LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FOURTH SEMESTER – **APRIL 2018**

ST 4502/ ST 4501 – DISTRIBUTION THEORY

Date: 09-05-2018   Dept. No.   Max. : 100 Marks
Time: 09:00-12:00

PART A

Answer ALL the questions: **(10X2=20)**

1) Define marginal distribution.

2) Define conditional expectation and variance.

3) Define trinomial distribution.

4) Obtain mean for Poisson distribution.

5) Define exponential distribution.

6) Define Cauchy distribution.

7) Define chi-square variate.

8) Define F distribution.

9) Define order statistics.

10) Define stochastic convergence.

PART B

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

11) Prove that $V(X) = E[V(X|Y)] + V[E((X|Y)]$

12) Let $f(x, y) = 8xy, 0 < x < y < 1; f(x, y) = 0$ elsewhere. Find

   (a) $E(Y|X = x)$ and (b)$Var(Y|X = x)$.

13) Obtain the mode of Binomial distribution.

14) Derive Poisson distribution as a limiting case of binomial distribution.

15) Obtain the constants of Beta distribution of first kind.

16) Let X have a Cauchy distribution. Find a p.d.f for X^2 and identify its distribution.

17) Derive student's t distribution.

18) State and prove central limit theorem.

PART C

19) Two ideal dice are thrown. Let X_1 be the score on the first die and X_2 the score on the second die.

   Let Y denote the maximum of X_1 and X_2 i., $Y = \max(X_1, X_2)$.

   (i)   Write down the joint distribution of Y and X_1

   (ii)   Find the mean and variance of Y and covariance (Y and X_1).

20) a. Obtain mean, variance and covariance of Multinomial distribution.

   b. Obtain the moment generating function of normal distribution. Also determine the first four

   moments.

21) a. Show that exponential distribution 'lacks memory'.

   b. Derive the mean and variance of Gamma distribution.

22) Derive F-distribution and also obtain the mode of F distribution.

<div align="center">**********</div>