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

UG DEGREE END SEMESTER EXAMINATIONS – APRIL 2025.
(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 & Session:23.04.2025/FN   **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.	A subset of population is called as_____. a) Sample b) Frame c) Probability d) Limit
CO1	K1	2.	In a sampling survey, a part of the population is called _____. a) Sample b) Population c) Census d) Variable
CO2	K2	3.	Which among the following is the procedure of selecting a random sample for simple random sampling method? a) Sen-Midzuno Method b) Des Raj's Method c) Horvitz-Thompson Method d) Lottery Method
CO2	K2	4.	Standard deviation of all possible estimates from samples of fixed size is called_____. a) Standard Error b) Probability Error c) Mean Error d) Variance
CO3	K3	5.	In stratified random sampling, the population is divided into subgroups known as_____. a) Cluster b) Strata c) Blocks d) Layers
CO3	K3	6.	Under proportional allocation one gets: a) a self-weighting sample b) an optimum sample c) minimum variance d) equal sample
CO4	K4	7.	Circular systematic sampling is used when_____. a) N is a multiple of n b) N is a whole number c) N is not divisible by n d) N is zero
CO4	K4	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	K5	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	K5	10.	Which of the following is an ordered estimator? a) Thompson b) Midzuno c) Des Raj d) Basu

Course Outcome	Bloom's K-level	Q. No.	SECTION – B (5 X 5 = 25 Marks) Answer ALL Questions Choosing either (a) or (b)
CO1	K1	11a.	Write short notes on census and sample survey. **(OR)**
CO1	K1	11b.	Mention the advantages and limitations of sampling.
CO2	K2	12a.	Discuss about the simple random sampling method. **(OR)**
CO2	K2	12b.	In SRSWOR, prove that the sample mean is an unbiased estimator of the population mean.
CO3	K3	13a.	List out the advantages of stratification. **(OR)**
CO3	K3	13b.	Explain proportional and Neyman allocation of sample size to strata.
CO4	K4	14a.	Write short notes on systematic sampling with example. **(OR)**
CO4	K4	14b.	Write the advantages and disadvantages of systematic random sampling.
CO5	K5	15a.	Write the procedures of selecting sample by using Lahiri's method **(OR)**
CO5	K5	15b.	Discuss how to select PPS sample (WOR) by Sen-Midzuno method.

Course Outcome	Bloom's K-level	Q. No	SECTION – C (5 X 8 = 40 Marks) Answer ALL Questions Choosing either (a) or (b)
CO1	K1	16a.	Describe the applications of sampling techniques and its limitations. **(OR)**
CO1	K1	16b.	Describe about sampling and non-sampling errors.
CO2	K2	17a.	Elaborate about the procedure of selecting a random sample in simple random sampling. **(OR)**
CO2	K2	17b.	Prove that (SRSWOR), sample mean ($\bar{y}$) is unbiased estimator of population mean ($\bar{Y}$) and its sampling variance is given by $V(\bar{y}) = \left(1 - \frac{n}{N}\right) S^2/n = (1-f)S^2/n \qquad where, S^2 = N\sigma^2/(N-1)$
CO3	K3	18a.	Construct the estimation of gain in precision due to Stratification. **(OR)**
CO3	K3	18b.	Prove that $V_{opt} \leq V_{prop} \leq V_{SRS.}$
CO4	K4	19a.	Explain the comparison of Systematic with Stratified Random Sampling. **(OR)**
CO4	K4	19b.	How to analyse the comparison of Systematic with Random Sampling.
CO5	K5	20a.	Prove that in pps sampling with replacement an unbiased estimator of the population mean $\bar{Y}$ is $E(\bar{y}_{pps}) = \bar{Y}$ with variance $V(\bar{Y}_{pps}) = \frac{1}{n}\sum_i^N p_i \left(\frac{y_i}{Np_i} - Y\right)^2$ where $\bar{y}_{pps} = \frac{1}{n}\sum_{i=1}^n (y_i/Np_i)$. **(OR)**
CO5	K5	20b.	Discuss about gain due to pps Sampling with Replacement.