UNIVERSITY OF THE PUNJAB

Seventh Semester – 2019

Examination: B.S. 4 Years Program

Roll No. in Fig. ....

Roll No. in Words. ....

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Signature of Supdt.

PAPER: Statistical Inference-I (Theory)
Course Code: STAT-401 Part–I (Compulsory)

MAX. TIME: 15 Min.
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.
Please encircle the correct option. Division of marks is given in front of each question.
This Paper will be collected back after expiry of time limit mentioned above.

Q.1. Encircle the right answer, cutting and overwriting is not allowed. (1x10=10)

1. The β is the probability of ----------------------
   A. Type-I Error B. Rejection Region
   C. Acceptance Region D. Type-II Error

2. A quantity obtained by applying certain rule or formula is known as
   A. Estimation B. Test Statistics
   C. Estimate D. Estimator

3. What is the probability of a type II error when α=0.05?
   A. 0.025 B. 0.05
   C. 0.95 D. Cannot be determined without more information

4. The estimator is called efficient if it has minimum ----------------------.
   A. Mean B. Variance
   C. Number of Values D. None of the above

5. Suppose $\bar{X}$ represents the sample mean, the expected value of $\bar{X}$ would be equal to --------------.
   A. σ B. μ
   C. $\bar{\bar{X}}$ D. None of above

6. The level of significance is represented by --------------.
   A. α B. β
   C. $1-\alpha$ D. $1-\beta$

7. The linear unbiased estimator which has also minimum variance is called ---------------.
   A. BLUE B. Better estimator
   C. Biased estimator D. None of the above

8. If the minimum variance estimator exists, it would essentially be ----------------------.
   A. Zero B. Greater than one
   C. Negative D. Unique

9. Parameter is a -------------- quantity.
   A. Constant B. Variable
   C. Both (A) and (B) D. None of the above

10. Criteria to check a point estimator to be good are ------------------.
    A Consistency B. Unbiasedness
    C. Efficiency D. All above

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PAPER: Statistical Inference-I (Theory)
Course Code: STAT-401 Part – II

MAX. TIME: 2 Hrs. 45 Min.
MAX. MARKS: 50

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Q. No. 2. Write a short note on the following: (5 each)

i. Best Asymptotically Normal (BAN) estimator

ii. Property of Invariance

iii. Risk Function

iv. Efficient Estimator

Q. No. 3. In a sequence of 'n' Bernoulli trails give the probability of success 'P' and r successes were obtained. Show that $\hat{P}(1-\hat{P})^2$ is not unbiased estimator of $P(1-P)^2$ but biasness→0 as n→∞. (07)

Q. No. 4. Show that in estimating σ from normal distribution with mean zero and variance σ^2. The estimator $t_2 = [\frac{1}{2}\sum_{i=1}^{n} X_i^2]^{1/2} \frac{\Gamma(n/2)}{\Gamma((n+1)/2)}$ is an unbiased estimator of σ. (07)

Q. No. 5. State and prove Neyman Factorization theorem. (08)

Q. No. 6. Let $y_1 < y_2 < \cdots < y_n$ denote the order statistic of a random sample $X_1, X_2, \ldots X_n$ from the distribution that has p.d.f (08)

$$f(X;\theta) = e^{-(x-\theta)} \qquad \theta < x < \infty, \qquad -\infty < \theta < +\infty$$

Assume $n = 3$, show that $max(X_i)$ is not a sufficient statistic for θ.