F-56/2110 10317/NJ

Statistical Inference I- 234

B.Sc. CSM (Sem-III)

(Syll-Dec-2019)

Maximum Marks: 30 **Time: 02:00 hours**

Note: Students need to attempt any four questions in all. All questions will carry equal marks.

SECTION-A

1. State the terms:
   a. Sample
   b. Parameter
   c. Parameter Space
   d. Confidence interval
2. State and prove Fisher-Neyman Factorization theorem.
3. Show that $\frac{[\sum x_i(\sum x_i - 1)]}{n(n-1)}$ is an unbiased estimator of θ^2, for the sample $x_1, x_2, \dots, x_n$ drawn on X which takes the values 1 or 0 with respective probabilities θ and $(1-\theta)$.
4. Explain all the properties of a good estimator in detail.

SESCTION-B

5. Write a note on method of moments in estimation. Support your answer with two examples.
6. Based on a sample of size n from $U(\theta, \theta + 1)$ distribution, obtain sufficient statistic and MLE for θ.
7. Describe simple and composite hypothesis in detail with examples. Also, state power of test.
8. Explain the concept of Maximum Likelihood estimators. Also, discuss its properties.

SECTION-C

9. Short answer type questions
   a) Define consistent estimator and give an example of an estimator which is consistent but not unbiased?
   b) Consider nBernoullian trails with probability of success p. Find the MLE of p.
   c) Consider a random sample of size n from $N(\mu, \sigma^2)$ with σ^2 known. Obtain shortest length confidence interval for μ.

   $(2\frac{1}{2} + 2\frac{1}{2} + 2\frac{1}{2})$