WEST BENGAL STATE UNIVERSITY

B.Sc. Honours/Programme 3rd Semester Examination, 2020, held in 2021

STSHGEC03T/STSGCOR03T-STATISTICS (GE3/DSC3)

BASICS OF STATISTICAL INFERENCE

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

GROUP-A

Answer any *four* questions from the following 5×4 = 20

1. (a) Distinguish between 'parameter' and 'statistics'. 3+2

   (b) If θ is a parameter and T is an estimator such that $E(T)=\frac{3\theta}{\sqrt{5}}$, suggest an unbiased estimator of θ and another biased estimator based on T.

2. Derive the partitioning of total sum of squares into component sums of squares for two-way classified data with one observation in each cell. 5

3. Define Type I error, Type II error and critical region in the context of testing of hypothesis. 5

4. Based on random sample of size n from normal distribution with mean μ and variance $\sigma^2(\sigma>0)$, find $100(1-\alpha)\%$ confidence interval for σ^2 when (i) μ is known and (ii) μ is unknown. 5

5. For a randomized block design, describe the layout and write down the model and assumptions made. 5

6. (a) The sample mean $\bar{x}$ is unbiased estimator for the population mean μ of a $N(\mu, 1)$ population. Check whether $\bar{x}^2$ is unbiased estimator of μ^2. $2\frac{1}{2}+2\frac{1}{2}$

   (b) When will you say an estimator T is MVU for a parameter θ?

GROUP-B

Answer any *two* questions from the following 10×2 = 20

7. Describe all the steps of Chi-Square test for testing association between two attributes.

8. Elaborate analysis of variance technique for one way classified data by mentioning the mathematical model with assumptions, the hypotheses, test statistic and critical region.

9. Consider two independent random samples of sizes n_1 and n_2 from two normal populations with means μ_1 and μ_2. Describe the test for equality of two means when variances are (i) known and (ii) unknown and equal.

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

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