LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FOURTHSEMESTER – APRIL 2017

ST 4502 / ST 4501 - DISTRIBUTION THEORY

Date: 27-04-2017   Dept. No.   Max. : 100 Marks
01:00-04:00

PART-A

Answer All the Questions: (10x2=20)

1. Define joint probability density function.

2. Define Marginal distribution function.

3. Define Hypergeometric distribution.

4. Define multinomial distribution.

5. Define Cauchy distribution.

6. Define normal distribution.

7. Define chi-square distribution.

8. Define F distribution.

9. Define the pdf of a nth order statistic.

10. Define Stochastic convergence.

PART-B

Answer any Five questions: (5x8=40)

11. 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. Find the mean and variance of Y.

12. Joint distribution of X and Y is given by

    $f(x, y) = 4xye^{-(x^2+y^2)}; x \geq 0, \geq y \geq 0$

    Test whether X and Y are independent. Find the conditional density of X given $Y = y$.

13. Using Moment generating function obtain the first two moments of Binomial distribution.

14. Explain how you will use hypergeometric model to estimate the number of fish in a lake.

15. Show that the exponential distribution 'lacks memory'.

16. State some of the properties of Normal distribution.

17. Obtain the mean and variance of chi square distribution.

18. Show that in odd samples of size n from U[0,1] population, the mean and variance of the distribution of median are ½ and 1/[4(n+2)] respectively.

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PART-C

19. (a). Define Negative binomial distribution also derive its mean and variance .

    (b). Obtain Poison distribution as a limiting case of binomial distribution.

20. (a). Prove that linear combination of independent normal variate is also a normal variate.

 (b). Define Beta distribution of first kind also derive its mean and variance.

21. (a). Derive the sampling distribution of sample mean from a normal population.

    (b). Derive the distribution of t-statistic.

22. (a). Explain the joint pdf of two order statistics.

    (b).Show that for a random sample of size 2 from $N(0,\sigma^2)$ population $E[X_{(1)}] = -\sigma/\sqrt{\pi}.$

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