2021
B.A./B.Sc.
Third Semester
CORE – 6
STATISTICS
Course Code: STC 3.21
(Survey Sampling & Indian Official Statistics)

PART–B
Total Mark: 30

Answer the following questions. 6×5=30

1. If (X_i, Y_i) are the pairs of the variates defined for every unit $(i = 1, 2, \ldots, N)$ of the population and $\bar{x}_n$ and $\bar{y}_n$ are the corresponding sample means of simple random sampling of size n taken without replacement, then prove that $Cov(\bar{x}_n, \bar{y}_n) = \left(\frac{1}{n} - \frac{1}{N}\right) \cdot \frac{1}{N-1} \sum_{i=1}^{N} \left(X_i - \bar{X}_N\right)\left(Y_i - \bar{Y}_N\right)$ 6

2. Compare the efficiency of proportional allocation with that of simple random sampling of the same size. 6

3. (a) Define systematic sampling and illustrate the method of selection of a systematic sample. 3
   (b) Explain briefly what is meant by ratio method of estimation and regression method of estimation. 3

4. Give the concept of probability proportional to size (PPS) sampling. Show that in PPS sampling with replacement an unbiased estimator of the population mean $\bar{Y}$ is given by $\hat{\bar{Y}}_{PPS} = \frac{1}{nN} \sum_{i=1}^{n} \frac{y_i}{P_i}$
   Hence obtain its sampling variance. 2+4=6

5. Write short notes on any two of the following: 3+3=6
   (i) Central Statistical Office (CSO)
   (ii) National Sample Survey Office (NSSO)
   (iii) National Statistical Commission
