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G. VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS), KOVILPATTI – 628 502.



UG DEGREE END SEMESTER EXAMINATIONS - NOVEMBER 2024.

(For those admitted in June 2021 and later)

PROGRAMME AND BRANCH: B.Sc., STATISTICS

SEM	CATEGORY	COMPONENT	COURSE CODE	COURSE TITLE
V	PART - III	CORE	U21ST507	SAMPLING TECHNIQUES

Date &amp; Session: 05.11.2024 / FN

Time : 3 hours

Maximum: 75 Marks

Course Outcome	Bloom's K-level	Q. No.	SECTION - A (10 X 1 = 10 Marks) Answer <u>ALL</u> Questions.
CO1	K1	1.	In a sampling survey, a part of the population is called _____. a) Sample                      b) Population                      c) Census                      d) Variable
CO1	K2	2.	The errors in a survey other than sampling errors are called _____. a) Formula Errors                      b) Planning Error c) Non Sampling Errors                      d) Responsive Error
CO2	K1	3.	In SRSWOR, the number of possible samples of size n from a population of size N is. a) $N^2$ b) $N_{C_n}$ c) $n^N$ d) $N^n$
CO2	K2	4.	In SRSWR the variance of the sample mean is _____. a) $V(\bar{y}) = \frac{\sigma^2}{n}$ b) $V(\bar{y}) = \frac{(N-n)S^2}{n}$ c) $V(\bar{y}) = \frac{(N-n)S^2}{n}$ d) $V(\bar{y}) = \frac{(N-1)S^2}{N}$
CO3	K1	5.	In stratified random sampling, the population is divided into subgroups known as _____. a) Cluster                      b) Strata                      c) Blocks                      d) Layers
CO3	K2	6.	In stratified random sampling for the fixed sample size n, $V(\bar{y}_{st})$ is minimum only when. a) $n_h \propto N_h$ b) $n_h = S_h$ c) $n_h \propto N_h S_h$ d) $n_h < N_h$
CO4	K1	7.	In Systematic sampling, $k =$ _____. a) $N/n$ b) $n/N$ c) $nN$ d) $\frac{n^2}{\sqrt{n}}$
CO4	K2	8.	Which method of sampling involves selecting units as regular intervals from an ordered list of the population? a) Simple random sampling                      b) Stratified sampling c) Cluster sampling                      d) Systematic sampling
CO5	K1	9.	In PPS sampling without replacement, the inclusion probability of a unit depends on. a) Simple Random Sampling b) The size measure of the unit relative to the population c) The number of units in the sample d) The randomness of the selection process
CO5	K2	10.	In PPS sampling with replacement, what is the likelihood of selecting a unit with a larger size measure? a) Higher than a smaller unit                      b) Equal to a smaller unit c) Lower than a smaller unit                      d) Zero

Course Outcome	Bloom's K-level	Q. No.	<p style="text-align: center;"><b>SECTION – B (5 X 5 = 25 Marks)</b>  <b>Answer ALL Questions choosing either (a) or (b)</b></p>
CO1	K3	11a.	Write short notes on census and sample survey. <b>(OR)</b>
CO1	K3	11b.	Explain the different sources of non-sampling error.
CO2	K3	12a.	How to determine the sample size for sampling procedure. <b>(OR)</b>
CO2	K3	12b.	Describe the details of simple random sampling for attributes.
CO3	K4	13a.	Elucidate the principles of stratification. <b>(OR)</b>
CO3	K4	13b.	Write short notes on Neyman's and Optimum allocation.
CO4	K4	14a.	Write short notes on systematic sampling with example. <b>(OR)</b>
CO4	K4	14b.	Prove that the sample variance of the systematic sampling is $V(\bar{y}_{sys}) = (N-1) \frac{S^2}{N} - (n-1) \frac{S_{wsys}^2}{n}$
CO5	K5	15a.	Explain difference between the methods of SRS and varying probability scheme. <b>(OR)</b>
CO5	K5	15b.	Write the procedures of selecting sample by using Lahiri's method.

Course Outcome	Bloom's K-level	Q. No.	<p style="text-align: center;"><b>SECTION – C (5 X 8 = 40 Marks)</b>  <b>Answer ALL Questions choosing either (a) or (b)</b></p>
CO1	K3	16a.	Elucidate the principal steps involved in sample surveys. <b>(OR)</b>
CO1	K3	16b.	Write detailed notes on various types of sampling techniques and state the difference between non-sampling errors.
CO2	K4	17a.	Write detailed notes on simple random sampling method. <b>(OR)</b>
CO2	K4	17b.	Prove that, in simple random sampling without replacement the sample variance is an unbiased estimated of the population variance( $s^2$ )= $S^2$ .
CO3	K4	18a.	In stratified random sampling prove that $V(\bar{y})_{sys} > V(\bar{y})_{prop} > V(\bar{y})_{opt}$ . <b>(OR)</b>
CO3	K4	18b.	Derive the estimation of population mean and variance for the stratified random sampling.
CO4	K5	19a.	In Systematic sampling, prove that $V(\bar{y}_{sys}) = \frac{nK-1}{nK} \cdot \frac{S^2}{n} [1 + (n-1)\rho]$ <b>(OR)</b>
CO4	K5	19b.	Prove that the systematic sample is more precise than a simple random sample without replacement if the mean square within the systematic sample is larger than the population mean square.
CO5	K5	20a.	Discuss about the varying probability sampling with replacement and estimate its population mean. <b>(OR)</b>
CO5	K5	20b.	Prove the ordered estimators of $\theta$ where, i) $E(\hat{\theta}_u) = E(\hat{\theta}_0)$ ii) $Var(\hat{\theta}_u) \leq Var(\hat{\theta}_0)$