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.Statistics - END SEMESTER EXAMINATIONS - NOV'2024
SEMESTER - IV
20USTCT4007 - Statistical Inference - I

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

Section B

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

1. Let X_i ; i = 1,2,.....,n follows Poisson distribution with parameter λ. Find the sufficient estimator for λ.
2. Prove that the sample mean is a consistent estimator of population mean when a random sample size of $'n'$ taken from N(μ,σ^2).
3. State and prove Rao-Blackwell Theorem.
4. Let X_i ; i = 1,2,.....,n follows Exponential distribution with parameter θ. Find the unbiased estimator for θ.
5. State the properties of Maximum likelihood estimators.
6. Obtain MVUE for μ in the normal population N(μ,σ^2) when σ^2 is known.
7. Obtain 100(1-α)% confidence interval for the parameter μ of the Normal population.
8. Explain the test for significance of single proportion.

Section C

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

9. A random sample X_i ; i = 1,2,3,4,5 is drawn from a Normal population with unknown mean μ. Consider the following estimators for μ

   i) $t_1 = \dfrac{X_1 + X_2 + X_3 + X_4 + X_5}{5}$

   ii) $t_2 = \dfrac{X_1 + X_2}{2} + X_3$

   iii) $t_3 = \dfrac{2X_1 + X_2 + \lambda X_3}{3}$

   Where λ is such that t_3 is an unbiased estimator.

   Find λ.

   Are t_1 and t_2 unbiased?

   Which is best among t_1 , t_2 and t_3?

Contd...

10. State and prove Cramer - Rao Inequality.

11. Let X_i ; i = 1,2,.....,n follows Normal distribution with mean μ and Variance σ^2. Find the MLE estimator for
    i. μ when σ^2 is known
    ii. σ^2 when μ is known
    iii. When μ and σ^2 both are unknown.

12. Obtain 100(1-α)% confidence interval for the difference between two population proportions of the Normal population.

13. a) Describe the independent sample t-test for means
    b) Describe the test for independence of attributes

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