LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

SECOND SEMESTER – **APRIL 2016**

ST 2503 – CONTINUOUS DISTRIBUTIONS

Date: 21-04-2016 Dept. No. Max. : 100 Marks
Time: 01:00-04:00

PART – A

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

1. Define stochastic independence.
2. If X is uniformly distributed with mean 1 and variance 4/3, find f(x).
3. State any four characteristics of the Normal distribution.
4. Under what conditions binomial distribution can be approximated to the Normal distribution.
5. Find the M.G.F. of gamma distribution.
6. Obtain mean of exponential distribution.
7. Define F- Statistic and give its probability density function.
8. State additive property of Chi-Square distribution.
9. Write down p.d.f of k^{th} order statistic.
10. Define stochastic convergence.

PART – B

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

11. Let (X,Y) be a two dimensional continuous random variable with p.d.f

    f(x,y) = 8xy, $0<y<x<1$, find E(Y/X).
12. State and prove linearity property of a normal distribution.
13. Given a normal curve with mean = 25.3 and standard deviation = 8.1, find the area under the curve between 20.6 and 29.1.
14. Obtain mean and variance of exponential distribution.
15. If X has a Cauchy distribution, then find p.d.f. for X^2 and identify the distribution.
16. Let $(X_1, X_2, ...X_n)$ be an n-dimensional random variable, then prove that $X_{(k)}$ the order statistic of order k, $1 \leq k \leq n$ is also a random variable.
17. Subway trains on a certain line run every half hour an between mid – night and six in the morning. What is the probability that a man entering the station at a random time during this period will have to wait atleast twenty minutes?
18. Obtain mean and variance of gamma distribution.

PART –C

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

19. Given

$$f(x,y) = \begin{cases} x\, e^{-x(1+y)} & , x \geq 0, y \geq 0 \\ 0 & , \text{otherwise} \end{cases}$$

find (i) E(XY) (ii) E(YX) and show that E(Y) does not exist.

20. Prove that odd order moments vanishe, but even order moments exist in the case of normal distribution.

21. Obtain relationship between Chi-square, t and F distributions.

22. State and prove Lindeberg-Levy theorem.

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