LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIFTH SEMESTER – **APRIL 2013**

ST 5505/ST 5501 - TESTING OF HYPOTHESES

Date: 10/05/2013 Dept. No. Max. : 100 Marks

Time: 9:00 - 12:00

PART - A

Answer ALL the questions: (10 x 2 = 20)

1. Distinguish between simple and composite hypothesis.
2. Give an example for a randomized test.
3. When do you say that a given density is a member of One Parameter Exponential Family?
4. Define UMPT.
5. What are likelihood ratio tests?
6. What is meant by strength of a SPRT?
7. Define Confidence level.
8. Write down the test statistic used for testing the hypothesis about single population based on a small sample drawn from a normal distribution with known variance.
9. Define Empirical Distribution Function.
10. What are nonparametric methods?

PART - B

Answer any FIVE Questions: (5 x 8 = 40)

11. Explain various approaches used in the theory of testing of hypotheses, namely, Neyman-Pearson approach, Likelihood Ratio principle and Tests of significance.

12. Derive the MPT of level 0.05 for testing $H:\theta=1$ against $K:\theta=2$ based on a sample of size 10 drawn from $U(0,\theta)$.Also compute its power under alternative hypothesis.

13. Define MLR property. Show that the family of Uniform densities defined on $(0,\theta),\theta>0$ has MLR in $x_{(n)}$.

14. Obtain the large sample confidence interval for θ in exponential distribution with mean θ.

15. Explain in detail paired t-test.

16. Derive the LRT for testing $H:\theta\le\theta_o$ against $K:\theta>\theta_o$ in $B(n,\theta)$.

17. Derive the SPRT for testing $H:\theta=\theta_o$ against $K:\theta=\theta_1,(\theta_1>\theta_o)$ in $B(1,\theta)$.

18. When do you recommend the use of Median Test? Explain in detail median test.

PART - C

Answer any TWO Questions: 2 x 20 =40

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

(b) Derive the Most Powerful Test of level 0.05 for testing $H : \lambda = 0.01$ against $K : \lambda = 0.07$ based on a sample of size 10 drawn from $P(\lambda)$.

20. (a) Give an example of a family of distributions which does not possess MLR Property.

(b) Let $X_1, X_2, ..., X_n$ be a random sample of size n drawn from $N(\theta,1)$. Show that the family of the joint densities has MLR in $\sum_{i=1}^{n} X_i$.

(c) Derive the Uniformly Most Powerful Test of level 0.05 for testing $H : \theta \leq 1$ against $K : \theta > 1$ based on a sample of size 10 drawn from $N(\theta,1)$.

21. (a) Derive the likelihood ratio test for testing $H : \theta = \theta_o$ against $K : \theta \neq \theta_o$ based on a sample of size n drawn from $N(\theta, \sigma^2)$ where σ^2 is unknown.

(b) Explain the process of testing equality of several population proportions.

22. (a) Describe Wilcoxon test.

(b) Describe Kolmogrov-Smirnov Two sample test.

$$$$$$$