

5. (a) What are the special features of a completely randomised design ? How does it differ from a randomised block design ? Compare the relative merits of the two designs.

(b) Derive the analysis of covariance for CRD with one concomitant variable. 7,9

6. (a) In two-way classification with one observations per cell, show that the mean square error provides an unbiased estimate of error variance.

(b) What is Experimental error ? How does the use of local control help in minimizing experimental error in design of agricultural experiments.

(c) In a 5×5 LSD, the following results were obtained :

Total yield from all plots is 80

15-5-17 Evening
S. Manday

This question paper contains 4+2 printed pages]

Roll No.

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S. No. of Question Paper : 354

Unique Paper Code

237651

G

Name of the Paper

: Sample Survey & Design of Experiments

Name of the Course

: B.A. (Programme) Statistics—

Discipline Course

Semester

: VI

Duration : 3 Hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt Five questions in all, selecting two from

Section A and B each one from Section C.

Use of simple calculators is allowed.

Section A

1. (a) What are the principal steps in the conduct of sample surveys ? Discuss them briefly.

P.T.O.

- (b) The following table gives ten random numbers each of two digits.

43 69 16 58 94 87 05 20 72 31

Obtain the serial numbers of 6 plots to be selected out of 50 plots without replacement.

- (c) Prove that in srswo, the variance of the sample mean is given by :

$$\text{Var}(\bar{y}_n) = \left(\frac{1}{n} - \frac{1}{N} \right) S^2$$

where the notations have their usual meaning. 5,4,7

2. (a) Describe the methods of allocating a sample to different strata. Obtain the variance of the estimate of the population mean under each allocation and compare them. Also compare them with simple random sampling.
- (b) In a finite population of size N , show that the systematic sampling will be more efficient than srswo if the intra class correlation coefficient ρ is $\frac{-1}{N-1}$. 8,8

3. (a) Define ratio estimator. Derive an expression for its bias upto the first approximation and show that it vanishes when the regression of y on x is a straight line passing through origin.
- (b) Prove that the relative efficiency of cluster sampling to simple random sampling increases as the mean square within the clusters increases. 8,8

Section B

4. (a) Explain the terms :
Treatment, experimental unit, experimental material, level of significance, critical difference, as used in the design of experiments.
- (b) Explain the principles of experimental design. Also explain how these principles are used in a randomised block design. 8,8

8. (a) Discuss the nature, scope and limitation of the Trade Statistics in India.
- (b) Discuss the concept of "Population Statistics" in India.

6,5

Raw or crude sum of squares is 368

Row totals are 19, 16, 19, 17, 15

Column totals are 18, 21, 16, 15, 16

Treatment totals are 11, 24, 10, 12, 29

Perform the analysis of variance and give your
comments. 5,5,6

Section C

7. (a) Write a short note on C.S.O. highlighting its main functions and major publications.
- (b) Name the agency responsible for the collection, compilation and publication of agricultural statistics in India. Name any *two* publications on agriculture.
- (c) State any *two* responsibilities of the statistical division of the Ministry of Statistics and Programme implementation. 5,3,3