

Paper II : Survey Sampling

Section--A

1. A selection procedure of a sample having no involvement of probability is a sampling of type :

- (a) Subjective (b) Purposive (c) Judgement (d) non sampling.

2. The numbers of all the possible sample of size two from a population of 5 units without replacement is :

- (a) 20 (b) 10 (c) 15 (d) None.

3. In stratified random sampling we have :

- (a) homogeneous population (b) heterogeneous population
(c) both (a) and (b) (d) None.

4. Under proportional allocations the size of the sample from each stratum depends on :

- (a) population size (b) total sample size
(c) size of the stratum (d) all of the above.

5. If we have a sample of size n from a population of N units, the finite population correction is :

- (a) $\frac{N-1}{N}$ (b) $\frac{N-n}{N}$ (c) $\frac{n-1}{N}$ (d) $\frac{N-n}{n}$.

6. If out of randomly selected households in a city, household members are selected randomly from the selected households, it is an example of :

- (a) Cluster sampling (b) Two-stage sampling
(c) Two-phase sampling (d) All of the above.

7. It is the usual notations, $C_y = 5$, $C_x = 9$ and $P = 0.7$, the ratio estimator is :

- (a) Preferable over simple random sampling (SRS)
(b) Now preferable over SRS
(c) Preferable over regression estimators
(d) Non-preferable compared to product estimator.

8. Regression estimator is preferred over ratio estimator and product estimator of :

(a) Any value of the correction coefficient (P) between steady and auxiliary variables

- (b) $P > 0.5$ (c) $P < 0.5$ (d) $P = 0.5$.

9. The numbers of different systematic samples of size n from a population consistency of $N = nk$, units will be :

- (a) n (b) N (c) k (d) None.

10. If a respondent is not found at home at the time of survey then it is a kind of :

- (a) Measurement error (b) Sampling error
(c) Non-response error (d) Both (a) and (b).

Section--B

1. Define SRS and show that the sample mean is an unbiased estimate of the population mean in SRSWOR.

2. Define stratified sampling.

3. Compare systematic sampling with stratified sampling.
4. Explain sampling and non-sampling error.
5. Distinguish between Two-phase and Two-stage sampling schemes.
6. Explain ratio type method of estimation and find the expression of its bias.
7. Give its idea of sampling with probability proportional to size.
8. Distinguish between simple random sampling and cluster sampling.
9. Distinguish between parameter and statistic.
10. Distinguish between complete enumeration and sampling study.

Section—C

1. (a) Explain various methods of drawing random sample.
(b) Following table of ten random numbers of two digits is provided. Make a random selection of 5 units from a population consisting of 45 units.
2. Find the expression of variance of sample mean and the expression for its estimator in simple random sampling without replacement.
3. In every stratum $\frac{n_i}{N_i}$ is negligible, prove that :

$$V(\bar{Y}_{st})_{opt} \leq V(\bar{Y}_{st})_{prop} \leq V(\bar{Y}_{rand})$$

4. Show that in random sampling in which b_0 is preassigned constant the linear regression estimate.

$$\bar{Y}_{lr} = \bar{Y}_n + b_0(\bar{x}_N - \bar{x}_n) \text{ is}$$

$$\text{unbiased with variance. } V(\bar{Y}_{lr}) = \frac{1-f}{n} (S_y^2 - 2b_0 S_{yx} + b_0^2 S_x^2).$$

5. Define two stage sampling and obtain an estimate of population mean and its variance.