SECOND SEMESTER M.Sc. DEGREE EXAMINATION, JUNE 2015

(CUCSS)

Statistics

ST 2C 07—SAMPLING THEORY

Time : Three Hours   Maximum : 36 Weightage

Part A

Answer **all** *the questions.*
Weightage 1 for each question.

1. Distinguish between census method and sampling method.

2. What is meant by sampling error ?

3. What is the probability of selecting ?

    (a)   A simple random sample with replacement ; and

    (b)   A simple random sample without replacement.

4. Give the expression for the variance of the estimator of population mean in stratified random sampling with Neyman allocation.

5. Define ratio estimator of population mean.

6. Which are the two different regression estimators with stratified random sampling ?

7. What do you mean by πps sampling ?

8. What is the second order inclusion probability with Zen-Midzuno scheme of sampling ?

9. Give a sufficient condition for the estimated variance of Horvitz-Thompson estimator as given by Yates and Grundy to be non-negative.

10. What is two stage sampling ?

11. How can you increase the efficiency of cluster sampling ?

12. Give an unbiased estimator of mean square between first stage unit means in the population in two stage sampling.

$(12 \times 1 = 12$ weightage)

Part B

Answer any **eight** *questions.*
Weightage 2 for each question.

13. Give an unbiased estimator of population variance based on a SRSWOR.

Turn over

14. Suppose you are given a list of 425 hospitals in Kerala and asked to select 20 hospitals accorc to SRSWOR. Explain your procedure of selection using remainder approach.

15. Estimate the sample size required to find an estimate of the population mean with a speci value for its coefficient of variation.

16. Carry out a comparison between Neyman allocation and proportional allocation in stratified ranc sampling.

17. Obtain the condition for regression estimator to be more precise than the ration estimator.

18. State the conditions for which the simple linear regression estimator become the BLUE.

19. Explain Lahiri's method of selecting a PPS sample without replacement.

20. Give an unbiased estimator of population mean based on a PPS sample with replacement. Whi its estimated standard error ?

21. What do you mean by Des Raj's ordered estimator of population mean ? Is it unbiased ?

22. What is meant by two phase sampling ?

23. What is multistage sampling ?

24. Write a short note on non-response.

$$(8 \times 2 = 16 \text{ weight}$$

Part C

Answer any **two** *questions.*
Weightage 4 for each question.

25. Express the variance of the estimator of population mean in systematic sampling in terms of i class correlation coefficient and carry out a comparison with simple random sample.

26. Estimate the relative gain in efficiency due to stratified random sampling with proporti allocations.

27. Derive Yates-Grundy form of estimated variance of Horvitz-Thompson estimator of popula mean.

28. In two stage sampling give an unbiased estimator of population mean if first stage units chosen with varying probabilities and with replacement and second stage units are chosen equal probability and without replacement. Also find an estimate of its variance.

$$(4 \times 2 = 8 \text{ weight}$$