

U.G. 4th Semester Examination - 2020**STATISTICS****[HONOURS]****[Survey Sampling and Indian Official Statistics]****Course Code : STAT(H)-CC-T-8**

Full Marks : 40

Time : $2\frac{1}{2}$ Hours*The figures in the right-hand margin indicate marks.**Candidates are required to give their answers in their own words as far as practicable.***Answer Q1, Q2 and any two from Q3 to Q6.**

1. Answer any **five** questions: 2×5=10
- What is sampling error?
 - What is non-probability sampling? Give an example.
 - What is systematic sampling?
 - What is finite population correction?
 - Define cluster sampling.
 - What is subsampling?
 - Write down two main roles of Ministry of Statistics & Program Implementation (MoSPI).

[Turn Over]

viii) What is the main function of CSO?

2. Answer any **two** questions: 5×2=10
- Discuss the basic principles of sample surveys.
 - Derive unbiased estimator of the population mean under SRSWOR from a finite population.
 - Obtain relative efficiency of cluster sampling with respect to SRSWOR.
 - Write a note on the nature, the coverage and the survey design of the National Sample Surveys of India.
3. a) A simple random sample of size $n = n_1 + n_2$ with mean $\bar{y}_n$ is drawn from a finite population of size N by SRSWOR. Further, a simple random sub-sample of size n_1 is drawn from it by SRSWOR with mean, $\bar{y}_1$ show that
- $$v(\bar{y}_1 - \bar{y}_2) = \left(\frac{1}{n_1} + \frac{1}{n_2} \right) S^2$$
 - $$v(\bar{y}_1 - \bar{y}_n) = \left(\frac{1}{n_1} + \frac{1}{n} \right) S^2$$
 - $$Cov(\bar{y}_n, \bar{y}_1 - \bar{y}_2) = 0$$
- where S^2 is the population variance.

- b) Describe the method of determining the sample size in case of simple random sampling so as to meet the desired margin of error and confidence coefficient, stating the assumption made. $6+4=10$
4. a) Obtain the estimated gain in precision due to arbitrary stratification over simple random sampling without replacement.
- b) Explain the concept of post stratification. Prove that, post stratification, with large sample is almost as efficient as stratified sampling with proportional allocation. $4+2+4=10$
5. a) Derive regression estimator and find its variance under first approximations.
- b) Suppose the values of the population units increase according to a linear model $Y_i = a + bi$, $i=1,2,\dots,N$, where a and b are constants. Compare the variances of the estimators of population mean under stratified random sampling, systematic random sampling and simple random sampling. $4+6=10$
6. a) Mention two recommendations each relating to the functioning of NSSO by the Commission

regarding (i) organizational aspects and (ii) survey programme.

- b) Write a short note on determinants of quality of statistics.
- c) Discuss briefly about the Government of India's principal publications containing data on industry and finance. $4+2+4=10$
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