NKT/KS/17/5185

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

STATISTICS

(Survey Sampling Techniques)

Compulsory Paper—2

Time : Three Hours] [Maximum Marks : 50

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

1. (A) Explain various steps in a large scale sample survey. 10

OR

(E) Write short notes on :

(i) Comparison of sample survey over complete enumeration.

(ii) Sampling errors.

(iii) Non sampling errors. 10

2. (A) Show that in SRSWOR, the probability of selecting a specified unit of the population at any given draw is equal to the probability of selecting it at the first draw. Show that sample mean is an unbiased estimator of population mean. Find its sampling variance. State merits and drawbacks of simple random sampling. 10

OR

(E) In case of SRSWOR applied to qualitative characteristic, show that sample proportion is an unbiased estimator of population proportion. Find its sampling variance. Also find the estimate of variance of sample proportion. 10

3. (A) What is stratified random sampling ? Explain proportional allocation. Derive expression for variance of sample mean under proportional allocation. Compare stratified sampling with proportional allocation with that of SRSWOR and comment. 10

OR

(E) Obtain an expression for strata sample size under optimum allocation by using the principle of fixing the cost of the survey and minimizing the variance of the estimate. Hence explain Neyman's allocation. Also derive the formula for variance of sample mean under Neyman's allocation. 10

4. (A) Obtain relative efficiency of cluster sampling with that of SRSWOR in terms of intraclass correlation coefficient. 10

OR

(E) Explain the procedure of systematic sampling. Explain its resemblance with stratified and cluster sampling. Obtain the variance of the estimate of population mean under systematic sampling. In usual notations, prove that the systematic sampling is more precise than SRSWOR; if $S^2_{WSY} > S^2$. 10

5. Attempt any **ten** of the following questions :–

(a) State two functions of C.S.O.

(b) State the divisions of N.S.S.O.

(c) State various types of sampling.

(d) Define SRSWR.

(e) Define sampling fraction and finite population correction.

(f) State the unbiased estimator for population variance under SRSWR.

(g) State the formula for variance of sample mean under stratified sampling with an arbitrary allocation.

(h) What is meant by stratifying factor ?

(i) State any one situation where stratified random sampling can be used.

(j) What is a cluster ?

(k) Given that the population has a linear trend $y_i = \mu + i\theta$; i = 1, 2, -------N. Obtain the population mean.

(l) Give one example where cluster sampling can be used. 1×10=10