

SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN  
(AUTONOMOUS)

(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)

Chromepet, Chennai - 600 044.

B.Sc.Statistics - END SEMESTER EXAMINATIONS - APRIL 2025

SEMESTER - VI

**20USTCT6013 - Sampling Methods**

Total Duration : 2 Hrs.30 Mins.

Total Marks : 60

### Section B

Answer any **SIX** questions ( $6 \times 5 = 30$  Marks)

1. Explain about design, organisation and execution of sample surveys.
2. In SRSWOR, prove that the sample mean square is an unbiased estimator of population mean square.
3. Obtain the variance of sample mean in SRSWOR.
4. Discuss about stratified sampling with an example.
5. Find the variance of sample mean in stratified sampling.
6. Derive the formulae for mean and variance of systematic sample for mean.
7. Find the bias of ratio estimator.
8. Analyse Ratio estimate with mean per unit estimate.

### Section C

Answer any **THREE** questions ( $3 \times 10 = 30$  Marks)

9. Elucidate in detail about sampling and non-sampling errors.
10. Determine the sample size of simple random sampling for a specified precision.
11. Obtain the Neymann formulae for optimum allocation for a fixed total sample size in stratified sampling.
12. Prove that  $\text{Var}(\overline{y}_{st}) \leq \text{Var}(\overline{y}_{sys}) \leq \text{Var}(\overline{y}_{ran})$ , when the population has linear trend.
13. Derive the variance of regression estimator and compare it with mean per unit.

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