

Topic List

Admission Corner

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 0 \end{bmatrix} \text{ হলে } A^{12} = ? \text{ [Buet '21-22]}$$

$$A^{-1} = \begin{bmatrix} 0 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$$

$$\begin{aligned} A^{12} &= (A^3)^4 \\ &= (I_3)^4 \\ &= I_3 \end{aligned}$$

$$A^3 = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} = I_3$$

$$\therefore A^{12} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \quad (A)$$

$$A = \begin{bmatrix} 0 & 0 & 2i \\ 0 & -2i & 0 \\ 2i & 0 & 0 \end{bmatrix} \text{ হলে } A^2 + 4I_3 = ? [i^2 = -1]$$

$$A^2 = \begin{bmatrix} 0 & 0 & 2i \\ 0 & -2i & 0 \\ 2i & 0 & 0 \end{bmatrix} \begin{bmatrix} 0 & 0 & 2i \\ 0 & -2i & 0 \\ 2i & 0 & 0 \end{bmatrix}$$

$$= \begin{bmatrix} 4i^2 & 0 & 0 \\ 0 & 4i^2 & 0 \\ 0 & 0 & 4i^2 \end{bmatrix}$$

$$= \begin{bmatrix} -4 & 0 & 0 \\ 0 & -4 & 0 \\ 0 & 0 & -4 \end{bmatrix}$$

$$A^2 + 4I_3 = \begin{bmatrix} -4 & 0 & 0 \\ 0 & -4 & 0 \\ 0 & 0 & -4 \end{bmatrix} + 4 \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} -4 & 0 & 0 \\ 0 & -4 & 0 \\ 0 & 0 & -4 \end{bmatrix} + \begin{bmatrix} 4 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & 4 \end{bmatrix}$$

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

$$A = \begin{bmatrix} \cos x & -\sin x \\ \sin x & \cos x \end{bmatrix} \quad A + A^t = I \text{ হলে } x = ? \quad (x \text{ একটি সূক্ষকোন})$$

$$A + A^t = I$$

$$\Rightarrow \begin{bmatrix} \cos x & -\sin x \\ \sin x & \cos x \end{bmatrix}_{2 \times 2} + \begin{bmatrix} \cos x & \sin x \\ -\sin x & \cos x \end{bmatrix}_{2 \times 2} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$\Rightarrow \begin{bmatrix} 2\cos x & 0 \\ 0 & 2\cos x \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$2\cos x = 1$$

$$\Rightarrow \cos x = \frac{1}{2}$$

$$\therefore \boxed{x = 30^\circ / \frac{\pi}{6}}$$

(Ans)