



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – STATISTICS

FIFTH SEMESTER – APRIL 2017

ST 5510 / ST 5505- TESTING OF HYPOTHESIS

Date: 22-04-2017
01:00-04:00

Dept. No.

Max. : 100 Marks

PART — A

Answer ALL questions.

(10 × 2 = 20 marks)

1. Formulate the problem of Hypothesis testing.
2. Distinguish between simple & composite hypotheses.
3. Differentiate parametric and non - parametric test.
4. Define level of significance & power of a test.
5. State the essential difference between Neyman – Pearson theory & Wald's theory of testing of hypotheses.
6. Write the test procedure to test $\rho = 0$.
7. Define one parameter exponential family of distributions.
8. State monotone likelihood ratio property.
9. How will you test the equality of two population means when the population variances are equal and unknown.
10. Explain the test for randomness.

PART - B

Answer any FIVE questions.

(5 × 8 = 40 marks)

11. Prove that every MP or UMP critical region is necessarily unbiased.
12. Describe the likelihood ratio test for testing the variance of a normal population.
13. Explain the general procedure of the Sequential probability ratio test.
14. Show that the one parameter exponential family of distributions possess the monotone likelihood ratio (MLR) property.
15. Show that UMP critical region exists for family of distributions having MLR property in statistic $T(\underline{x})$ for testing the one sided alternative hypothesis ($\theta > \theta_0$).
16. Describe Mann – Whitney test for two sample problem.
17. Explain Kolmogorov – Smirnov one sided and two sided tests for single sample problem.
18. Discuss the test procedure of testing hypothetical population variance. Also give 95% confidence interval for population variance σ^2 .

PART - C

Answer any TWO questions.

(5 × 8 = 40 marks)

19. (a). State and prove Neyman Pearson Lemma.
(b). Construct the best critical region for testing $H_0: \theta = \theta_0$ against $H_1: \theta = \theta_1$ ($\theta_0 < \theta_1$) in case of normal population $N(\theta, \sigma^2)$, where σ^2 is known. Also find the power of the test.
20. (a). Describe the Likelihood ratio test for testing equality of means of two normal populations when variances are unknown but equal.
(b). Show that there is no UMP test for testing $H_0: \theta = \theta_0$ against $H_1: \theta \neq \theta_0$, for a random sample of size n from $f(x, \theta) = \theta e^{-\theta x}$; $x > 0$ & $\theta > 0$.
21. (a). Construct the SPRT for testing $H_0: \theta = \theta_0$ against $H_1: \theta = \theta_1$ for the Bernoulli distribution. Also obtain the OC & ASN function.
(b). Explain median test.
22. (a). Describe the test procedure of goodness of fit.
(b). Explain the test procedure to test the equality of two population correlation coefficients.
