(E) What should be the sample size if the population is completely homogeneous ?

(F) In sampling for attributes state the expression for variance of sample proportion when SRSWOR is used.

(G) What is optimum allocation in stratified sampling ?

(H) State true or false :

(i) Stratified sampling with arbitrary allocation is more efficient than SRS.

(ii) Stratified sampling is used when population is heterogeneous.

(I) Fill in the blanks :

To improve the efficiency of the sampling method strata should be formed of _____ units, while clusters should be formed of _____ units.

(J) Give a practical situation where systematic sampling can be used.

(K) Write the expression for efficiency of cluster sampling in terms of intraclass correlation coefficient.

(L) State a limitation of systematic sampling procedure. 1×10=10

Bachelor of Science (B.Sc.) Semester—V
(C.B.S.) Examination
STATISTICS
Compulsory Paper—II
(Survey Sampling Techniques)

Time : Three Hours] [Maximum Marks : 50

Note :— All the questions are compulsory and carry equal marks.

1. (A) Discuss various steps in the planning of a large scale sample survey. 10

OR

(E) State the functions of CSO.

(F) What are the advantages of sample survey over complete enumeration ? What are non-sampling errors ? 5+5

2. (A) In SRSWOR show that sample mean is an unbiased estimator of population mean. Derive its variance. 10

OR

(E) Define simple random sampling. Show that, probability that a specified unit of the population is selected at the first draw is same as the probability that it will be selected at any of the subsequent draws when simple random sampling is used.

(F) Derive the expression for the sample size, when the confidence coefficient and the permissible margin of error is given, in case of SRSWOR. 5+5

3. (A) Explain the need of stratification of the population and the procedure of selecting a stratified random sample. Obtain an unbiased estimator of population mean based on a stratified sample. Derive its variance. Obtain an unbiased estimate of the variance. 10

OR

(E) Explain proportional allocation and Neyman allocation in stratified random sampling. Derive the expression for variance of sample mean in each case. In usual notation, show that :

$$V(\bar{Y}_w)_N \leq V(\bar{Y}_w)_P \leq V(\bar{Y}_n)_R.$$ 10

4. (A) What is cluster sampling ? Show that if clusters are formed of random samples of the elements of the population, they will, on the average, be as efficient as the individual elements themselves.

(B) For a population with linear trend show that :

$$V(\bar{Y}_w)_{st} / V(\bar{Y}_i)_{sy} = 1/n.$$ 5+5

OR

(E) Derive the expression for relative efficiency of cluster sampling with respect to simple random sampling. Show that it increases if the clusters are so formed that the variation between cluster means is small and variation within clusters is large.

(F) For a population with linear trend, derive the expression for relative efficiency of systematic sampling with respect to simple random sampling. 5+5

5. Solve any ***ten*** of the following :

(A) Define :

(i) Frame

(ii) Sampling unit.

(B) What do the following abbreviations stand for :

(i) CSO

(ii) NSSO.

(C) Name the organization which conducts large scale sample surveys to provide information to the government. When was it established ?

(D) In sampling for attributes, let X denote the number of units in the sample which possess a specified attribute. State the probability distribution of X, if SRSWR is used.