**B.Sc. DEGREE EXAMINATION, NOVEMBER 2016.**

**II YEAR — IV SEMESTER**

**Major Paper VII— STATISTICAL INFERENCE-I**

**Time : 3 hours Max. Marks : 60**

**SECTION A — (10 × 1 = 10 marks)**

**Answer any *TEN* questions.**

1. State the characteristics of Estimators.
2. Define most efficient estimator.
3. Define minimum variance unbiased estimator.
4. Define unbiased estimator.
5. State any two properties of maximum likelihood estimator.
6. Give example of Maximum likelihood estimator which is not unbiased.
7. Write the probable limits for the proportion in the population at level α.
8. Write the probable limits for the difference of two sample means at level α.
9. Define Null hypothesis.
10. Define standard error.
11. Define t-statistic.
12. When the estimator is said to be consistent?

**SECTION B — (5 × 4 = 20 marks)**

**Answer any *FIVE* questions.**

1. Prove that the sample mean from a Cauchy distribution is not a consistent estimator of population mean.
2. State and Cramer –RaoInequality.
3. Prove that sufficient estimator is function of maximum likelihood estimator.
4. Obtain the 95% confidence interval for mean of a normal distribution.
5. Define chi-square statistic and state the applications.
6. X1, X2, and X3 is a random sample of size 3 from a population with mean μ and variance σ2. Consider T1 = X1+ X2- X3 T2 =2 X1+3 X2 - 4 X3. Check whether T1 and T2 are unbiased estimator of μ.
7. Find the sufficient estimators for mean and variance of a Normal distribution.

**SECTION C — (3 × 10 = 30 marks)**

 **Answer any *THREE* questions.**

1. a) State the NeymannFactorisation Theorem.

b) Let xi (i = 12,..n) be a random sample from a uniform population on [0,θ]. Find the sufficient estimator for θ.

1. State and Rao-Blackwell Theorem.
2. For random sample from a normal population N(μ,σ2), find the maximum likelihood estimator for (i) σ2 when μ is known (ii) the simultaneous estimation of μ and σ2.
3. Obtain the 100(1-α)% confidence interval for Variance of a normal distribution.
4. Explain the procedure of testing the independence of two attributes.

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