

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 - APRIL 2025  
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. If  $T_n$  is a consistent estimator of  $\gamma(\theta)$  and  $\Psi(\gamma(\theta))$  is a continuous function of  $\gamma(\theta)$ , then show that  $\Psi(T_n)$  is consistent estimator of  $\Psi(\gamma(\theta))$ .
2. Identify the properties of MLE.
3. Inspect that for the distribution  $dF(x) = \theta e^{-\theta x}$ ;  $0 < x < \infty$  central confidence limits for  $\theta$  for large samples with 95% confidence coefficient are given by  $\theta = \left(1 \pm \frac{1.96}{\sqrt{n}}\right) / \bar{x}$ .
4. Build the concept of Chi-square test for goodness of fit.
5. Demonstrate the MVB estimator for  $\mu$  in the normal population  $N(\mu, \sigma^2)$ , where  $\sigma^2$  is known.
6. Examine Pearson's Type III distribution and estimate  $\alpha$  and  $\beta$  in case of by the method of moments.
7. Construct  $100(1-\alpha)\%$  confidence interval for the parameters of Poisson distribution.
8. Construct the procedure for testing of hypothesis.

**Section C**

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

9. Make use of consistent property and prove the sufficient condition for consistency.
10. Examine whether the Cramer Rao inequality provides a lower bound to the variance of an unbiased estimator.
11. In random sampling from normal population  $N(\mu, \sigma^2)$  determine the maximum likelihood estimators for (i)  $\mu$  when  $\sigma^2$  is known (ii)  $\sigma^2$  when  $\mu$  is known.
12. Inspect the  $100(1-\alpha)\%$  confidence interval for the parameters (a)  $\theta$  and (b)  $\sigma^2$ , of the normal distribution.
13. Elaborate the procedure for test for the equality of means of two normal populations.

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