



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – STATISTICS

FIFTH SEMESTER – NOVEMBER 2013

ST 5505/5501 – TESTING OF HYPOTHESIS

Date : 07/11/2013
Time : 9:00 - 12:00

Dept. No.

Max. : 100 Marks

PART – A

Answer **ALL** questions:

(10x2=20 Marks)

1. Distinguish between simple and composite hypothesis.
2. Define randomized test.
3. Briefly explain the two types of errors.
4. Define Test statistic.
5. Mention any two properties of LRT.
6. What are the applications of Chi-square distribution?
7. Which tests of hypothesis are called Two-tailed tests? Give an example for it.
8. Which types of tests are called non-parametric tests?
9. What are the applications of t-distribution in test of significance?
10. Mention any two advantages of non-parametric tests.

PART – B

Answer any **FIVE** questions:

(5x8=40 Marks)

11. Describe the steps involved in testing statistical hypothesis.
12. Consumption of electricity in a township is assumed to be exponentially distributed with parameter θ . In order to test the hypothesis $H_0: 1000$ kw. Against $H_1: 1500$ kw. A day is chosen at random and if the consumption on that day is greater than 3000 kw. H_0 is rejected. Find the size of two errors.
13. Develop a LRT test for testing $H_0: \theta = \theta_0$ of Normal distribution $N(\theta, \sigma^2)$ when σ^2 is known.
14. Derive a likelihood ratio test for the variance of a normal population $N(\mu, \sigma^2)$ when μ is known.
15. Describe likelihood ratio test and state its properties.
16. Discuss the merits and demerits of parametric and non-parametric methods.
17. Explain Sign test for one sample.
18. Discuss the procedure for median tests.

PART – C

Answer any **TWO** questions:

(2x20=40 Marks)

19. (a) State and prove Neyman – Pearson Lemma.

(b) Given the density function $f(x, \theta) = \begin{cases} \frac{1}{\theta}, 0 < x < \theta \\ 0 \text{ otherwise} \end{cases}$, you are to test

$H_0: \theta = 1$ against $\theta = 2$ by means of a single observation. Find the type I and type II error if the critical region is (i) $0.5 \leq X < 1$ (ii) $1 \leq X \leq 1.5$. Also obtain the power function of the test.

(10 + 10 marks)

20. a) (i) What are the applications of chi-square distribution in testing of hypothesis.
(ii) Explain the test procedure for testing equality of variances of two normal populations.

(b) Explain randomized test for the parameter of binomial distribution.

(12+8 marks)

21. (a) Illustrate that UMP test does not exist always. (10 + 10 marks)
(b) Explain the test of independence of attributes in contingency tables.

22. (a) Explain Median test for two-sample problem. (10 + 10 marks)
(b) Explain Mann-Whitney-Wilcoxon U-test.

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