

5. (A) Explain the technique of randomized response. Describe Warner's model for related and unrelated questionnaire methods. Obtain an estimate of population proportion of the members in the sensitive group.

OR

- (B) Explain double sampling procedure for estimating strata sizes on ratio and regression method of estimation. Also describe its applications. 16



First Semester M. A. / M. Sc. (Part-I) (CBCS Pattern) Examination

(New Course)

STATISTICS

(Sampling Theory)

Paper - IV (1 SCA - 4)

P. Pages : 4

Time : Three Hours]

[Max. Marks : 80

Note : Solve (A) or (B) from each question.

1. (A) (a) Explain the procedure of stratified random sampling with an example. Give its principal advantages.
- (b) Define SRSWOR giving one example. Show that sample mean square is an unbiased estimate of population mean square in SRSWOR. 9+7

OR

- (B) (i) Explain systematic sampling with an example. Derive the variance of sample mean in it.

(ii) Define :—

(a) SRSWOR and

(b) SRSWR.

Carry out Comparison between them.

8+8

2. (A) (a) Explain Lahiri method with an example in PPS sampling.

(b) Explain Horvitz Thompson estimator and derive its variance. 8+8

OR

(B) (i) Define Murthy's estimator, obtain its variance.

(ii) Write a short note on set of Des Raj estimators. 8+8

3. (A) (a) Explain the ratio method of estimation. Define the bias of ratio estimator. State the practical utility of ratio estimator.

(b) Define regression estimator. Compare it with that of ratio estimator and simple unbiased estimator. 8+8

OR

(B) (i) Explain two ways of using available auxiliary information in case of sampling.

(ii) Explain and derive the bias of regression estimator. 7+9

4. (A) (a) Define cluster sampling with equal and unequal cluster sizes with examples.

(b) In case of two stage sampling, show that sample mean is an unbiased estimate of population mean. Derive its variance. 8+8

OR

(B) (i) Explain equal cluster sampling with an example. Show that

$$V(\bar{y}_{no}) = \frac{(1-f)}{n} S_b^2$$

where notations have their usual meanings.

(ii) Describe the method of two stage sampling with its advantages and disadvantages. 8+8