Spring Semester, 2022
B.Tech-II, Semester-(IV)
Tutorial Sheet-8
MA- 212

Full Marks: 10
Answer all of the following questions. All notations have their usual meanings.

1. Let X_1, X_2 are random sample taken from $N(\theta, 1)$ then write all possible unbiased estimator for θ.

2. Let $X \sim P(\theta)$ then find the unbiased estimator for $e^{4\theta}$.

3. Let $X_1, X2, \ldots, X_5$ and $Y_1, Y_2, \ldots, Y_{10}$ be i.i.d. $N(\theta, 1)$ then what is the distribution of random variable $W = \frac{2\sum_{i=1}^{5} X_i^2}{\sum_{i=1}^{10} Y_i^2}$.

4. Let $X_1, \ldots, X_4$ are iid $N(0, 1)$ then find the sampling distribution of $\frac{(X_1+X_2)^2}{(X_3-X_4)^2}$.

5. Is MLE always unbiased and consistent? If not then give the counter example for both.

6. Let $X_1, X2, \ldots, X_n$ are random sample from exponential distribution with mean $\frac{1}{\alpha}$ then find MLE for $\sqrt{\alpha}$.

7. Construct 99% confidence interval for μ if sampling is done from normal population with mean μ and variance 1 and sample mean is 10 and sample size is 5.

8. Show that sample variance is unbiased estimator for population variance.

9. Which one is most efficient estimator in example-1?

10. A population has mean 85 and standard deviation 10 . Random samples of size 100 are taken. Find the mean and standard deviation of the sample mean.