

2023/TDC(CBCS)/ODD/SEM/
STSHCC-302T/113

TDC (CBCS) Odd Semester Exam., 2023

STATISTICS

(Honours)

(3rd Semester)

Course No. : STSHCC-302T

(Sample Survey 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 *ten* questions, selecting any *two* from each

Unit :

2×10=20

UNIT—I

1. Define parameter and statistic.
2. What do you mean by sampling unit and sampling frame?
3. SRSWOR is better than SRSWR. Explain.

(2)

UNIT—II

4. Write a note on pilot survey.
5. Write two advantages of stratified random sampling over simple random sampling.
6. In stratified random sampling, sample mean is an unbiased estimate of population mean. Prove it.

UNIT—III

7. Systematic sampling is a mixed sampling. Explain.
8. Write a short note on double sampling.
9. Define cluster sampling.

UNIT—IV

10. Define multistage sampling.
11. What is ratio method of estimation?
12. Define regression method of estimation.

24J/129

(Continued)

(3)

UNIT—V

13. Write the publications which provide data on agricultural statistics.
14. Write a short note on National Statistical Commission.
15. Write a short note on official statistics in India.

SECTION—B

Answer *five* questions, selecting *one* from each
Unit : 6×5=30

UNIT—I

16. (a) Write the basic principles of sample survey. 3
(b) Why is sample survey better than complete enumeration? Explain. Write the major sources of sampling errors. 3
17. Prove that in SRSWOR sample mean is an unbiased estimate of population mean. Show that in SRSWOR the variance of sample mean is

$$V(\bar{x}_n) = \left(\frac{1}{n} - \frac{1}{N} \right) S^2 \quad 2+4=6$$

24J/129

(Turn Over)

(4)

UNIT—II

18. (a) Define proportional allocation and optimum allocation. 2
(b) Prove that $V(\bar{y}_{st})$ is minimum for fixed total size of the sample (n) if $n_i \propto N_i S_i$. 4
19. Prove that

$$V(\bar{y}_R) \geq V(\bar{y}_{st})_{prop} \geq V(\bar{y}_{st})_N$$

where symbols have their usual meanings.

UNIT—III

20. If the population consists of a linear trend

$$Y_i = i, \quad i = 1, 2, 3, \dots, k$$

then prove that

$$V(\bar{y}_{st}) \leq V(\bar{y}_{sys}) \leq V(\bar{y}_R)$$

21. In SRSWOR of n clusters each containing M elements from a population of N clusters, the sample mean \bar{y}_n is an unbiased estimator of \bar{y}_N and its variance is given by

$$V(\bar{y}_n) = \left(\frac{1}{n} - \frac{1}{N}\right) S_b^2 \approx \left(\frac{1}{n} - \frac{1}{N}\right) \frac{S^2}{M} [1 + (M-1)\rho]$$

where ρ is the intra-cluster correlation coefficient.

24J/129

(Continued)

(5)

UNIT—IV

22. Prove that $E(R_n) = R_N$, where R_n is the ratio of the sample means and R_N is the ratio of the population means.
23. Define regression estimator. Find mean and variance of regression estimator. 2+4=6

UNIT—V

24. Write briefly about NSSO, mentioning its function.
25. Discuss about the methods of collection of official statistics in India along with their reliability and limitation.

24J—100/129

2023/TDC(CBCS)/ODD/SEM/
STSHCC-302T/113