

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034



B.Sc. DEGREE EXAMINATION – STATISTICS

FIFTH SEMESTER – APRIL 2022

UST 5504 – TESTING OF HYPOTHESES

Date: 17-06-2022

Dept. No.

Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

SECTION – A

Answer all the Questions.

(10 X 2 =20)

1. Define simple and composite hypothesis.
2. Define one-tailed test with an example.
3. State Monotone Likelihood ratio property.
4. Define one parameter exponential family
5. Mention any two properties of LRT.
6. Define likelihood ratio test.
7. What are the applications of t-distribution in test of significance?
8. Give the test statistic for testing the difference between two population variances.
9. When do we use Non - parametric tests?
10. Obtain the number of runs in the sequence xxyyxxxxyxyyyxx.

SECTION – B

Answer any FIVE Questions.

(5 X 8 = 40)

11. Describe the steps involved in testing statistical hypothesis.
12. Let X_1, X_2, \dots, X_n be a random sample from Bernoulli distribution. Obtain the best critical region for testing $H_0: p = \frac{1}{2}$ against $H_1: p = \frac{1}{3}$.
13. Show that the one parameter exponential family of distributions possesses the monotone likelihood ratio property.
14. Explain the concept of SPRT.
15. Let X_1, X_2, \dots, X_n be a random sample from $N(\mu, \sigma^2)$. Obtain LRT for testing $H_0: \mu = \mu_0$ against $H_1: \mu \neq \mu_0$
16. Explain the test procedure for Kruskalwallis test.
17. Random samples of 400 men and 600 women were asked whether they would like to have a fly-over near their residence. 200 men and 325 women were favour of it. Test the equality of proportion of men and women in the proposal?
18. Explain the sign test for one sample and two samples.

SECTION – C

Answer any TWO Questions.

(2 X 20 = 40)

19. State and prove Neymann-Pearson lemma.

20. a) Discuss the merits and demerits of non-parametric test. (10)

b) The table given below shows the data obtained during outbreak of small pox.

	Attacked	Not Attacked
Vaccinated	31	469
Not Vaccinated	185	1315

Test the effectiveness of vaccination in preventing attack from small pox. Test at 5 % level of significance. (10)

21. Derive the LRT for testing the equality of means of two independent normal populations with equal variance.

22. To verify whether a course in accounting improved performance, a similar test was given to 12 participants both before and after the course. The original marks recorded before the course are

44 40 61 52 32 44 70 41 67 72 53 and 72.

After the course, the marks were in the same order,

53 38 69 57 46 39 73 48 73 74 60 and 78.

Was the course useful?

@@@@@@