

Section-I

Attempt any three.

1. (a) Obtain standard error of first two row moments of a sample of size 07
(b) Obtain standard error of sample variance. 07
2. (a) Obtain Standard error of third central moment of a sample of size n. 07
(b) Obtain Standard error of sample correlation coefficient. 07
3. (a) Let X_1, X_2, \dots, X_n be a random sample from Poisson distribution with mean $\lambda > 0$. 07
Show that $T = \sum_{i=1}^n X_i$ be the sufficient statistic for λ . also show that $W = (1 - \frac{1}{n})^T$,
is unbiased for $e^{-\lambda}$.
(b) State and prove Cramer-Rao inequality. 07
4. (a) Let X_1, X_2, \dots, X_n be a random sample from Bernoulli distribution with parameter p,
 $0 < p < 1$. Show that $\frac{\sum_{i=1}^n x_i}{n} (1 - \frac{\sum_{i=1}^n x_i}{n})$ is consistent estimator of $p(1-p)$.
(b) Let X_1, X_2, \dots, X_n be a random sample from exponential distribution with mean $\theta > 0$. 07
Obtain CRLB to the unbiased estimator of $g(\theta) = \theta^2$.
5. (a) Let X_1, X_2, \dots, X_n be a random sample from $N(\mu, \sigma^2)$ distribution. Obtain MLE of μ 07
and σ^2 . Hence suggest MLE of $e^{\mu + \sigma^2/2}$.
(b) Let X_1, X_2, \dots, X_n be a random sample from $N(\mu, \sigma^2)$ distribution. Obtain moment 07
estimate of μ and σ^2 .
6. (a) Let X_1, X_2, \dots, X_n be a random sample from $U(0, \theta)$, $\theta > 0$, uniform distribution. 07
Obtain MLE of θ . Is it unbiased? Justify your answer.
(b) Describe method of scoring to get MLE. 07
7. (a) Let X_1, X_2, \dots, X_n be a random sample from $N(\mu, \sigma^2)$ distribution. Obtain confidence 07
interval for σ^2 when (i) μ is known and (ii) μ is unknown.
(b) Describe general method of constructing confidence interval for unknown parameter. 07
8. (a) Describe the method to obtain confidence interval for unknown parameter using MLE. 07
(b) Let X_1, X_2, \dots, X_n be a random sample from exponential distribution with mean $\theta > 0$. 07
Obtain confidence interval for θ based on its MLE.

Attempt any eight.

1. Define standard error.
2. State standard error of sample correlation coefficient.
3. What is parameter?
4. What is parametric space?

5. Define unbiased estimator.
6. Define consistent estimator.
7. Define sufficient statistic.
8. Define efficiency of T_1 with respect to T_2 .
9. How many moments are required to obtain moment estimate of θ in $U(-\theta, \theta)$ uniform distribution?
10. State moment estimator of θ for $f(x, \theta) = \theta e^{-\theta x} x > 0, \theta > 0$.
11. Define likelihood function.
12. State invariance property of ML estimator.
13. State full form of MVUE.
14. State pivotal statistic to obtain confidence interval for mean of normal distribution based on a random sample of size n .
15. State the name of the asymptotic distribution of MLE.

