LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

SECOND SEMESTER – **APRIL 2018**

17/16UST2MC01/ ST 2503 – CONTINUOUS DISTRIBUTIONS

Date: 24-04-2018 Dept. No. Max. : 100 Marks

Time: 01:00-04:00

PART – A

Answer ALL Questions: (10 x2=20 marks)

1. Define Uniform distribution.
2. If X_1 and X_2 are independent uniform variates on [0, 1], find the mean and variance of $X_1 + X_2$.
3. Write the P.d.f. of standard normal distribution.
4. Give any two importance of normal distribution.
5. Write the MGF og Gamma variate.
6. Justify, why moments do not exist for Cauchy distribution.
7. If X and Y are independent continuous random variables, then the p.d.f of U = X + Y is given by : $h(u) = \int f_x (v) f_y (u - v) dv$.
8. Derive the additive property of chisquare distribution.
9. What is Lack of memory property?
10. Define Beta distribution of first kind.

PART – B

Answer Any FIVE Questions: (5 x8=40 marks)

11. Suppose the two dimensional continuous random variable (X,Y) has joint pdf given by

$$f(xy) = \begin{cases} 6x^2y, & 0 < x, y < 1 \\ 0 & otherwise \end{cases}$$

   (i) Find the marginal distributions of X and Y and
   (ii) Conditional distribution of X given Y= y.
12. X is a normal variate with mean 12 and S.D 4. Find the probabilities that
   (i) $0 \leq X \leq 12$ (ii) $X \geq 20$
13. Prove that the arithmetic mean of independent observations from a standard Cauchy is also a standard Cauchy variate.
14. Obtain the Moment Generating Function of exponential distribution.
15. Obtain the derivation of Student's t – distribution.
16. Obtain the mode of F-distribution.
17. Explain stochastic convergence in detail.
18. Derive the joint p.d.f. of k^{th} order statistics.

PART – C

Answer Any TWO Questions: (2 x20 =40 marks)

19. Derive the moments of Normal distribution.
20. Derive the pdf of F distribution.
21. State and prove central limit theorem.
22. a. Obtain the distribution of sample mean when the random sample is from normal distribution

   b. Obtain the distribution of ${ns^2}/{\sigma^2}$ *when the random sample in from* $N(\mu, \sigma^2)$

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