# 5.4.22

INDHIRESH S- EE25BTECH11027

**Question**.Using elementary transformations, find the inverse of the following matrices

$$\begin{pmatrix} 6 & -3 \\ -2 & 1 \end{pmatrix}$$

**Solution**:

Let the given matrix be:

$$\mathbf{A} = \begin{pmatrix} 6 & -3 \\ -2 & 1 \end{pmatrix} \tag{1}$$

Now finding the inverse of a matrix by elementary operation.
Now forming the augmented matrix $[\mathbf{A}|\mathbf{I}]$

$$[\mathbf{A}|\mathbf{I}] = \left(\begin{array}{cc|cc} 6 & -3 & 1 & 0 \\ -2 & 1 & 0 & 1 \end{array}\right) \tag{2}$$

$$\left(\begin{array}{cc|cc} 6 & -3 & 1 & 0 \\ -2 & 1 & 0 & 1 \end{array}\right) \xleftrightarrow{R_2 \leftarrow R_2 + \frac{1}{3}R_1} \left(\begin{array}{cc|cc} 6 & -3 & 1 & 0 \\ 0 & 0 & \frac{1}{3} & 1 \end{array}\right) \tag{3}$$

From above we can observe that the rank of the left-side augmented matrix is 1
Therefore the matrix $\mathbf{A}$ is singular and hence the inverse does not exist for the given matrix