Eastern University, Sri Lanka
Fourth Year First Semester Examination in Agriculture 2016/2017 (December 2018)
CS 4102: Design and Analysis of Experiments

Answer ALL Questions

Time allowed: 02 hours

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1. A researcher conducted an experiment to study the effect of four different fertilizers (F_1, F_2, F_3 and F_4) on growth of chilli plants using Randomized Complete Block Design (RCBD) with five blocks. The recorded plant height (cm) values are given below.

Block	Plant height (cm)			
	F_1	F_2	F_3	F_4
1	12.5	14.6	13.5	12.4
2	9.2	11.2	10.7	11.3
3	11.3	12.7	12.6	9.2
4	8.2	10.6	11.6	9.6
5	12.7	11.6	13.1	11.1

   a. Write the statistical model for the above design.

   b. Construct the Analysis of Variance (ANOVA) table for the above data.

   c. Interpret the results at 5% significant level.

   d. Compute the Coefficient of Variation for the experiment.

2. Write the short notes on the following:

   a. Blocking techniques in agricultural research.

   b. Randomization in Latin Square Design.

   c. Methods to increase precision of experiments.

3. A field experiment was conducted using split plot design with three blocks to stud effect of irrigation and fertilizer on rice yield. Two levels of irrigation (I1 and I2 three levels for fertilizer (F1, F2 and F3) were used in the experiment. Yield rec from the experiment are given below.

			Rice yield (kg/plot)					
Block	I1F1	I1F2	I1F3	I2F1	I2F2	I2F3		Aı Ti
1	13.5	29.1	17.4	12.3	15.6	10.5		
2	8.9	11.3	6.3	8.9	11.3	13.7		
3	24.7	12.5	8.1	9.5	17.6	19.8		

Perform the ANOVA and interpret the results at 5% significant level.

4. A factorial experiment was conducted in a green house to study the effect of th hormones (H_1, H_2 and H_3) and two varieties (V_1 and V_2) on brinjal yield us Completely Randomized Design (CRD) with four replicates. The ANOVA table for data is given below.

SOV	Df	SS	MS	F value
H	2	174.26	87.13	31.68
V	1	65.23	65.23	23.72
H*V	2	23.15	11.57	4.20
Error	18	49.61	2.75	
Total	23	312.25		

a. Sketch the layout of the experimental design.
b. Write the statistical model for the ANOVA.
c. Write the appropriate SAS codes to perform above ANOVA.
d. Interpret the above output.
e. Rewrite the SAS codes to test the main effect of each factor by fixing the othe factor.

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