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.
M.Sc.Biostatistics - END SEMESTER EXAMINATIONS - NOV' 2024
SEMESTER - I
23PBSCT1002 - Statistical Inference

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

Section B

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

1. Let X_1, X_2, ... X_n be identically independently distributed Binomial variables with parameters n, θ. Compute the minimal sufficient statistic of θ
2. Let T_0 be minimum variance unbiased estimator, while T1¬ is an unbiased estimator with efficiency e_0. If ρ_0 be the correlation coefficient between T_0 and T_1. Then show that $\rho_0 = \sqrt{e_0}$.
3. Compute the test for the mean of a normal distribution.
4. Sketch the Lehman - Scheffe theorem.
5. If $x \geq 1$ is the critical region for testing H_0: $\theta = 2$ against H_1: $\theta = 1$ on the basis of the single observation from the population
   $f(x, \theta) = \theta e^{-\theta x}$; $0 \leq x < \infty$.
   Compute the value of Type I and Type II errors.
6. Apply the testing against trend using Kendall's statistic.
7. Let $X \sim Poisson(\lambda)$; $\lambda > 0$.Show that $T = \sum_{i=1}^{n} x_i$ is complete.
8. Explain Siegel-Turkey Test

Section C

I - Answer any **TWO** questions $(2 \times 10 = 20$ Marks)

9. Compute Neyman Factorization theorem.
10. Let T_1 and T_2 be two unbiased estimators of $\gamma(\theta)$ with efficiencies e_1 and e_2 respectively and $\rho = \rho_\theta$ be correlation coefficient between them. Relate
    $\sqrt{e_1 e_2} - \sqrt{(1-e_1)(1-e_2)} \leq \rho \leq \sqrt{e_1 e_2} + \sqrt{(1-e_1)(1-e_2)}$

Contd...

11. Ascertain Neyman - Pearson Lemma.

12. Consider a survey of two different universities of P.G students on the topic on their willingness to join the research funding project on AI.

    University 1: 3 2 3 5 8 9 8 8

    University 2: 2 8 2 4 4 3 6

    Determine whether the samples are from same distribution. Use Wilcoxson test,

II - Compulsory question $(1 \times 10 = 10$ Marks)

13. Ascertain Rao - Blackwell theorem

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