LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **STATISTICS**

FIFTH SEMESTER – **NOVEMBER 2014**

ST 5510/ST 5505/ST 5501 - TESTING OF HYPOTHESIS

Date : 05/11/2014 Dept. No. Max. : 100 Marks
Time : 09:00-12:00

PART – A

Answer **ALL** the questions: **(10x2=20 Marks)**

1. What is meant by critical region?
2. Explain two types of errors.
3. Define (i) Level of significance (ii) Power of the test.
4. State the properties of likelihood ratio test.
5. Distinguish between one tailed and two tailed test.
6. Define standard error.
7. Differentiate between parametric and non-parametric methods.
8. What are the applications of t-distribution in test of significance?
9. State the situation where sign test can be applied.
10. Define run and length of a run.

PART – B

Answer any **FIVE** questions: **(5x8=40 Marks)**

11. Examine whether a best critical region exists for testing the null hypothesis $H_0 : \theta = \theta_0$ against the alternative hypothesis $H_1 : \theta = \theta_1 > \theta_0$ for the parameter θ of the distribution $f(x,\theta) = \frac{1}{\theta}, 0 < x < \theta$.

12. Suppose we want to test a hypothesis H_0 against H_1 by tossing a coin once and agreeing to accept H_0 if a head is shown and accept H_1 otherwise, (i) Find probability of type I and type II errors. (ii) What will be the probability of these errors if the coin is tossed twice and agreed to accept H_0 if 2 heads are shown and to accept H_1 otherwise.

13. Discuss the procedure of Median test.

14. (a) Explain Randomised test procedure.
    (b) Explain power of a test and power function.

15. Derive a likelihood ratio test for a mean of a normal population $N(\mu,\sigma^2)$ when σ^2 is known.

16. Derive the likelihood ratio test for the variance of a normal population $N(\mu,\sigma^2)$ when μ is unknown.

17. How will you test for goodness of fit?

18. Write the procedure for Kolmogrov two sample tests.

PART – C

Answer any **TWO** questions: **(2x20=40 Marks)**

19. (a) State and prove Neymann- Pearson lemma.
    (b) Derive a LRT for equality of means of two independent normal populations with common unknown variance.

20. If $X_1, X_2, ..., X_n$ is a random sample from a population with pdf

$$f(x,\theta) = \begin{cases} \theta \, e^{-\theta x} \\ 0 \quad otherwise \end{cases}$$

    Show that there exists no UMP test for testing $H_0 : \theta = \vartheta_0$ against $H_1 : \theta \neq \vartheta_0$.

21. (a) Explain the test of independence of attributes in contingency tables.

    (b) Illustrate that UMP test doesn't exist always.

22. (a) Explain the procedure of Mann-Whiteney-Wilcoxon U-test.

    (b) Explain the Sign test with illustration.

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