

Variety	Mean Yield
A	50.3
B	69.0
C	24.0
D	94.0
E	75.0
F	95.3

Replication per treatment=4,MSE(From ANOVA table)=120,Df_{error}=18, Fcal=24.80, Ftab=2.77, and P<.05. **[10]**

3.2 State the four assumptions of ANOVA for Completely Randomized Design. **[4]**

3.3 Define data transformation. **[2]**

3.4 Why do we transform data? State four data transformation techniques. **[5]**

3.5 List four aposteriori multiple comparisons tests. **[4]**

Question 4(25Marks)

A horticulturist wanted to study the effect of row spacing and phosphate fertilizer on the yield of bush beans. She decided to use a factorial set of treatments with spacing at three levels: S_1=45cm S_2=90cm and S_3=135cm and phosphate at two levels P_1= No phosphate and P_2=25kg/ha phosphate. She decided to use a RCBD with three blocks. The field plan and bean yields are shown below.

4.1 State the model for the design. **[3]**

4.2 Carryout the ANOVA, and report your results. Test at 5% significant level. **[16]**

4.3 Obtain the Coefficient of variation, CV, and report your result. **[4]**

4.4 Determine the coefficient of determination, R^2, and comment on your result. **[2]**

Block:	I	II	III
	S_2P_1 60	S_1P_2 45	S_1P_1 55
	S_1P_1 65	S_3P_1 55	S_3P_1 51
	S_3P_2 66	S_3P_2 57	S_1P_2 43
	S_3P_1 59	S_1P_1 58	S_2P_1 54
	S_1P_2 56	S_2P_2 50	S_2P_2 45
	S_2P_2 62	S_2P_1 59	S_3P_2 50

Figure: Field plan and bean yields (kg/plot) for a spacing × phosphate trial in bush beans.

.....**[100Marks]**