Q.1) Find the eigen value adj(A) and $A^2 - 2AI + 1$ if

$$A = \begin{bmatrix} 2 & 3 & 4 \\ 0 & 4 & 2 \\ 0 & 0 & 3 \end{bmatrix}$$

Q.2) Apply C-H-T theorem to $A = \begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$ and hence deduce that $A^8 = 625I$

Q.3) Check whether matrix $A = \begin{bmatrix} 8 & -8 & -2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$ is diagonalizable?

If yes find transforming and diagonal matrix

$$A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$$

Q.4) Find the eigen values of $A^2 - 2A + I$ if $A = \begin{bmatrix} 2 & 1 & -2 \\ 0 & 1 & 4 \\ 0 & 0 & 3 \end{bmatrix}$

Q.5) Verify C-H-T for the matrices hence find A^4, A^{-1}, A^2

$$A = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$$

Q6) Solve by Simplex method

Maximise $Z = 3x_1 + 2x_2$

Sub to $3x_1 + 2x_2 \leq 18$

$0 \leq x_1 \leq 4$

$0 \leq x_2 \leq 6$

$x_1, x_2 \geq 0$

Q.7) Use dual simplex method to solve the L.P.P

Minimise $z = x_1 + x_2$

Sub to $2x_1 + x_2 \geq 2$

$-x_1 - x_2 \geq 1$

$x_1, x_2 \geq 0$

Q.8) Maximise $z = x_1 + 3x_2 + 3x_3$

Sub to $x_1 + 2x_2 + 3x_3 = 4$

$2x_1 + 3x_2 + 5x_3 = 7$

Find all basic solution to the above problem.

Q.9) If a random variable X follows P.D show that $P(x=1) = 2P(x=2)$. Find the mean and variance of distribution. Also Find $P(X=3)$.

Q.10) If a normal distribution 31% of items are under 45 and 8% are over 64. Find mean and S.D of distribution.

Q.11) Based on the data below determine if there is a relation between literacy and smoking.

	Smoking	Non-smoking
literates	83	57
illiterates	45	68

Q.12) The marks of 1000 students in an examination are found to be normaly distributed with means 70 and S.D 5 estimate the no. of students whose marks will be between 60 and 75.

Q.13 A car hire firm has two car which it hires out day by day. The no of demand for a car on each day is distributed as poisson variate with mean 1.5. Calculate the proportion of days on which neither car is used.