Exam.Code:0004
Sub. Code: 0345

1057

B.A./B.Sc. (General) Fourth Semester

Statistics

Paper – 203: Sample Survey, Design and Analysis of Experiments

Time allowed: 3 Hours Max. Marks: 65

***NOTE**: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.*

x-x-x

I. Answer the following:-

a) What are the basic principles of sample survey?

b) What are the different sources of errors in sample survey?

c) How do the size and shape of plots and blocks affect the result of a field experiment?

d) How many degrees of freedom are there for error sum of square in two way analysis of variance with *m* observations per cell. Justify your answer.

e) What do you mean by Precision in Design of experiment? (3,3,2,3,2)

UNIT – I

II. a) What is difference between probability and non-probability sampling schemes? Explain these sampling schemes by giving suitable examples.

b) What are random sampling numbers? Outline the different random number series and explain how these are used to select a simple random sample? (6,7)

III. a) Define Simple Random Sampling'(SRS). State different types of SRS giving suitable examples.

b) A sample of size n is drawn from a population of size N using Simple Random Sampling without replacement, show that sample mean is an unbiased estimator of population mean. Also find out the variance of sample mean. (4,9)

IV. a) What do you mean by Systematic sampling? Explain the situation where we can apply systematic sampling.

b) Derive the variance of the mean of a systematic sampling of size n drawn from a population of size N = nk and derive condition under which it is more efficient than simple random sample. (5,8)

V. Explain the technique of stratified sampling. Write down the types of allocation used in stratified sampling and compare their variances. (13)

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UNIT – II

VI. a) Explain the meaning of 'Analysis of variances' and give its uses. State the basic assumptions in Analysis of variance.

b) State general linear model and explain Fixed, mixed and random effects models. (4,9)

VII. Explain in detail the two-way analysis of variance with one observation per cell. State the underlying model used, hypothesis and assumptions. Also give some real life examples of two-way classified model and how it differs from one-way classified model. (13)

VIII. Explain the three basic principles of design of Experiments. What is Completely Randomized design? Write down its underlying model and analysis. Also state its merits and demerits. (13)

IX. a) Explain the model for Latin square design and state clearly the assumptions used.

b) Discuss the analysis of Latin square design and develop the expression for efficiency of Latin square design w.r.t. Randomized block design. (5,8)

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