TDC (CBCS) Odd Semester Exam., 2021
held in March, 2022

STATISTICS

(3rd Semester)

Course No. : STSHCC–302T

(Survey Sampling and Indian Official Statistics)

Full Marks : 50
Pass Marks : 20

Time : 3 hours

The figures in the margin indicate full marks for the questions

SECTION—A

Answer any *ten* of the following questions : 2×10=20

1. What is non-probability sampling?
2. Define simple random sampling with and without replacement.
3. Explain any two advantages of sample survey over complete enumeration.
4. What is pilot survey?

5. How do you estimate the population mean in stratified random sampling?

6. What do you mean by stratified random sampling procedure?

7. Define systematic sampling.

8. Explain how to draw a sample of size 20 from a population of size 400 by systematic sampling technique.

9. What is the advantage of cluster sampling?

10. What do you mean by ratio method of estimation?

11. Mention one advantage and one disadvantage of multistage sampling.

12. Briefly explain PPS sampling procedure.

13. Mention the Government of India's principal publications in the industry sector.

14. Discuss the role of MoSPI in connection with coverage and quality of official statistics.

15. Mention the sources of collecting official statistics.

SECTION—B

Answer any *five* of the following questions : 6×5=30

16. *(a)* Prove that in SRSWOR, the variance of sample mean is given by

$$\text{var}(\bar{y}_n) = \frac{N-n}{nN} S^2$$

where symbols hold their usual meanings. 4

(b) Discuss any one method of selecting a simple random sample. 2

17. *(a)* Explain the basic principles of sample survey. 3

(b) Discuss about the sources of non-sampling errors. 3

18. *(a)* Discuss about the advantages of stratified random sampling over simple random sampling. 3

(b) Show that in stratified random sampling

$$V(\bar{y}_{st}) = \frac{1}{N^2} \sum_{i=1}^{k} N_i (N_i - n_i) S_i^2 / n_i$$

and hence obtain $V(\bar{y}_{st})$ under proportional allocation. 2+1=3

19. (a) Explain the process of proportional allocation and optimum allocation of sample size in stratified random sampling. 3

(b) Compare $V(\bar{y}_{st})_{prop}$ and $V(\bar{y}_{st})_{Neyman}$ and comment on it. 3

20. (a) Find the estimators of population mean and population total in systematic sampling. 3

(b) Write a note on double sampling. 3

21. If the population consists of linear trend, $Y_i = i$; $i = 1, 2, \ldots N$, prove that

$$V(\bar{y}_{st}) : V(\bar{y}_{sys}) : V(\bar{y})_{SRSWOR} :: \frac{1}{n} : 1 : n \text{ (approx)}$$ 6

22. (a) Find the estimator of population mean by regression method of estimation. 3

(b) Distinguish between multistage and multiphase sampling techniques. 3

23. Prove that

$$V(\hat{R}) = \frac{1-f}{n} R^2 [C_x^2 + C_y^2 - 2\rho C_x C_y]$$

according to first-order approximation. Symbols have their usual meanings. 6

24. Discuss in detail about Central Statistical Organization (CSO) and its functions. 6

25. (a) What are the functions of National Sample Survey Organization (NSSO)? 3

(b) Write a note on the National Statistical Commission. 3

★ ★ ★