VPM's B.N. Bandodkar College of Science, Thane
S.Y. B.Sc. First Semester end Examination Oct 2014
Statistics Paper II Sub Code: USST302

Duration 2 hrs 30 Mins

Max Marks-75

1) All Questions are compulsory.
2) Figures to right indicate marks.
3) Use of calculators is allowed.

Q.1) a) Discuss census survey and sample survey by stating advantages and disadvantages of both. 10

b) Explain the various steps in the organization of sample survey. 10

OR

Q.1) a) Explain two types of errors in sample survey. 10

b) Explain two method of drawing simple random sample. 10

Q2) a) Explain stratified random sampling. 10
Is stratified random sample mean unbiased for population mean ?
Prove your answer.

b) Why do you understand by proportional allocation? Modify the expression for variance of unbiased estimator of population mean under this allocation. 10

OR

Q2) a) Derive the formula for sample size from each stratum such that cost is minimized for the fixed variance where cost function is $C = a + \sum c_i n_i$ in usual notations. 10

b) In usual notations prove that 10

$$V(\bar{y}_{st})_{opt} \leq V(\bar{y})_{prop}$$

Contd.....

Q 3) a)Define regression estimator of population total. Obtain expression for its variance. 10

b) Define regression estimator of population mean by explaining various values used in it. Show that it is unbiased. Discuss the case when constant b = $\hat{R}$ where $\hat{R}$ is estimator of population ratio R. 10

OR

Q.3) a) State the ratio estimator of population mean. Show that ratio estimator is biased. Further show that the bias is negligible for large samples. 10

b) Give the comparison between ratio and regression estimators. 10

Q 4) a) Derive the formula for sample size n in simple random sampling without replacement for estimating population mean with permissible error d and Confidence coefficient 100(1- α)%. 10

b) In usual notations prove that 10

$$V(\bar{y}_{st})_{Prop} \leq V(\bar{y}_{st})_{SRS}$$

OR

Q 4) a) Show that sample proportion is unbiased estimator for population Proportion. Obtain variance of sample proportion in case of simple random sampling without replacement. 10

b)Explain (i) Systematic sampling
(ii) Cluster sampling 10

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