Q.1) Solve (1 mark each)

A) Find eigen value & eigen vector corresponding to lowest eigen value

$$\begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$$

B) Verify Cayley Hamilton theorem & find A^{-1} & A^{-2} using Cayley Hamiton theorem

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

C) Given a line segment starting at a point (0,0) ending point is (8,1). Rotate line by 45 degree & find new coordinate.

Q.2) Fill in the blanks(0.5)

A) The given characteristic equation is $\lambda^3 - 7\lambda^2 + 16\lambda - 12 = 0$.The algebraic multiplicity of each eigen value is & eigen values of A^{-2} is

B) Given a square whose coordinates are given by $A \equiv (2,1)$ $B \equiv (3,1)$ $C \equiv (3,4)$ $D \equiv (2,4)$.Translate square by 7 units right & 6 units down. Find new coordinates.

C) The sum & product of eigen values of $A_{n \times n}$ matrix is if A have $\lambda_1, \lambda_2, \lambda_3 \dots \dots \lambda_n$ are eigen values of A.

D) If A is orthogonal matrix if 6 is one eigen value then other eigen value is......