

Step-1

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Given block matrix is $M = \begin{bmatrix} A & B \\ C & D \end{bmatrix}$.

We have to find M^T .

Step-2

Since $M = \begin{bmatrix} A & B \\ C & D \end{bmatrix}$

So $M^T = \begin{bmatrix} A & B \\ C & D \end{bmatrix}$

Hence the transpose of the given block matrix is $\boxed{M^T = \begin{bmatrix} A & B \\ C & D \end{bmatrix}}$.

Step-3

The given block matrix is symmetric if $C = B$.