

Bachelor of Science (B.Sc.) Semester-V (C.B.S.) Examination

SURVEY SAMPLING TECHNIQUES

Compulsory Paper—2

(Statistics)

Time : Three Hours]

[Maximum Marks : 50

N.B. :— All questions are compulsory and carry equal marks.

1. (A) Describe the divisions and functions of C.S.O. and N.S.S.O. 10
- OR**
- (E) Describe the advantages of sample survey over complete enumeration method.
 (F) Define : (i) an estimator (ii) standard error of estimator (iii) sampling unit.
 (G) What are sampling errors ? Explain their causes.
 (H) Explain the three types of sampling with one example of each type. 2.5×4=10
2. (A) Show that in case of SRSWOR :
- (i) Sample mean is an unbiased estimator of population mean
 (ii) Sample mean square is an unbiased estimator of population mean square
 (iii) Sample proportion is an UE of population proportion. 10
- OR**
- (E) Distinguish between SRSWOR and SRSWR.
 (F) Derive the expression for variance of the sample mean under SRSWR.
 (G) In case of SRSWOR, show that the probability of selecting any specified unit at say rth draw ($1 \leq r \leq n$) is equal to probability of its selection at the first draw.
 (H) In case of SRSWOR, derive an expression for 100 (1- α)% confidence interval for population mean. 2.5×4=10
3. (A) Define proportional allocation and obtain the formula for variance of the sample mean under this allocation. Compare stratified sampling under proportional allocation with SRSWOR. Comment on the efficiency. 10
- OR**
- (E) Derive an expression for the estimated gain in precision due to stratification. 10
4. (A) Obtain an expression for efficiency of cluster sampling with that of SRSWOR in terms of intra-class correlation coefficient. 10
- OR**
- (E) For a population with linear trend $Y_i = \mu + \theta \cdot i$ for $i = 1, 2, \dots, N$; find,
 (i) an expression for the population mean.
 (ii) variance of the estimate of population mean under SRSWOR, stratified random sampling and systematic sampling procedures. Compare the efficiencies of these procedures. 10
5. Answer any **ten** questions from the following :
- (A) Do sampling errors exist in complete enumeration ? Justify your answer.
 (B) State any three requirements of a good questionnaire.
 (C) What is meant by non-sampling errors ?
 (D) State the names of two random number tables.
 (E) Define a simple random sample.
 (F) Find the probability that a specified unit is included in the sample of size n under SRSWOR.
 (G) Define Neyman allocation. State the formula for variance of sample mean under this allocation.
 (H) Explain the need of stratification.
 (I) Show that in case of stratified random sampling the population mean is the weighted arithmetic mean of strata means.
 (J) Give one example of real life situation where systematic sampling may be used.
 (K) State one advantages of systematic sampling.
 (L) What is cluster sampling ? 1×10=10