Reg. No ..... Name **20U336**

B. Sc DEGREE END SEMESTER EXAMINATION - OCT. 2020 : JANUARY 2021

SEMESTER 3 : STATISTICS FOR B Sc MATHEMATICS / B Sc COMPUTER APPLICATION

COURSE : **19U3CPSTA03 / 19U3CRCST03 : PROBABILITY DISTRIBUTIONS**

(For Regular - 2019 Admission)

Time : Three Hours Max. Marks: 75

PART A

Maximum Marks for this Part is 10

1. What is Cauchy-Schwartz inequality?
2. Let X be a random variable with p.d.f f(X) = (1-X) when $0 \leq X \leq 1$ and zero elsewhere find $E(6X+3X^2)$
3. If X and y are two independent random variables with standard deviations 3 and 2 respectively, find the variance of 2x-3y
4. State the relationship between Poisson distribution and Binomial distribution?
5. The coefficient of skewness of Poisson distribution?
6. A man tosses a fair coin 10 times . find the probability that he will have not more than 5 heads?
7. Find the sum of two gamma variables which are independently distributed?
8. State Bernoulli's law ?
9. If X is a random variable with E(X) =3, V(x) =2, then find k if $P\{|X-3|<2\geq k\}$
10. Find the distribution of sum of squares of independent standard normal variables ?
11. What is sampling error?
12. Write down the mean and S.D. of a chi-square distribution with 10 d.f.?

(1 x 10 = 10)

PART B

Maximum Marks for this Part is 15

13. Define mathematical expectation? Derive multiplication theorem on expectation?
14. find the mean and standard deviation of a random variable X with p.d.f. f(X) =6X(1-X) 0<X<1 and zero elsewhere?
15. During a war one ship out of 9 was sunk on an average in making a certain voyage, what was the probability that 3 out of a convoy of 6 ships would arrive safely?
16. The mean and variance of a binomial variate X with parameter n and p are 16 and 8. Find (1) P(x=0) (2) P(X=1) (3) $P(X\geq 2)$
17. Find the variance of the random variable X which has uniformly distributed between 0 and 1
18. State and prove weak law of large numbers
19. Find the mean of chisqure distribution with 'n' degress of freedom?

(3 x 5 = 15)

PART C

Maximum Marks for this Part is 20

20. Find the M.G.F. of the random variable X whose probability function $P(X=x)= 1/2^x$; x=1,2,3, ... Hence find its mean?
21. Obtain the mode/s of Binomial distribution with parameter n and p?
22. Show that Q.D.:M.D.:S.D.: =10 :12: 15 . for a normal random variable with mean μ and s.d. σ
23. Show that Poisson distribution is positively skewed and lepto kurtic?

24. Two independent random sample of size 8 and 10 are drawn from a normal population. find an upper bound to the ratio of the variances of two samles such that the probability that the ratio exceeding the bound is 0.05.

25. Define (1) simple random samplig (2) systematic sampling (2) stratified sampling

(5 x 4 = 20)

PART D

Maximum Marks for this Part is 30

26. 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 and y?

27. (a) show that for a normal distribution with mean μ, and standard deviation σ, μ_{2r+1} = 1*3*5* . . . (2r-1) σ^{2r} .
(b) If X and Y are independent binomial variates with parameters m and n respectively, then find the conditional distribution of X given X+Y

28. (a) State and prove Tchebycheff's inequality ? (b) Two unbiased dice are thrown and x denotes the sum of the numbers shown. Find an upper bound ato the probability that x will not be between 4 and 10 by using Tchebycheff's inequality.

29. i) Define chi-square distribution and state its applications ii) Define 't' distribution and state its assumptions iii) Define 'F' distribution

(10 x 3 = 30)