K23U 1146

Reg. No. : ....

Name : ....

IV Semester B.Sc. Degree (CBCSS – OBE – Regular/Supplementary/ Improvement) Examination, April 2023
(2019 Admission Onwards)
CORE COURSE IN STATISTICS
4B04STA : Statistical Inference – I

Time : 3 Hours Max. Marks : 48

Instruction : Use of calculators and statistical tables are permitted.

PART – A
(Short Answer)

Answer all 6 questions. (6×1=6)

1. What do you mean by parameter ?
2. Write the probability density function of F-distribution.
3. Define estimator.
4. Write any two properties of maximum likelihood estimation.
5. What do you mean by confidence interval ?
6. Define interval estimation.

PART – B
(Short essay)

Answer any 7 questions. (7×2=14)

7. Define chi-square distribution with one degrees of freedom. Obtain its mean.
8. Define sampling distribution.
9. Explain the concept of efficiency.
10. State the properties of moment estimators.
11. Show that $\overline{x}$ is unbiased estimate of population mean when x follows N(μ, σ).
12. Explain the method of minimum variance.

P.T.O.

13. A random sample of size 15 from a normal population gives $\overline{x}$ = 3.2 and S^2 = 4.24. Determine the 90% confidence limits for σ^2.
14. 150 heads and 250 tails resulted from 400 tosses of a coin. Find 90% confidence interval for the probability of head.
15. Obtain the 99% confidence interval for the difference of means of two normal populations N (μ1, σ1) and N (μ2, σ2), when σ1, σ2 is known.

PART – C
(Essay)

Answer any 4 questions. (4×4=16)

16. Define t distribution and obtain its mean.
17. Establish the relationship between students t, chi-square and F-statistic.
18. If tn is consistent estimator of θ, then show that tn^2 is also a consistent estimator of θ^2.
19. Show that sample mean is sufficient for m when x follows poison distribution with parameter m.
20. Estimate p in a sampling from binomial population with parameter n and p, by the method of moments.
21. Find moment generating function of chi - square distribution. Also state and prove the additive property of chi-square distribution.

PART – D
(Long Essay)

Answer any 2 questions. (2×6=12)

22. Derive sampling distribution of the sample variance when samples are taken from N(μ, σ).
23. Find the maximum likelihood estimates of the parameters in N(μ, σ).
24. Derive the confidence interval for the parameter λ of poison distribution.
25. Let $x_1, x_2, \ldots\ldots, x_n$ be a random sample of n observations from N(0, θ). Find Fisher measure of information in estimating θ.