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**B.Sc. (Part - III) (Semester - VI)****Examination, December - 2016****STATISTICS****Sampling Theory (Paper - XV)****Sub. Code : 65866****Day and Date : Friday, 16 - 12 - 2016****Total Marks : 40****Time : 12.00 noon to 2.00 p.m.**

- Instructions :**
- 1) All questions are compulsory.
  - 2) Figures to the right indicate full marks.

**Q1) Choose the correct alternative. [8]**

- a) The sampling interval in the systematic sampling is \_\_\_\_\_.
  - i)  $n/N$
  - ii)  $N/n$
  - iii)  $(1-n/N)$
  - iv) None of these
- b) When frame is not available or costly then \_\_\_\_\_ sampling scheme helps in reducing cost of the survey.
  - i) SRSWOR
  - ii) Cluster
  - iii) Systematic
  - iv) None of these
- c) In the optimum allocation the sample size from each stratum is \_\_\_\_\_.
  - i)  $n_i = n N S_i / N_i$
  - ii)  $n_i = n N_i S_i / (\sum N_i * S_i)$
  - iii)  $n_i = n N / N_i$
  - iv) None of these
- d) When the regression line Y on X is passing through origin then \_\_\_\_\_ estimators are more efficient.
  - i) Ratio
  - ii) Regression
  - iii) SRSWOR
  - iv) None of these
- e) The finite population correction (f.p.c.) in SRSWOR is \_\_\_\_\_.
  - i)  $n/N$
  - ii)  $N/n$
  - iii)  $(1-n/N)$
  - iv) None of these

**P.T.O.**

- f) In stratified sampling a formula for optimum sample size was derived by \_\_\_\_.
- i) K.Pearson                      ii) Tschuprow  
 iii) J.Neyman                      iv) None of these
- g) In sampling for proportion, if N is large and samples are large then  $V(p) =$  \_\_\_\_.
- i)  $pq/n$                       ii)  $(N-n)PQ/n$   
 iii)  $(N-1)PQ/n$                       iv) None of these
- h) If the complete and up-to-date list is available then \_\_\_\_ sampling scheme is employed.
- i) SRSWR                      ii) Ratio  
 iii) Systematic                      iv) None of these

**Q2) Attempt any two of the following:**

**[16]**

- a) In case of SRSWOR show that-  
 $E(s^2) = S^2$
- b) In stratified sampling with usual notations show that-  

$$V(\overline{y}_n)_R \geq V(\overline{y}_{st})_{prop} \geq V(\overline{y}_{st})_{opt}.$$
- c) Explain the technique of drawing cluster sample. Give an unbiased estimator of population mean and derive the expression for standard error of the estimator.

**Q3) Attempt any four of the following:**

**[16]**

- a) Show that sample proportion is an unbiased estimator of population proportion.
- b) Explain the idea of two stage and multistage sampling.
- c) Explain SRSWOR and SRSWR sampling methods and compare.
- d) Explain the sampling and non sampling errors.
- e) Work out Neyman's optimum allocation principle of units in stratified random sampling.
- f) Explain how systematic sampling can be regarded as a particular case of cluster sampling.

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