

18P264

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Name:.....

Reg. No:.....

SECOND SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2019

(Regular/Improvement/Supplementary)

(CUCSS - PG)

CC15P ST2 C07 - SAMPLING THEORY

(Statistics)

(2015 Admission onwards)

Time: Three Hours

Maximum: 36 Weightage

Part A

Answer *all* questions. Each question carries 1 weightage.

1. Define secondary data. State their chief sources.
2. Explain Principles of Sampling theory.
3. Distinguish between Cluster and Stratum.
4. Give Des Raj's ordered estimator of population mean with an unequal probability sampling design without replacement.
5. What do you mean by SRSWR and SRSWOR?
6. What do you mean by Zen-Midzuno scheme of sampling?
7. What is meant by auxiliary variable? Give an example.
8. What do you mean by cluster sampling?
9. Define PPS Sampling with replacement.
10. Define regression estimator of population mean.
11. What are the advantages of sampling over census?
12. What is Lottery method of sampling?

(12 x 1 = 12 Weightage)

Part B

Answer any *eight* questions. Each question carries 2 weightage.

13. Explain Murthy's unordered estimator?
14. What is II PS sampling?
15. Show that the sample variance is not an unbiased estimator of population variance in SRSWOR. Give an unbiased estimator in this case.
16. Explain Horvitz-Thompson estimator.
17. Derive the mean and variance of two stage sampling with equal first stage units.
18. Show that sample proportion, p is an unbiased estimate of population proportion, P . Also obtain the confidence interval for the population proportion.

19. Explain regression method of estimation in two phase sampling.
20. Carry out a comparison between ratio and regression estimators with mean per unit method.
21. What is the difference between multi phase sampling and multi stage sampling?
22. If the population consists of liner trend, then prove that

$$\text{Var} (\overline{Y_{st}}) \leq \text{Var} (\overline{Y_{sys}}) \leq \text{Var} (\overline{Y_{ran}})$$
23. Carry out a comparison between Neymann allocation and proportional allocation in stratified random sampling.
24. Explain cumulative total method of drawing a PPS sampling.

(8 x 2 = 16 Weightage)

Part C

Answer any *two* questions. Each question carries 4 weightage.

25. Give any three estimators of population mean in cluster sampling where clusters are of unequal size and discuss their properties.
26. (a) Derive Yates-Grundy form of estimated variance of Hurvitz-Thomson estimator of population mean upon a PPS sample without replacement.
 (b) Show that $\text{Var} (\overline{y_{sys}}) = \frac{N-1}{Nn} (1 + (n-1) \rho) S^2$, where ρ is the interclass correlation between the units of the same systematic sample.
27. (a) Show that sample mean is the BLUE of population mean in SRSWOR.
 (b) Explain various factors of non sampling errors.
28. (a) Explain Principle Steps in a Sample Survey.
 (b) Show that regression estimator of population mean is not unbiased but consistent.

(2 x 4 = 8 Weightage)
