KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICS & STATISTICS
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STAT 502: Statistical Inference
Semester 142
Final Exam (Objective)
Saturday May 23, 2015
7:00 − 8:00 pm

Student's Name ____ Student's ID ________________________

1. An estimator $\hat{\theta}$ which is most concentrated about a parameter θ is the ___________________ estimator.

2. A sufficient statistic $S = s(X_1, X_2, \ldots, X_n)$ is called a ____________________________ statistic if it cannot be condensed any more without sacrificing the criterion of sufficiency.

3. Let there be a sample of size n from log-normal distribution. The efficiency of median relative to the mean is ____________________.

4. An estimator is considered to be the best if its distribution is

(a) Discrete (b) Continuous
(c) concentrated about its variance (d) Normal
(e) all of above (f) none of above

5. Regularity conditions of Crammer-Rao inequality are related to

(a) integrability of functions (b) differentiability of functions
(c) both (a) and (b) (d) neither (a) nor (b)

6. Crammer-Rao inequality is valid in case of

(a) continuous variable (b) discrete variable
(c) both (a) and (b) (d) neither (a) nor (b)

7. None of the estimation of hypothesis techniques can be applied when we have a sample ______________________________.

8. If T_1 and T_2 are two most efficient estimators with the same variance S^2 and the correlation between them is ρ, the variance of ${(T_1 + T_2)}/{2}$ is equal to

(a) S^2 (b) ρS^2

(c) $\frac{(1+\rho)S^2}{4}$ (d) $\frac{(1+\rho)S^2}{2}$

(e) all of above (f) none of above

9. If $\bar{x}$ is a sample mean from the binomial distribution $b(1, p)$, then

(a) $\bar{x}$ is a sufficient statistic for p (b) $\bar{x}$ is an efficient statistic for p

(c) both (a) and (b) (d) neither (a) nor (b)

10. Let X follows a density $f(x; \theta)$ and we want to test $H_0: \theta = \theta_0$ against $H_1: \theta = \theta_1$ where $\theta_1 = \theta_0 + 2.5$ then the BCR using Neyman-Pearson lemma will be

(a) $T(x_1, x_2, \dots, x_n) > k$ (b) $T(x_1, x_2, \dots, x_n) < k$

(c) either (a) or (b) (d) both (a) and (b)

(e) none of above

11. If the density function of a random variable is $f(x; \theta) == \frac{\beta^\alpha}{\Gamma\alpha} x^{\alpha-1} e^{-\beta x}$ for $x > 0$ (with mean $\mu = \alpha/\beta$ and variance $\sigma^2 = \alpha/\beta^2$). Then 95% confidence limits for β (assuming $\alpha = 4$ and large sample size) are ___________________________________.

12. Let X represents a random variable following $N(\mu, \sigma^2 = 9)$. The hypotheses are $H_0: \mu = 4$ against $H_1: \mu = 11/4$. A sample of size 25 is selected randomly and H_0 is rejected if sample mean is less than $7/4$.

Then the probability of type I error is equal to ____________ and the power of the test is equal to ___________.

13. Confidence limits are useful because they

(a) yield the probability of making a Type I error

(b) provide a more stable estimate than the point estimate

(c) determine the range of data within certain probability limits

(d) enable inferences from sample statistics to population parameters

(e) all of above

(f) none of above