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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 θ, show that T^2 and $\sqrt{T}$ are the biased estimator of θ^2 and $\sqrt{\theta}$ respectively.
8. If t is a consistent estimator of θ, then show that t^2 is also a consistent estimator of θ^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 μ, when σ 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)**

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)**
