1059

B.A./B.Sc. (General) Fourth Semester
Statistics
Paper – 203: Sample Surveys, 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) Write briefly about principles of 'sample surveys'.

   b) Explain any two methods of selecting a 'simple random sample' from a finite population.

   c) Write down the demerits systematic sampling.

   d) Explain the layout of RBD.

   e) Distinguish between-fixed and mixed effect models.   (2,2,3,3,3)

UNIT – I

II.   Discuss in detail about sampling and non-sampling errors in survey techniques. (13)

III. Define simple random sampling without replacement (SRSWOR) from a finite population. For this sampling scheme, derive the unbiased estimates of population mean and population variance.   (13)

IV.   Write down the advantages of stratified sampling over simple random sampling. Show that under various allocations in stratified random sampling and SRSWOR.

Var (Y_{st}) Neyman allocation $\leq$ Var (Y_{st}) Proportional allocation $\leq$ Yar (Y_n) SRSWOR

where the symbols used have their usual meanings.   (13)

V.   Define systematic sampling and obtain an unbiased estimate of the population mean for this sampling scheme and compare its efficiency with that of corresponding SRSWOR estimate. Also interpret the result.   (13)

UNIT – II

VI.   Discuss the technique of analysis of variance in one-way classified data under fixed effect model, stating the mathematical model, assumptions you make and by giving the analysis of variance table.   (13)

P.T.O.

VII. Write down the model for two-way classification with multiple observations per cell under fixed effect model, clearly explaining all the terms. For this classification. Derive the mathematical expression for total sum of square, between sum of squares, and within sum of square, and also relate these sums of squares. (13)

VIII. a) Explain the fundamental principles of experimental designs specifying their role in the valid and accurate interpretation of data.

b) Discuss the advantages and disadvantages of RBD. (8,5)

IX. Explain the Latin square design (LSD) and list two practical situations where such a design need to be applied. Also discuss the complete analysis of LSD, clearly writing its mathematical model and assumptions used. (13)

x-x-x