M 25143

Reg. No. : .....

Name : .....

II Semester M.A./M.Sc./M.Com. Degree (Reg./Sup./Imp.) Examination, March 2014
STATISTICS
Paper – 2.2 : Sampling Theory

Time: 3 Hours Max. Marks : 70

Instructions : *1) Answer **five** questions **without** omitting **any** Unit.*
*2) **All** questions carry **equal** marks.*

UNIT – 1

I. a) Distinguish between sample survey and census survey. What are the circumstances under which census surveys are preferred over sample surveys ?

b) Describe various steps in planning and execution of a large scale sample survey.

II. a) Distinguish between SRSWOR and SRSWR. For estimating population mean with a precise estimator which one of these two schemes you recommend ? Justify your answer.

b) Explain the procedure of estimating sample size in simple random sampling.

UNIT – 2

III. a) What is stratified random sampling ? When do you go for such a sampling procedure ? Describe a situation where stratified sampling can be employed.

b) Derive the optimum allocation under stratified random sampling for a fixed total cost. Show that Neyman allocation is its particular case.

IV. a) Describe the circumstances under which systematic sampling is preferred to simple random sampling.

b) For populations with a linear trend explain why systematic sampling is not preferred to stratified sampling.

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UNIT – 3

V. a) Distinguish between ordered and unordered estimator under PPS sampling. Describe Desraj's ordered estimator.

b) Describe systematic PPS sampling.

VI. a) Show that Horvitz-Thompson estimator is an unbiased estimator of population total. Obtain its sampling variance.

b) Distinguish between Desraj's ordered estimator and Murthy's unordered estimator.

UNIT – 4

VII. a) If y and x are the unbiased estimators of the population totals Y and X of the study variate and the auxiliary variate respectively, show that $\frac{B(\hat{R})}{\sigma_{\hat{R}}} \leq \frac{\sigma_{\bar{x}}}{\bar{X}}$.

b) Discuss the conditions under which the ratio estimator is better than the mean per unit estimator under SRSWOR.

VIII. a) Describe regression estimator. What are its advantages ? How does this estimator differ from ratio estimator ?

b) In simple random sampling, show that the bias of regression estimator is approximated by $B(\bar{y}_l) \simeq -\text{Cov}(\bar{x}, b)$.
When will this estimator reduce to the ratio estimator ? Give the expression for bias in that case.

UNIT – 5

IX. a) What you mean by cluster sampling ? How does it differ from stratified sampling ? Describe the advantages of cluster sampling.

b) In cluster sampling with unequal cluster sizes under usual notations prove that $\bar{y} = \sum_{i=1}^{n} M_i \bar{y}_i / n\bar{M}$ is an unbiased estimator of population mean $\bar{Y}$. Obtain the variance of the estimator $\bar{y}$.

X. a) Describe two stage sampling procedure. Derive the allocation of sample size to the two stages assuming equal first stage and the cost of the survey to be proportional to the size of the sample.

b) Write short note on the role of double sampling in ratio-regression methods of estimation.