

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.

M.Sc.Biostatistics - END SEMESTER EXAMINATIONS - NOV' 2024

SEMESTER - III

20PBSCT3008 - Sample Survey Designs

Total Duration : 2 Hrs. 30 Mins.

Total Marks : 60

Section B

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

1. Derive first and second order inclusion probabilities under simple random sampling.
2. Prove Lahari's method is using probability proportional to size selection.
3. Explain the unit drawing mechanism of Linear systematic sampling.
4. Derive the formula for n_h under optimum allocation for given cost.
5. Derive the bias and mean square error of Regression estimators.
6. Explain the unit drawing mechanism of cluster sampling with unequal probabilities without replacement.
7. Explain the procedure of snowball sampling.
8. Discuss the sources of non-sampling errors.

Section C

I - Answer any **TWO** questions ($2 \times 10 = 20$ Marks)

9. Derive Yates - Grundy form of variance of Horvitz Thomson estimator.
10. Show that if stratified random sampling with one unit of stratum is taken then $V_{st} \leq V_{sys} \leq V_{srs}$ if $Y_i = \alpha + \beta i$, $i = 1, 2, \dots, N$.
11. Describe Warner's randomized response method.
12. Prove that \hat{Y}_{TS} is an unbiased estimator of population total under two stage sampling when SRS is used in both stages. Also derive $V(\hat{Y}_{TS})$.

II - Compulsory question ($1 \times 10 = 10$ Marks)

13. Derive the development of Hartley – Ross unbiased ratio type estimator.
