



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – STATISTICS

SECOND SEMESTER – APRIL 2017

ST 2503- CONTINUOUS DISTRIBUTIONS

Date: 04-05-2017
01:00-04:00

Dept. No.

Max. : 100 Marks

SECTION – A

Answer ALL Questions

10X2=20 MARKS

- 1) Write the significance of Normal distribution.
- 2) Write the mean and variance of Uniform distribution.
- 3) Obtain the distribution function $F(x)$ for exponential distribution.
- 4) Write any two properties of the sampling distribution of 't'
- 5) Define Gamma distribution.
- 6) When two random variables are said to be stochastically independent?
- 7) Define order statistics.
- 8) Define marginal distribution function.
- 9) Define Convergence in Probability.
- 10) Define Bivariate Normal Distribution.

SECTION - B

Answer Any FIVE Questions

5X8=40 MARKS

- 11) The joint p.d.f. of a two dimensional random variable (x, y) is given by
$$f(x,y) = \begin{cases} 2 & 0 < y < x < 1 \\ 0 & \text{elsewhere} \end{cases}$$
 - a. Find the marginal density function of X .
 - b Find the conditional density function of $Y/ (X=x)$.
- 12) Derive the moment generating function of Exponential distribution.
- 13) Define standard Cauchy distribution if X_1 and X_2 are i.i.d. $N(0,1)$ variables obtain the pdf of
$$y_1 = \frac{X_1}{X_2}.$$
- 14) Define chi-square variate and give the application of chi-square distribution.
- 15) Write the pdf of Beta distribution of first kind and second kind. Obtain the Harmonic mean for first Kind.
- 16) Find the distribution of Range.

- 17) State and Prove the linearity property of Normal distribution.
 18) Define Conditional Expectation and Conditional Variance.

SECTION – C

Answer Any TWO Questions

2X20=40 MARKS

- 19) a. State and Prove Lindberg- Levy central limit theorem. **(15)**

b. Let X_1, X_2, \dots, X_n be a random sample from exponential distribution. Obtain the distribution of

$$i = \frac{\sum_{i=1}^n X_i - n E(X_1)}{\sqrt{nv(X_1)}} \quad (5)$$

- 20) a. Students of class were given an aptitude test. Their marks were found to be normally distributed with mean 60 and Standard Deviation 5 What percentage of student scored

More than 60 marks

Less than 50 marks

Between 45 and 65 marks

- b. Write the characteristics of Normal distribution.

- 21) a. Obtain the moment generation function of chi-square distribution **(10)**

b. Let X_1 and X_2 be independent random variables with Gamma distribution and parameters m and n respectively.

Obtain the joint pdf of $y_1 = X_1 + X_2$ and $y_2 = \frac{X_1}{X_1 + X_2}$ **(10)**

- 22) a. Derive the pdf of t-distribution. **(15)**

- b. Obtain the mode of F-distribution. **(5)**
