Tutorial-6

Eng. Maths-III (B. Tech-II EEC)

Q.1 Find the rank of the following matrices:

(a) $\begin{pmatrix} 1 & 2 & 3 \\ 1 & 4 & 2 \\ 2 & 6 & 5 \end{pmatrix}$ (b) $\begin{pmatrix} 1 & 3 & 4 & 3 \\ 3 & 9 & 12 & 3 \\ 1 & 3 & 4 & 1 \end{pmatrix}$.

(c) $\begin{pmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{pmatrix}$. (d) $\begin{pmatrix} 2 & -1 & 0 & 5 \\ 0 & 3 & 1 & 4 \end{pmatrix}$.

Q.2 Reduce the the following matrix to triangular form

$$\begin{pmatrix} 3 & -4 & -5 \\ -9 & 1 & 4 \\ -5 & 3 & 1 \end{pmatrix}.$$

Q.3 For the matrix $A = \begin{pmatrix} 1 & 1 & 2 \\ 1 & 2 & 3 \\ 0 & -1 & -1 \end{pmatrix}$, find non-singular matrices P and Q such that PAQ is in the normal form. Hence find the rank of A.

Q.4 Find the inverse of $A = \begin{pmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{pmatrix}$ by elementary row operations.

Q.5 If $A = \begin{pmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{pmatrix}$

(i) find A^{-1} (ii) show that $A^3 = A^{-1}$.