Reg. No.								

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

UG DEGREE END SEMESTER EXAMINATIONS - NOVEMBER 2024.

(For those admitted in June 2023 and later)

PROGRAMME AND BRANCH: B.Sc., STATISTICS

SEM	CATEGORY	COMPONENT	COURSE CODE	COURSE TITLE
III	PART - III	CORE-6	U23ST306	SAMPLING TECHNIQUES

Date & Session: 12.11.2024 / AN **Time : 3 hours** **Maximum: 75 Marks**

Course Outcome	Bloom's K-level	Q. No.	**SECTION – A (10 X 1 = 10 Marks)** **Answer ALL Questions.**
CO1	K1	1.	In the contest of sample surveys, a collection of units like households, people, cities, countries etc. is called a_____population. a) uncountable b) finite c) countless d) infinite
CO1	K2	2.	An element or a group of elements on which observations can be taken is called a_____. a) sampling units b) random variable c) field d) trail
CO2	K1	3.	Finite population correction given by_____. a) $\frac{Nn}{N}$ b) $\frac{N+n}{N}$ c) $\frac{N-n}{N}$ d) $\frac{N-n}{n}$
CO2	K2	4.	If n units are selected by Simple Random Sampling Without Replacement (SRSWOR), the total number of possible samples are . a) Nc_n. b) $(N-1)C_{n-1}$ c) $(N-1)C_n$ d) NC_{n-1}
CO3	K1	5.	If the population is heterogenous with respect to the characteristicunder study, then one sampling procedure is called_____. a) SRSWOR b) cluster sampling c) systematic sampling d) stratified sampling
CO3	K2	6.	In stratified random sampling, the strata are constructed such that they are_____. a) within homogenous and among homogenous b) within homogenous and among heterogenous c) within heterogenous and among homogenous d) within heterogenous and among heterogneous
CO4	K1	7.	The first unit is selected at random and other units are selected automatically (systematically). This systematic sample is called as k^{th} systematic sample and 'k' is termed as_____. a) scale interval b) ratio interval c) sampling interval d) confidence interval
CO4	K2	8.	The systematic sampling is more efficient than stratified sampling, when____ a) $\rho_{wst} < 0$ b) $\rho_{wst} \neq 0$ c) $\rho_{wst} = 0$ d)$\rho_{wst} > 0$
CO5	K1	9.	In varying probability scheme, the probability of drawing a specified unit _____from draw to draw. a) differs b) same c) similar d) constant
CO5	K2	10.	If y is the variable under study and x is an auxiliary variable related to y, then in the most commonly used using varying scheme, the units are selected with probability proportional to the value of x, called as_____. a) interval b) ratio c) size d) scale

Course Outcome	Bloom's K-level	Q. No.	**SECTION – B (5 X 5 = 25 Marks)** **Answer ALL Questions choosing either (a) or (b)**
CO1	K3	11a.	(i) Define the sampling frame and give a real life example. (ii) Define Mean squared error. **(OR)**
CO1	K3	11b.	List the advantages of sampling over complete enumeration.
CO2	K3	12a.	Explain sample size determination for proportion. **(OR)**
CO2	K3	12b.	Prove that the sample mean is an unbiased estimator of population mean under Simple Random Sampling Without Replacement (SRSWOR).
CO3	K4	13a.	Define $\bar{y}_{st}$ and show that $\bar{y}_{st}$ is an unbiased estimator of population mean $\bar{Y}$ under stratified sampling. **(OR)**
CO3	K4	13b.	Explain the procedure of stratified random sampling with a real life example.
CO4	K4	14a.	Explain systematic sampling in two dimensions. **(OR)**
CO4	K4	14b.	Define linear systematic sampling and mention its advantages.
CO5	K5	15a.	Describe Lahiri's method. **(OR)**
CO5	K5	15b.	Under varying probability scheme and with replacement for a sample size of n, show that sample mean is unbiased estimator of population mean.

Course Outcome	Bloom's K-level	Q. No.	**SECTION – C (5 X 8 = 40 Marks)** **Answer ALL Questions choosing either (a) or (b)**
CO1	K3	16a.	(i) Distinguish between probability and non-probability sampling. (6 marks) (ii) Distinguish between sample and population. (2 marks) **(OR)**
CO1	K3	16b.	Explain the principal steps involved in the sample survey.
CO2	K4	17a.	Construct variance of the sample mean, $V(\bar{y})$ under Simple Random Sampling Without Replacement (SRSWOR). **(OR)**
CO2	K4	17b.	Explain Simple random sampling for qualitative characteristics in detail.
CO3	K4	18a.	Explain four types of allocation techniques of stratified random sampling **(OR)**
CO3	K4	18b.	Obtain the variance of $\bar{y}_{st}$ under stratified sampling
CO4	K5	19a.	Derive the variance of the systematic sample mean as $Var(\bar{y}_{sys}) = \frac{N-1}{N}S^2 - \frac{(n-1)}{n}S_{wsy}^2$ **(OR)**
CO4	K5	19b.	Describe the systematic sampling comparison with stratified sampling in detail.
CO5	K5	20a.	Under varying probability scheme and with a replacement for a sample size of n, define the population total $\hat{Y}_{total}$ and obtain $V(\hat{Y}_{total})$. **(OR)**
CO5	K5	20b.	Explain the steps involved in cumulative total method under pps sampling.