A (Printed Pages 7)

Roll No. _____

S-704

B.Sc. (Part-II) Examination, 2015

STATISTICS

Paper - Second

(Sampling Techniques)

Time Allowed : Three Hours] ***[Maximum Marks : 50***

Note : Answer five questions in all. Questions No. 1 is compulsory. Rest attempt one question from each unit.

keâue heeÜje ØeMvee keâ Gòej oeepeS~ ØeMve me. 1 DeeveJeeÙe n~ Fmekeâ Deelee jòeâ ØelÙekeâ FkeâeF me Skeâ ØeMve keâeepeS~

1. (a) Define precision and efficiency of sampling estimators.

Øeelee ÛeÙeveve Deekeâuekeâe keâe hee jMeæ lee SJe o#elee keâe hee jYeee<elee keâeepeÙe~

(b) Differentiate between purposive and probability sampling.

P.T.O.

ØeeeÙekeâlee ØeeleÛeÙeve leLee meeJeÛeej ØeeleÛeÙeve ce Devlej yeleeFS~

(c) Explain the use of random numbers in the selection of samples from a finite population.

Skeâ meeecele mecee<Š me ØeeleoMe ØeeleÛeÙeve c Devlej yeleeFS~

(d) Explain the use of cost function in sampling.

JÙeÙe heâueve keâe GheÙeeie ØeeleÛeÙeve ce mecePeeFS~

(e) How stratified random sampling is different from a cluster sampling?

mleejle ØeeleÛeÙeve, ieÛÚ ØeeleÛeÙeve me ekeâme eYeVe n?

(f) Distinguish between standard error and standard deviation.

ceevekeâ $eeŠ Deej ceevekeâ eJeÛeueve ce Devlej mhe° keâeepeÙe~

(g) Describe sampling and non-sampling errors.

ØeeleÛeÙeve leLee DeØeeleÛeÙeve $eeŠÙee keâe JeCeve keâeepeÙe~

eÉmlejeÙe ØeeleÛeÙeve keâe heejYeee<ele keâeepeÙe~ Skeâ eÉmlejeÙe ØeeleÛeÙeve keâ eueÙe, mecee° ceeOÙe keâe Deekeâuekeâ Deej Fmekeâe Øemejce evekeâeeueÙe~ Deekeâuekeâ keâ Øemejce keâe DeveeYevele Deekeâuekeâ Yee evekeâeeueÙe~

9. Write an essay on double sampling technique in ratio method of estimation.

Deveheeelekeâ Deekeâueve eJeeOe ce oenj ØeeleÛeÙeve hej Skeâ eveyevOe eueeKeÙe~

under simple random sampling without replacement.

mejue ÙeeÂeÛÚkeâ ØeeleÛeÙeve keâe heejYee<ee eueeKeÙe~ hevemLeeheve jenle mejue ÙeeÂeÛÚkeâ ØeeleÛeÙeve ce mecee° ceeOÙe keâe DeveeYevele Deekeâuekeâ Deej Fmekeâe ØemejCe %eele keâeepeÙe~

Unit - II

FkeâeF - II

4. What do you understand by stratification? Find the variance of the estimator of the population mean based on stratified random sample. Hence obtain the variances under proportional and optimum allocation.

mleejle eJeeOe me Deehe keÙee mecePele n? mleejle ÙeeÂeÛÚkeâ ØeeleoMe hej DeeOeeejle, mecee° ceeOÙe keâ Deekeâuekeâ keâe ØemejCe evekeâeeueÙe~ Fmeme meceeveheeleeÙe Deej Devekeâuelece DeeyeŠvee keâ eueÙe Yee ØemejCe evekeâeeueÙe~

5. Define systematic sampling. Give its advantages and disadvantages. A sample of size n is drawn from a population of size nk, having a linear trend, prove that :

$$V(\bar{y}_{st}) : V(\bar{y}_{sy}) : V(\bar{y}_{ran}) \simeq \frac{1}{n} : 1 : n$$

›eâceyeæ ØeeleÛeÙeve keâe heejYeee<ele keâeepeÙe~ Fmekeâ ueeYe SJe neeveÙee keâe oeepeÙe~ Skeâ jeKekeâ Gheveele eeuee mecee° me epemekeâe Deekeâejnk n, n Deekeâej keâe ØeeleoMe eueÙee ieÙee n~ emeæ keâeepeÙe ekeâ :

$$V(\bar{y}_{st}) : V(\bar{y}_{sy}) : V(\bar{y}_{ran}) \simeq \frac{1}{n} : 1 : n$$

Unit - III

FkeâeF - III

6. Explain the ratio method of estimation. Obtain an approximate expression for the variance of the ratio estimator $\hat{\bar{y}}_R$ of the population mean. For the ratio estimator $\hat{\bar{y}}_R$ of the population mean, prove that:

$$\frac{|\text{Bias}(\hat{\bar{y}}_R)|}{\sigma_{\hat{\bar{y}}_R}} \le c \cdot v.(\bar{x})$$

Deekeâueve nle Deveheeelekeâ eJeeOe mecePeeFS~ mecee° ceeOÙe keâ Deveheelee Deekeâuekeâ $\hat{\bar{y}}_R$ keâ ØemejCe keâe meeVekeâš JÙepekeâ Øeehle keâeepeÙe~ mecee° ceeOÙe keâ Deveheelee Deekeâuekeâ $\hat{\bar{y}}_R$ keâ eueÙe

emeæ keâeepeÙe ekeâ :

$$\frac{|\text{Bias}(\hat{\bar{y}}_R)|}{\sigma_{\hat{\bar{y}}_R}} \leq c \cdot v.(\bar{x})$$

7. Describe the technique of cluster sampling. In which situation is it better than simple random sampling? Obtain the estimate of the population mean and its variance under this scheme when the clusters are of equal size.

ieÛÚ Øeeleûeùeve eJeeOe keâe JeCeve keâeepeÙe~ mejue ÙeeÂeÛÚkeâ Øeeleûeùeve keâe Dehe#ee ekeâve heejemLeeleÙee ce Ùen DeeOekeâ DeÛÚe nelee n? Fme Øeeleûeùeve eJeeOe Éeje Øeehle mecee° ceeOÙe keâe Deekeâuekeâ leLee Gmekeâe Øemejce Øeehle keâeepeÙe Ùen %eele n ekeâ ieÛÚ meceeve Deekeâej keâ n~

Unit - IV

FkeâeF - IV

8. Define two-stage sampling. For a two-stage sampling, find an estimator of population mean and its variance. Also, find the unbiased estimator of the variance of the estimator.

(h) State conditions when the ratio estimator is the best linear unbiased estimator.

Gve Melee keâe eueeKeÙe peye Deveheelee Deekeâuekeâ meyeme DeÛÚe jKeeÙe DeveeYevele Deekeâuekeâ nelee n~

(i) Differentiate between equal and unequal cluster sampling.

meceeve Deej Demeceeve ieÛÚ ØeeleûeÙeve ce Devlej yeleeFS~

(j) Explain double sampling technique.

oenje ØeeleûeÙeve eJeeOe keâe mecePeeFS~

Unit - I

FkeâeF - I

2. Give an outline of main steps involved in designing and organising of a sample survey. What is the role of sampling in surveys?

ØeeleoMe meJe#eCe keâe mejÛevee SJe meÙeepevee keâ ceKÙe ÛejCee keâe Skeâ ™hejKee Øemlele keâeepeÙe~ meJe#eCee ce ØeeleûeÙeve keâe keÙee Yeecekeâe n?

3. Define simple random sampling. Find unbiased estimate of population mean and its variance