LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIFTH SEMESTER – NOVEMBER 2012

# ST 5505/ST 5501 - TESTING OF HYPOTHESES

 Date : 03/11/2012 Dept. No. Max. : 100 Marks

 Time : 9:00 - 12:00

**PART – A**

**Answer ALL Questions: ( 10 x 2 = 20 Marks )**

1. Distinguish between Simple and Composite hypotheses.

2. Define Best Critical Region.

3. Define Exponential Distribution.

4. When do you call a test uniformly most powerful?

5. Define SPRT for testing Ho against H1.

6. State the ASN function for the SPRT for testing Ho: θ = θ0 against H1: θ = θ1.

7. What do you mean by one-tailed and two-tailed tests?

8. State the assumptions for Student’s t-test.

9. Mention the assumptions associated with Non-parametric tests.

10. State the situations where Sign test can be applied.

**PART – B**

**Answer any FIVE questions: ( 5 x 8 = 40 Marks )**

11. Explain the concept of critical region.

12 Define and elaborate two types of errors in testing of hypothesis.

13. Discuss the general approach of likelihood ratio test.

14. Find the LRT of Ho: θ = θ0 against H1: θ ≠ θo based on sample of size 1 from the density

 f ( x, θ ) = 2 ( θ - x ) / θ2 , 0 < x < θ

15. Explain the concepts

 i) Level of Significance

 ii) Null and Alternative hypotheses.

16. A manufacturer of dry cells claimed that the life of their cells is 24.0 hours. A sample of

 10 cells had mean life of 22.5 hours with a standard deviation of 3.0 hours. On the basis of

 available information, test whether the claim of the manufacturer is correct.

17 In a breeding experiment, the ratio of off-spring in four classes was expected to be 1:3:3:9.

 The experiment yielded the data as follows:

 Classes AA Aa aA aa

 No.of offsprings: 8 29 37 102

 Test whether the given data is in agreement with the hypothetical ratio.

18. Use the sign test to see if there is a difference between the number of days required to collect

 an account receivable before and after a new collection policy. Use the 00.5 significance level

 Before: 33 36 41 32 39 47 34 29 32 34 40 42 33 36 27

 After : 35 29 38 34 37 47 36 32 30 34 41 38 37 35 28

**PART – C**

**Answer any TWO questions: (2 x 20 = 40 Marks )**

19 a) State and Prove Neymann-Pearson Lemma.

 b) A sample of size 1 is taken from density

 f ( x, θ ) = 2 ( θ - x ) / θ2 , 0 < x < θ

 = 0 else where

 Find an Most Powerful test of Ho: θ = θ0 versus H1: θ = θ1 ; θ0 > θ1  at level α .

20 a) Describe the sequential procedure for testing Ho: θ = θ0 against H1: θ ≠ θ1 where θ is the

 parameter of the Poisson distribution.

 b) The heights of ten children selected at random from a given locality had a mean 63.2 cms

 and variance 6.25 cms. Test at 5 % level of significance the hypothesis that the children of

 the given locality are on the average less than 65 cms in all. Given for 9 degrees of freedom

 P( t.> 1.83) = 0.05.

21. a) Explain Chi-square test of Goodness of fit.

 b) The following table gives the number of aircraft accidents that occurred during the seven

 days of the week. Find whether the accidents are uniformly distributed over the week.

 Days : Mon Tue Wed Thur Fri Sat Total

 No.of accidents : 14 18 12 11 15 14 84

22. a) Find 99 % confidence limits for the parameter λ in Poisson distribution.

 b) Apply Median Test for the following data:

 X: 27 31 32 33 34 29 35

 Y: 28 30 30 24 25 26

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