ASSIGNMENT-1

AI21BTECH11029
SURAJ KUMAR

Question ⇒ Given $\begin{bmatrix} 4 & 2 \\ -1 & 1 \end{bmatrix} M = 6I$**,where M is a matrix and I is unit matrix of order** 2×2.

(a) **State the order of matrix M**

solution ⇒

$$\Rightarrow \quad \begin{bmatrix} 4 & 2 \\ -1 & 1 \end{bmatrix} M = 6I$$

here I is unit matrix.
we have to find order of matrix M
let the order the matrix M is

$$\Rightarrow \quad a \times b$$

we know that for multiply two matrix their order must be in the form of (x,y) (y,z) here $x, y, z \in N$ hence order of matrix will be $2 \times b$.
so overall left hand side order is

$$\Rightarrow \quad (2 \times 2) \times (2 \times b) = (2 \times b)$$

for comparing LHS=RHS their order must be same so
order of LHS= $(2 \times b)$, RHS=(2×2)
hence b = 2.
hence the order of matrix M is (2×2).

(b) Find the matrix M

$$A = \begin{bmatrix} 4 & 2 \\ -1 & 1 \end{bmatrix}$$

$$AM = 6I$$

multiply by A^{-1} both side

$$M = A^{-1} \times 6I$$

$$I \times M = M$$

by calculation we get

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

$$\text{here } 6I = \begin{bmatrix} 6 & 0 \\ 0 & 6 \end{bmatrix}$$

by calculation we get

$$M = \begin{bmatrix} 1 & -2 \\ 1 & 4 \end{bmatrix}$$