B.Sc. DEGREE EXAMINATION,NOVEMBER 2018
II Year IV Semester
Core Major - Paper VII
STATISTICAL INFERENCE - I

Time : 3 Hours **Max.marks :60**

Section A $(10 \times 1 = 10)$ Marks

Answer any **TEN** questions

1. Define a Parameter.
2. State the properties of a good estimator
3. Define minimum variance unbiased estimator.
4. Write the properties of MLE.
5. Define type I and type II errors.
6. Define a confidence interval.
7. Write down the 100(1-α)% confidence interval for σ^2.
8. What is efficiency of an estimator?
9. Mention the use of Rao-Blackwell theorem.
10. State Neyman Factorization theorem.
11. Distinguish between estimate and estimator.
12. Give an example of an estimate which is consistent but biased.

Section B $(5 \times 4 = 20)$ Marks

Answer any **FIVE** questions

13. State and prove invariance property for a consistent estimator.
14. Obtain the 100(1-α)% confidence interval for difference of proportions.
15. Derive the sufficient statistics for the parameter 'p' for a random sample of size 'N' from B(n,p), $0 < p < 1$.
16. Let $X_1, X_2 \ldots\ldots X_n$ is a sample from N(θ,1). Obtain the CR lower bound for the variance of θ.
17. State and prove Rao-Blackwell theorem.
18. Find the MLE for the parameter θ of U(0,θ) distribution.
19. Describe the t-test for testing the mean of a normal population.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. State and prove Cramer-Rao inequality.

21. Derive the Maximum likelihood estimators of the parameters of a Normal distribution with both mean and variance unknown.

22. Obtain the sufficient statistic for the parameter of the exponential distribution with mean λ. Check whether it is an unbiased estimator.

23. Derive the 100(1-α)% confidence interval for the variance ratio of two independent normal distributions with unknown means.

24. Describe the test procedure for testing equality of means of two normal populations when variances are unknown and homoscedastic.

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