LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

SECOND SEMESTER – **APRIL 2015**

ST 2503 - CONTINUOUS DISTRIBUTIONS

Date : 15/04/2015 Dept. No. Max. : 100 Marks

Time : 01:00-04:00

SECTION – A

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

1. Let f(x,y) = 8xy , 0<x<y<1. Find the marginal probability density functions of x.
2. The waiting time for catching a train is a random variable with pdf $f(x)=\frac{1}{30}, 0<x<30,$ zero otherwise what is the probability that a man entering the station at random will have to wait atleast 20 minutes?
3. State any two properties of the Normal distribution.
4. If X is a normal variate with mean 30 and standard deviation 5, find p(26≤X≤40).
5. Obtain the MGF of gamma distribution.
6. Write down the density function of Cauchy distribution. Does mean exist for Cauchy distribution.
7. Obtain the mode of Chi-square distribution with n degrees of freedom.
8. State any two applications of t-distribution.
9. Write the joint pdf of i^{th} and j^{th} order statistics.
10. For exponential distribution f(x) = e^{-x} , x ≥ 0, obtain the pdf of n^{th} order statistics.

SECTION – B

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

11. The variables X & Y have the joint p.d.f given by

    f(x,y) = ⅓ (x + y); 0 ≤ x ≤ 1 , 0 ≤ y ≤ 2.

    find the correlation coefficient between X and Y.
12. Obtain the MGF of normal distribution.
13. Obtain the mean and Variance of Beta distribution of first kind.
14. Define t-statistic and derive its probability density function.
15. Find the p.d.f of sample range.
16. If X has a uniform distribution in[0 ,1]. Find the distribution of -2logX. Identify the distribution also.
17. Let f(x,y) = 8 xy ; 0 < x < y <1

    = 0 ; Otherwise

    Find V(Y/X=x).
18. Let X have a (standard) Cauchy distribution. Find p.d.f of X^2. Find its distribution.

SECTION-C

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

19. Two random variables X and Y have the following joint probability density function.

$f(x, y) = 2-x-y \quad ; \quad 0 \leq x \leq 1 , 0 \leq y \leq 1$

$= 0 \quad ; \quad$ otherwise

Find (i) Marginal p.d.f of X and Y

(ii) Conditional density functions

(iii) V(X) and V(Y) and

(iv) Covariance between X & Y.

20. (a) Obtain the moments of normal distribution.

(b) In a distribution exactly normal , 10.03% of the items are under 25 kilogram weight and 89.97% of the items are under 70 kilogram weight . What are the mean and standard deviation of the distribution?

21. Obtain the p.d.f of F distribution.

22. State and prove Lindberg –Levy central limit theorem.

$$$$$$$