

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION MAY 2025
(Fourth Semester)
Branch - STATISTICS

BASIC SAMPLING THEORY

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer ALL questions
ALL questions carry EQUAL marks

(10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	A pilot survey is conducted to a) Estimate total population b) Pre-test the survey design c) Replace the actual survey d) Analyze census data	K1	CO1
	2	A sample is considered biased if a) It is randomly selected b) It does not represent the population c) It is very large d) It is from a known population	K2	CO1
2	3	Simple random sampling ensures a) Every unit has an equal chance of selection b) Large sample size c) Only one unit is selected d) Bias in results	K1	CO2
	4	The standard error measures a) The population size b) The accuracy of an estimate c) The total variance d) The range of data	K2	CO2
3	5	Stratification is most useful when the population is a) Homogeneous b) Heterogeneous c) Small d) Infinite	K1	CO3
	6	Which of the following is not a method of allocation in stratified sampling? a) Equal allocation b) Proportional allocation c) Optimum allocation d) Systematic allocation	K2	CO3
4	7	In circular systematic sampling, the selection process is a) Repeated in a cycle b) Based on random numbers c) Limited to the first half of the population d) Similar to cluster sampling	K1	CO4
	8	Systematic sampling is particularly useful when the population has a) A natural ordering b) No patterns c) Unequal variances d) Small sample sizes	K2	CO4
5	9	Ratio estimators are most effective when the study and auxiliary variables are a) Highly correlated b) Uncorrelated c) Normally distributed d) Randomly selected	K1	CO3
	10	The bias of a regression estimator is minimized when a) The sample size is large b) The auxiliary variable is weakly correlated c) The population is not stratified d) The sample is selected non-randomly	K2	CO4

Cont...

SECTION - B (35 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Define sampling. Brief about need for sampling. Explain the design and organization to execute survey.	K3	CO1
		(OR)		
	11.b.	Describe the role of National Sample Survey Organization (NSSO).		
2	12.a.	Show that s^2 is unbiased for S^2 in simple random sampling without replacement.	K3	CO2
		(OR)		
	12.b.	Summarize finite population correction and estimation of SE.		
3	13.a.	Discuss the concept of optimum allocation in stratified sampling.	K3	CO3
		(OR)		
	13.b.	Estimate $V(Y_{st})$ in stratified random sampling,		
4	14.a.	Prove that the mean of a systematic sample is more precise than the mean of a SRS iff $S^2_{wsy} < S^2$	K4	CO4
		(OR)		
	14.b.	Narrate cluster sampling. In what situations the cluster sampling is adopted?		
5	15.a.	Analyze the bias of the ratio estimator in case of simple random sampling.	K5	CO4
		(OR)		
	15.b.	Explain the concept of efficiency in ratio and regression estimators.		

SECTION - C (30 Marks)

Answer ANY THREE questions

ALL questions carry EQUAL Marks

(3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Describe the different types of sampling methods used in surveys.	K4	CO1
2	17	Discuss the method of selecting a simple random sampling. Illustrate.	K3	CO2
3	18	Explain in detail on optimum allocation and Neyman's allocation and state its significance.	K5	CO3
4	19	State and prove the variance of the mean of a systematic sampling method.	K4	CO4
5	20	Explain ratio and regression estimators based on simple random sampling.	K5	CO4

Z-Z-Z

END