

Eastern University, Sri Lanka

Final Year First Semester Examination in Agriculture 2012/2013 (Mar/Apr 2015)

CS 4102: Design and Analysis of Experiments

Answer ALL Questions

Time allowed: 02 hours

1. A researcher conducted an experiment to test the yield of four paddy varieties (V1, V2, V3 and V4) in Randomized Complete Block Design (RCBD) with five blocks. Recorded grain yield of paddy (kg/plot) is given below.

Block	Paddy yield (kg/plot)			
	V1	V2	V3	V4
1	32.0	33.1	31.1	30.7
2	30.3	30.5	30.1	30.5
3	32.5	34.9	30.5	34.6
4	32.4	33.2	30.3	32.8
5	34.1	32.3	30.9	32.6

- Write the statistical model for the above design.
 - Construct the Analysis of Variance (ANOVA) for the above experiment.
 - Interpret the results at 5% significant level.
 - Compute the relative efficiency of Randomized Complete Block Design (RCBD) compared with Complete Randomized Design (CRD).
2. Write the short notes on the following:
- Principles of field experimentation.
 - Mean separation procedures in agricultural experiments.
 - Methods to increase the precision of the experiment.

3. A digestion trial carried out with four shorthorn cattle (C1, C2, C3 and C4), each animal receive each of four rations (A, B, C and D) in four successive periods (P1, P2, P3 and P4), using Latin Square Design. Calculated digestibility of nitrogen were given as follows;

Shorthorn cattle	Period			
	P1	P2	P3	P4
C1	63.3 (D)	68.9 (A)	67.9 (B)	63.4 (C)
C2	66.8 (A)	63.5 (B)	62.3 (C)	62.3 (D)
C3	64.8 (C)	67.2 (D)	69.1 (A)	67.8 (B)
C4	66.1 (B)	68.9 (C)	65.3 (D)	65.3 (A)

- Perform the ANOVA and interpret the results at 5% significant level.
 - Write the appropriate SAS codings to analyze the above results.
 - Calculate the Coefficient of Variation (CV) for the above experiment.
4. A field experiment was conducted in split plot design with three blocks to study the effect of ploughing and fertilizer on chilli yield. Three levels of ploughing (P1, P2 and P3) and two levels for fertilizer (F1 and F2) were used in the experiment. Yield recorded from the experiment are given below.

Block	Chilli yield (kg/plot)					
	P1F1	P1F2	P2F1	P2F2	P3F1	P3F2
1	19	22	27	30	20	19
2	20	18	26	28	23	23
3	18	23	20	29	21	22

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