Unit 6 - Week 5

Assignment 5

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-03-04, 23:59 IST.

1) Consider the statement : For $N(\mu, \sigma^2)$, the sample variance is a consistent estimator for population variance. Which of the following options is/are CORRECT with respect to the given statement? *1 point*

- True
- False
- Only true for standard normal
- Only true for $\mu = 0$

No, the answer is incorrect.
Score: 0
Accepted Answers:
True

2) Consider the statement : If T_n is a consistent estimator for λ, then $f(T_n)$ is a consistent estimator for $f(\lambda)$. When is the given statement CORRECT? *1 point*

- Always
- Only if f is invertible
- If f is continuous
- Never

No, the answer is incorrect.
Score: 0
Accepted Answers:
If f is continuous

3) The Fisher's Information index in the Cramer-Rao bound is given by which of the following *1 point*

- $E\left(\left(\frac{\partial \log L}{\partial \theta}\right)^2\right)$
- $-E\left(\frac{\partial^2 \log L}{\partial \theta \partial^2}\right)$
- $E\left(\frac{\partial L}{\partial \theta}\right)$
- $E\left(\left(\frac{\partial L}{\partial \theta}\right)^2\right)$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$E\left(\left(\frac{\partial \log L}{\partial \theta}\right)^2\right)$
$-E\left(\frac{\partial^2 \log L}{\partial \theta \partial^2}\right)$

4) Which of the following is the Cramer-Rao bound for a Bernoulli distributed randomvariable? (Symbols have their usual meanings.) *1 point*

- $\frac{n}{pq}$
- $\frac{p}{n}$
- $\frac{n}{p}$
- $\frac{pq}{n}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\frac{pq}{n}$

5) Let n samples be drawn from a random variable $X \sim \Gamma(\lambda, a)$. Find the Cramer-Rao bound for estimating λ. (a is known) *1 point*

- λ^2/na
- λ^2/n
- an/λ^2
- λ^2/a

No, the answer is incorrect.
Score: 0
Accepted Answers:
λ^2/na

6) Which of the following is the proposed estimator by the Rao-Blackwell theorem? U is an unbiased estimator of θ and T is a sufficient statistic. *1 point*

- U
- $E(U)$
- $E(U|T)$
- $E(T|U)$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$E(U|T)$

7) Neymann factorization theorem is a test for which of the following properties of an estimator? *1 point*

- Unbiasedness
- Consistency
- Efficiency
- Sufficiency

No, the answer is incorrect.
Score: 0
Accepted Answers:
Sufficiency

8) Let $X_1, X_2, \ldots X_n$ be a set of n random variables with pdf denoted by $f(x)$ and cdf denoted by $F(x)$. Let $f_1(x)$ denote the pdf of the $\min\{X_1, X_2, \ldots, X_n\}$. Which of the following is an expression of f_1? *1 point*

- $nf(x)F(x)^{n-1}$
- $nf(x)[1-F(x)]^{n-1}$
- $f(x)F(x)^{n-1}$
- $f(x)[1-F(x)]^{n-1}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$nf(x)[1-F(x)]^{n-1}$

9) Consider a random variable X, with pdf $f(x)$. For which of the following, there does not exist a sufficient statistic for θ? *1 point*

- $f(x) = \frac{x}{\theta}; \quad 0 \leq x \leq \theta$
- $f(x) = \frac{1}{\pi}\frac{1}{1+(x-\theta)^2}; \quad -\infty < x < \infty$
- $f(x) = \frac{1}{2\pi}e^{\frac{-(x-\theta)^2}{2}}; \quad \infty < x < \infty$
- $f(x) = \frac{1}{\theta}e^{\frac{-x}{\theta}}; 0 < x < \infty$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$f(x) = \frac{1}{\pi}\frac{1}{1+(x-\theta)^2}; \quad -\infty < x < \infty$

10) Consider the statement: Rao-Blackwell theorem ensures that the new estimator obtained will be the Minimum Variance Unbiased Estimator (MVUE). When does the given statement hold? (U is an unbiased estimator of θ and T is a sufficient statistic)q *1 point*

- Always
- Depends on T
- Depends on the starting estimator U
- Depends on both T and U

No, the answer is incorrect.
Score: 0
Accepted Answers:
Depends on T