

3) b)  $A = \begin{bmatrix} 0 & 2 & 1 \\ 0 & -75 & -45 \\ 0 & 100 & 60 \end{bmatrix}$   $\lambda_1 = 0, m_1 = 2$   $\lambda_2 = -15$   $J = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & -15 \end{bmatrix}$

ii) Jordan Form Method:

$$(A - \lambda_1 I)q_1 = 0$$

$$q_1 = \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}$$

$$A q_2 = q_1$$

$$0 + 2b + c = 1$$

$$0 - 75b - 45c = 0$$

$$0 + 100b + 60c = 0$$

$$q_2 = \begin{pmatrix} 0 \\ 3 \\ -5 \end{pmatrix}$$

$$(A + 15I)q_3 = 0$$

$$\begin{bmatrix} 15 & 2 & 1 \\ 0 & -60 & -45 \\ 0 & 100 & 75 \end{bmatrix} q_3 = 0$$

$$15a + 2b + c = 0$$

$$0 - 60b - 45c = 0 \rightarrow b = -45$$

$$0 + 100b + 75c = 0 \rightarrow c = 60$$

$$q_3 = \begin{pmatrix} 2 \\ -45 \\ 60 \end{pmatrix} \quad a = 2$$

$$Q = [q_1, q_2, q_3] = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 3 & -45 \\ 0 & -5 & 60 \end{bmatrix}$$

$P(Q) = 3$   
All L.T.