

## Matrices and Determinants - Class XII

### Past Year JEE Questions

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#### Questions

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##### Question: 01

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If A is a symmetric matrix and B is a skew-symmetric matrix such that  $A + B = \begin{bmatrix} 2 & 3 \\ 5 & -1 \end{bmatrix}$ , then

AB is equal to :

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

B.  $\begin{bmatrix} -4 & -2 \\ -1 & 4 \end{bmatrix}$

C.  $\begin{bmatrix} -4 & 2 \\ 1 & 4 \end{bmatrix}$

D.  $\begin{bmatrix} 4 & -2 \\ -1 & -4 \end{bmatrix}$

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#### Solutions

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##### Solution: 01

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##### Explanation

$$A + B = \begin{bmatrix} 2 & 3 \\ 5 & -1 \end{bmatrix} = P(\text{say})$$

$$\text{Now } A = \frac{P+P^t}{2} \text{ \& } B = \frac{P-P^t}{2}$$

$$\text{So } A = \frac{1}{2} \left( \begin{bmatrix} 2 & 3 \\ 5 & -1 \end{bmatrix} + \begin{bmatrix} 2 & 5 \\ 3 & -1 \end{bmatrix} \right) = \begin{bmatrix} 2 & 4 \\ 4 & -1 \end{bmatrix}$$

$$B = \frac{1}{2} \left( \begin{bmatrix} 2 & 3 \\ 5 & -1 \end{bmatrix} - \begin{bmatrix} 2 & 5 \\ 3 & -1 \end{bmatrix} \right) = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$$

$$\text{So } AB = \left( \begin{bmatrix} 2 & 4 \\ 4 & -1 \end{bmatrix} \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix} \right) = \begin{bmatrix} 4 & -2 \\ -1 & -4 \end{bmatrix}$$