**QP CODE: 24803821**

24803821

**Reg No :** .....

**Name :** .....

# INTEGRATED MSC DEGREE EXAMINATION, JULY 2024

## Fourth Semester

INTEGRATED MSC BASIC SCIENCE-STATISTICS

## CORE - IST4CR02 - INTRODUCTION TO SAMPLING THEORY

2020 Admission Onwards

212BFEDB

Time: 3 Hours Weightage: 30

**Part A (Short Answer Questions)**

*Answer any **eight** questions.*

*Weight **1** each.*

1. What is sample survey? Give an example
2. Write down two disadvantages of sampling
3. What is non-response?
4. Obtain the estimate of population total under SRSWR
5. Write down the variance of estimate of population proportion under SRSWR
6. Write down the formula for the sample size determined on the basis of pre-specified estimator error
7. The student council is crrying out a survey.They want to collect a stratified sample of 10% of students in years 7-11. Calculate the number of students in each year group that will take part in the survey.

| year 7 | year 8 | year 9 | year 10 | year 11 |
|---|---|---|---|---|
| 342 | 330 | 316 | 346 | 318 |

8. Write down the variance of $\bar{x}_{st}$ under optimum allocation.
9. Write down the basic difference between stratified and cluster sampling.
10. What is the inclusion probability (sampling fraction) of a two-stage cluster sample?

(8×1=8 weightage)

## Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. Distinguish between restricted and non restricted sampling. Give an example for each.
12. What are the principles of sample survey?
13. Distinguish between convenience sampling and quota sampling.
14. Show that sample mean is an unbiased estimate of population mean in SRSWOR.
15. Obtain $100(1-\alpha)\%$ confidence interval for the population mean when $\sigma^2$ is known
16. Explain stratified sampling. Give any four of its applications.
17. Define systematic sampling. What are its advantages,disadvantages?
18. Compare systematic sampling with stratified sampling.

(6×2=12 weightage)

## Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. Explain the role of Sampling Theory
20. a) Explain Simple random sampling with replacement and without replacement and obtain the probability of drawing samples of size n from population of size $N$. b) Show that all ${}^{N}C_{n}$ distinct samples have an equal chance of being selected in SRS
21. Show that $V(\bar{y}_{st})_{Ney} \leq V(\bar{y}_{st})_{Prop} \leq V(\bar{y}_{st})_{ran}$
22. Explain systematic sampling and derive the estimte of population mean also.

(2×5=10 weightage)