2019

B.Sc. (Honours)

3rd Semester Examination

STATISTICS

Paper - GE 3-T

(Basics of Statistical Inference)

Full Marks : 40   Time : 2 Hours

The figures in the margin indicate full marks.
Candidates are required to give their answers
in their own words as far as practiable.

1. Answer any *five* questions :   2×5=10

   (a) Define parameter and statistic.   2

   (b) Define Type I and Type II errors.   2

   (c) What do you mean by local control ?   2

   (d) Write some properties of X^2-distribution.   2

   (e) Define the terms : size and level of significance.
                                                          2

[Turn Over]

(f) Give the definitions of an unbiased estimator and a consistent estimator. 2

(g) What is the difference between parametric and non-parametric tests ? 2

(h) What is p-value ? 2

2. Answer any *four* questions : 5×4=20

(a) Describe the test for significance of correlation coefficient. 5

(b) Let $X_1 X_2, ..., X_n$ be a random sample of size n drawn from a normal distribution with unknown mean μ and unknown variance σ^2. Obtain an exact test for the mean of the normal population.
5

(c) Describe the sign test. 5

(d) Find the maximum likelihood estimator of θ for a random sample $X_1 X_2 ..., X_n$ from a continuous distribution having density function.

$$f_\theta(x) = \frac{1}{\theta} e^{-x/\theta}, \ \theta > 0, \ x > 0.$$
5

(e) Describe three basic principles of design of experiments. Also state the different assumptions in ANOVA. $3+2=5$

(f) Let $X_1 X_2 ..., X_m$ and $Y_1 Y_2 ..., Y_n$ be two independent random samples drawn from $N\left(\mu_1, \sigma_1^2\right)$ and $N\left(\mu_2, \sigma_2^2\right)$, respectively, where μ_1 and μ_2 are known. Obtain 95% confidence interval for σ_1^2 / σ_2^2. 5

3. Answer any *one* question : $10 \times 1 = 10$

(a) Give the layout and analysis of randomized block design. 10

(b) Describe Wilcoxon two sample test. 10