



Date:

**ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU-27**  
B.Sc. STATISTICS - IV SEMESTER  
SEMESTER END EXAMINATION: APRIL 2022 (Supplementary)  
(Examination conducted in July 2022)

**ST 417 – Statistical Inference II**

**Time: 1 ½ Hours**

**Max: 35 Marks**

*This question paper contains **ONE** printed page and **THREE** parts*

**PART A**

**I Answer any FIVE from the following** **2 x 5 = 10**

1. State the theorem on UMP tests for testing one sided hypotheses for distributions with MLR property.
2. Define Likelihood ratio test.
3. What are large sample and small sample tests?
4. Define odds ratio.
5. Rory suspects that teachers in his district have less than 5 years of experience on average. He decides to test  $H_0: \mu = 5$  versus  $H_1: \mu < 5$  using a sample of 25 teachers. His sample mean was 4 years and his sample variance was 4 years<sup>2</sup>. Calculate appropriate test statistic.
6. What are nonparametric tests?
7. Find the number of runs in the following data and what is the length of longest run?  
Data is as follows: 1 0 1 1 0 0 0 0 0 1 1 1 0 0 1 1 0 0 1.

**PART B**

**II Answer any THREE from the following** **5 x 3 = 15**

8. Check whether Binomial distribution possess MLR property.
9. Write a note on Fisher's Z-transformation and its applications.
10. Give test procedure of testing for independence of attributes in a 2 X 2 contingency table.
11. Explain the test procedure of Wilcoxon – Signed rank test for two samples.
12. Write a short note on Normal probability plot and Q – Q plot.

**PART C**

**III Answer any ONE from the following** **10 x 1 = 10**

13. A) Write the steps involved in the test of significance of the ratio of two variances.  
B) Explain the test procedure of paired t test. (5+5)
14. A) Derive the likelihood ratio test for testing the hypothesis  $H_0: \mu = \mu_0$  vs  $H_1: \mu \neq \mu_0$  when population variance is known.  
B) Explain the test procedure of Kolmogorov-Smirnov one sample test. (6+4)

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