Reg. No…….. Name……

B.Sc. DEGREE END SEMESTER EXAMINATION OCTOBER 2017

SEMESTER – 3: STATISTICS FOR MATHEMATICS AND BSc COMPUTER APPLICATIONS

COURSE: 15U3CRCST3-15U3CPSTA3; PROBABILITY DISTRIBUTIONS

Common for Regular (2016 Admission) & Supplementary / Improvement (2015 Admission)

Time: Three Hours Max Marks: 75

Use of Scientific calculators and Statistical tables permitted

PART A

Answer ***all*** questions. Each question carries **1** mark.

1. The joint pdf of two dimensional random variable (X,Y) is given by f(x,y)=2,0<x<y<1 and zero elsewhere. What is the marginal density of Y?
2. If X and Y are two independent random variables with standard deviations 3 and 2 respectively, find the variance of 2X-3Y
3. Name the continuous distribution which possess lack of memory property
4. If X follows a binomial distribution with mean 6 and variance 3.6.Find P(X=4).
5. If a normal variate has the points of inflexion at x=2 and x=8.Then find its mean and SD?
6. If $X \sim N(5, 1)$, find the distribution of $Y = X^2 - 10X + 25$
7. State Chebyshevs inequality.
8. What is the mean of F distribution wih (8,12) degrees of freedom?
9. What is the recurrence relation for even order central moments of t distribution with n degrees of freedom?
10. What are the conditions under which Poisson distribution is obtained as a limiting form of binomial? (1 x 10 = 10)

PART B

Each question carries 3 marks. Maximum marks from this part is 15

11. If joint pdf of (X,Y) is f(x,y)=2-x-y, 0<x<1 ,0<y<1 then find the conditional frequency function of Y given x=1/2
12. Define central Limit Theorem. Give the assumptions on CLT
13. What is Renovsky formula? Hence state the skewness of binomial distribution
14. Obtain the mgf of exponential distribution
15. For a Normal distribution mean is 40 and SD is 8.Find the Quartiles of the distribution
16. Define chi-square distribution. State the relation between Normal and Chi-square Distribution.
17. Explain stratified sampling.

PART C

Each question carries 5 marks. Maximum marks from this part is 20

18. The joint pdf of a pair (X,Y)of random variables is given by f(x,y)=(x+y)/21,forx=1,2,3 and y=1,2. Find the conditional density of x given y=2 and conditional density of y given x=1
19. State and Prove the lack of memory property of geometric distribution
20. If X and Y are independent Poisson variates such that P(X=1)=P(X=2) and P(Y=2)=P(Y=3).Find V(2X-3Y)
21. Define t statistic and write the pdf of t distribution. Obtain an example for a statistic following t distribution
22. A horizontal line of length 5 units is divided by a point chosen at random into two parts.If the length of the first part is X, Find E[X(1-X)] .Also find the mgf of X and hence find its mean and variance.
23. Show that Binomial distribution tends to Normal distribution under certain conditions.

PART D

(Each question carries 10 marks. Maximum marks from this part is 30)

24. If f(x,y) = (x+y) for 0 < x ,y < 1 and equal to zero elsewhere is the joint p.d.f. of (X,Y), find the correlation coefficient of X & Y
25. (a)State and prove Bernoulli's law of large numbers. (b) Use Bernoulli's law of large numbers to find the least number of tossing of a fair coin required inorder that the probability will be atleast 0.95. that the frequency ratio of the number of heads will lie between 0.35 & 0.65
26. Obtain the recurrence relation for central moments of Poisson distribution. Hence show that Poisson distribution is positively skewed.
27. Define Chi-square Distribution. Obtain the Karl Pearson's coefficient of skewness for a chi-square distribution with n degrees of freedom

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