SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN (AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai — 600 044.
B.Sc. END SEMESTER EXAMINATIONS NOVEMBER-2022
SEMESTER - IV
20USTCT4007 - Statistical Inference - I

Total Duration : 2 Hrs 30 Mins. **Total Marks : 60**

Section A

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. Prove that sample mean is a consistent estimator of population mean when the samples are drawn from a normal population.
2. What is sufficiency? Also state Neyman Factorization theorem.
3. State and prove Rao-Blackwell theorem.
4. Describe the method of moments for estimating the parameters.
5. Define MVU estimators. Show that an MVU estimator is unique.
6. Prove that if a sufficient estimator exist it is function of MLE.
7. Obtain 100 (1-α)% confidence interval for the parameter μ of the normal population.
8. Write the test procedure for variance based on sample from normal population.

Section B

Answer any **THREE** questions $(3 \times 10 = 30$ Marks)

9. Define the invariance property of a consistent estimator. State and prove a sufficient condition for the consistency of an estimator.
10. In random sampling from normal population N(μ,σ^2) find the maximum likelihood estimator for
    (i) μ when σ^2 is known
    (ii) σ^2 when μ is known
    (iii) the simultaneous estimation of μ and σ^2
11. State and prove Cramer – Rao inequality.
12. Discuss the concept of interval estimation. Obtain 100 (1-α)% confidence limits (for large samples) for the parameter λ of the Poisson distribution.
13. Write the testing procedure of difference of two population means and two population variances.

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