SECTION - C (30 Marks)

Answer any **THREE** Questions
ALL Questions Carry **EQUAL** Marks (3 x 10 = 30)

16. Explain skew Hermitian matrix and prove that the diagonal elements of a skew-Hermitian matrix is either zero or pure imaginary.

17. Solve the system of linear equations using Cramer's Rule.
$x+2y+3z = 6;\ 2x+4y+z = 7\ ;\ 3x+2y+9z = 14$

18. Write down the matrix form the system of equations.
$2x-y+3z=9;\ x+y+z=6;\ x-y+z=2$ and Find A^{-1}

19. Verify Cayley-Hamilton theorem Find A^4 and A^{-1} when $A = \begin{bmatrix} 2 & -1 & 2 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$

20. Reduce the quadratic form to a canonical form by an orthogonal reduction $2x_1x_2+2x_1x_3-2x_2x_3$. Also finds its nature.

Z-Z-Z END

PSG COLLEGE OF ARTS & SCIENCE, COIMBATORE
(AUTONOMOUS)

BSc DEGREE EXANINATION DECEMBER 2022
(Third Semester)

Branch - **STATISTICS**

PROBABILITY DISTRIBUTION

Time : Three Hours Maximum : 75 Marks

SECTION – A (20 Marks)
Answer **ALL** Questions
ALL question carry **EQUAL** marks (10x2 =20)

1. State the weak law of large numbers.
2. Explain the Central limit theorem of iid random variable.
3. State the properties of distribution function
4. Define conditional variance
5. The mean and variance of binomial distribution is 6 and 4. Find the $P(X \geq 3)$
6. Write the moment generating function of geometric distribution
7. State the characteristics of normal distribution
8. Give a probability function of Gamma distribution.
9. Define F distribution.
10. Write any two application of Chi square distribution.

SECTION – B (25 Marks)
Answer **ALL** Questions
ALL question carry **EQUAL** marks (5x5 =25)

11. (a) Prove that the moment generating function of the sum of n independent random variables is equal to the product of their respective moment generating function.

(OR)

(b) Give the properties of Characteristic function.

12. (a) The joint probability mass function of (X,Y) is given by $P(x,y) = K(2x+3y)$, $x = 0,1,2$; $y = 1,2,3$. Find the marginal probability distribution of x and Y.

(OR)

(b) Discuss the two dimensional discrete and continuous random variables.

13. (a) State and prove the additive property of Poisson distribution.

(OR)

(b) Explain Binomial and Negative Binomial distribution.

14. (a) Derive the mean and variance of Uniform distribution.

(OR)

(b) State and prove the memory less property of Exponential distribution.

15. (a) Obtain the moment generating function of Chi-Square distribution.

(OR)

(b) Discuss the relation between F and Student's t distribution.

Cont...