



QP CODE: 26019597



Reg No :

Name :

M.Sc DEGREE (CSS) EXAMINATION, MARCH 2026

Fourth Semester

MSc Statistics with Data Science

Core Courses - ST040401 - NON-PARAMETRIC STATISTICS

2020 Admission Onwards

A3C0D6FE

Time: 3 Hours

Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

Weight 1 each.

1. What makes nonparametric tests different from parametric tests?
2. Explain probability integral transformation.
3. How do you interpret the goodness-of-fit test results?
4. Define Kolmogorov-Smirnov one sample statistic. What are one-sided Kolmogorov-Smirnov statistics?
5. Explain Shapiro- Wilk test.
6. Describe McNemar test.
7. Briefly explain Cochran's Q test clearly stating the assumptions.
8. What is Spearman's Rho?
9. Do you think that applying the Jackknife method to an unbiased estimator has any effect? Give your reasons.
10. What do you mean by smoothing?

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

Weight 2 each.

11. Obtain the power function and normal approximation of the sign test.
12. Describe the median test and obtain the null distribution of the test statistic.





13. Distinguish between Kolmogorov-Smirnov test and Cramer-von Mises test.
14. How do you test the Jarque-Bera test for normality? Explain.
15. (a) Under what conditions do we use the two sample Kolmogorov-Smirnov test? (b) Suppose two mutually independent random samples were taken from two different populations. Explain how you would use Kolmogorov-Smirnov test to examine whether two samples have come from the same distribution.
16. Compare and contrast Friedman's test and two way analysis of variance F-test.
17. What is the difference between Pearson and Kendall correlation?
18. Describe kernel density estimation.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

Weight 5 each.

19. Explain one sample Wilcoxon signed rank test. Obtain the null distribution of the Wilcoxon statistic and hence find its normal approximation.
20. (a) Explain the procedure of the one sample run test clearly stating the null and alternative hypotheses. (b) Let R be the total number of runs in a random arrangement of two symbols. Find the null distribution of R . What is the asymptotic distribution of R ?
21. (a) Explain Kruskal- Wallis test. b) Describe the difference between Mann-Whitney U test and Kruskal- Wallis test.
22. Explain in detail various methods of non-parametric regression.

(2×5=10 weightage)

