

THIRD SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2023
(Supplementary – 2018 Admission)
STATISTICS COMPLEMENTARY COURSE TO MATHEMATICS AND C.S
ASTA3C03T: STATISTICAL INFERENCE

Time: 3 Hours

Maximum Marks: 80

PART A: Answer *all* the questions. Each carries *one* mark.

1. Define Statistic.
2. Write the pdf of a chi-square distribution.
3. State the relation connecting t and F statistics.
4. Define F statistic
5. Write all four desirable properties of a good estimator.
6. State the Neyman factorization theorem.
7. State the concept of a 95% confidence interval.
8. Write exact confidence intervals for difference of proportions.
9. Define hypothesis.
10. Write assumptions of one sample t test.
11. Define the term attribute.
12. Comment on critical region.

(12 x 1 = 12 Marks)

PART B: Answer *all* the questions. Each carries *two* marks.

13. Distinguish between Standard error and Standard deviation.
14. Write any four applications of t statistics.
15. Examine the differences between type I and II errors.
16. Distinguish between point estimation and interval estimation.
17. Write any two confidence interval using t distribution.
18. Distinguish between simple and composite hypotheses.
19. Write the test statistic for large sample tests concerning mean equality of means.
20. Distinguish between significance and power of a test.
21. Write for tests based on Chi-square distribution.

(9 x 2 = 18 Marks)

(PTO)

PART C: Answer any *five* questions. Each carries *six* marks.

22. Derive F distribution from two independent Chi-square distributions.
23. Let $X \sim N(n, p)$. Find an unbiased estimator for n , and p based on sample of size m .
24. Derive Chi-square distribution from Normal distribution.
25. Explain Method of maximum likelihood and method of moments.
26. Derive the 95% confidence interval for mean difference.
27. Write a short note on small sample tests based on t distribution for equality of means.
28. Derive the 95% confidence interval for variances using F statistic.
29. Explain the working procedure of Chi-square for goodness of fit.

(5 x 6 = 30 Marks)

PART D: Answer any *two* questions. Each carries *ten* marks.

30. Write the interrelationship between Chi-square, t and F statistic.
31. Explain four desirable properties of a good estimator using proper examples.
32. A study is conducted to analyze the effectiveness of two different teaching methods, A and B, in improving students' test scores. The scores of 15 students who underwent method A and 15 students who underwent method B are given below. Perform a test to determine if there is a significant difference between the two teaching methods.

Observation No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Method A	80	78	67	74	83	69	78	74	89	86	77	73	80	71	85
Method B	72	70	69	71	69	70	71	72	70	70	70	70	69	70	71

(2 x 10 = 20 Marks)

