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NP – 199

IV Semester B.Sc. Examination, August/September 2023  
(NEP Scheme)  
STATISTICS

STS 401 : Statistical Inference – I

Time : 2½ Hours

Max. Marks : 60

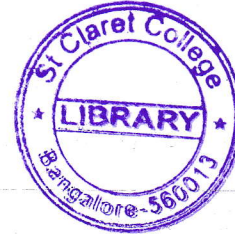
- Instructions :** i) *Scientific calculators are permitted.*  
ii) *Statistical tables and graph sheets are provided on request.*

PART – A

Answer any four questions (2 marks each).

(2×4=8)

1. What do you mean by single parameter exponential family ?
2. Define consistency.
3. Define Minimum Variance Bound Estimator (MVBE).
4. Define null and alternative hypotheses.
5. What do you mean by power of the test ?
6. Define shortest confidence interval.



PART – B

Answer any four questions (5 marks each).

(5×4=20)

7. If  $T$  is an unbiased estimator of  $\theta$ , show that  $T^2$  and  $\sqrt{T}$  are the biased estimator of  $\theta^2$  and  $\sqrt{\theta}$  respectively.
8. If  $t$  is a consistent estimator of  $\theta$ , then show that  $t^2$  is also a consistent estimator of  $\theta^2$ .
9. What are properties of MLE ? Explain.
10. Explain :
  - i) Simple and composite hypotheses
  - ii) Type I error and Type II error.

P.T.O.



11. Explain the test procedure of the equality of two population means for large sample test.
12. Obtain  $(1 - \alpha)$  100% confidence interval for the normal population mean  $\mu$ , when  $\sigma$  is unknown.

## PART – C

Answer **any four** questions (8 marks **each**).

(8×4=32)

13. State and prove the sufficient conditions for the consistency of an estimator. 8
  14. Explain the concept of moment method of estimation and estimate the parameter of  $U(a, b)$  by the method of moments. 8
  15. a) Explain the terms :
    - i) Statistical hypotheses
    - ii) Critical region
    - iii) Level of the significance.b) State Neyman-Pearson theorem. (6+2)

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  16. a) What do you mean by MVUE ?  
b) Explain the test procedure of the proportion of success of a population. (3+5)
  17. a) Define MP test and UMP test.  
b) Explain the concept of likelihood ratio test. (4+4)
  18. a) Obtain  $(1 - \alpha)$ 100% CI for the difference of two population means.  
b) Obtain  $(1 - \alpha)$ 100% CI for the difference of two binomial population proportions  $(P_1 - P_2)$ . (4+4)
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