

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION MAY 2019
(Fourth Semester)

Branch – STATISTICS

BASIC SAMPLING THEORY

Time : Three Hours

Maximum : 75 Marks

SECTION-A (20 Marks)

Answer ALL questions

ALL questions carry EQUAL marks (10 x 2 = 20)

- 1 Define Standard error.
- 2 What is meant by Sampling frame?
- 3 What do you understand by random sampling?
- 4 Which factors are responsible for size of a sample?
- 5 Define Stratum.
- 6 What is proportional allocation?
- 7 When do you recommend systematic sampling?
- 8 State the disadvantages of Systematic Sampling.
- 9 Write the variance of Cluster Sampling.
- 10 Define Ratio Estimator.

SECTION - B (25 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks (5 x 5 = 25)

- 11 a State the limitations of Sample Survey.
OR
b Distinguish between Sampling and Non-Sampling errors.
- 12 a Estimate the sample size of SRS with specified coefficient of dispersion.
OR
b State the merits and demerits of Simple random sampling.
- 13 a Show that in Stratified random sampling $E(\bar{y}_{st}) = \bar{Y}_n$.
OR
b State the advantages of Stratified random sampling.
- 14 a Show that in Systematic sampling $Var(\bar{y}_{sys}) = \frac{nk-1}{nk} \cdot \frac{s^2}{n} \{1 + (n-1)p\}$
where p is the intra correlation coefficient.
OR
b Compare the efficiency of systematic sampling Vs stratified random sampling.
- 15 a Define cluster sampling. In what situation the cluster sampling be preferred?
OR
b Explain the concept of regression estimator.

SECTION - C (30 Marks)

Answer any THREE Questions

ALL Questions Carry EQUAL Marks (3 x 10 = 30)

- 16 Discuss the principle steps in a sample survey.
- 17 Prove that, in SRSWOR $V(\bar{y}_n) = \left(\frac{1}{n} - \frac{1}{N}\right) s^2 = \frac{N-n}{N} \cdot \frac{s^2}{n}$
- 18 Show that $Var(\bar{y}_{st})_{prop} \leq Var(\bar{y}_n)_{ran}$.
- 19 If the population consists of a linear trend $y_i = i, i=1,2,\dots,k$, then prove that
 $Var(\bar{y}_{st}) \leq Var(\bar{y}_{sys}) \leq Var(\bar{y}_n)_R$.
- 20 Describe two-stage sampling with respect to SRS.