

Q- $M, N \Rightarrow 3 \times 3$ Non-singular skew symmetric matrices such that $MN = NM$. If P^T denotes transpose of P , then $M^2 N^2 (M^T N)^{-1} (MN^{-1})^T$ is equal to

- a) M^2 b) $-N^2$ c) $-M^2$ d) MN

$$\begin{aligned} M^2 N^2 (M^T N)^{-1} (MN^{-1})^T &= M^2 N^2 (-MN)^{-1} (MN^{-1})^T \\ &= M^2 N^2 (-MN)^{-1} \{ (N^{-1})^T M^T \} \end{aligned}$$

$$\left\{ \begin{array}{l} M, N \Rightarrow \text{skew symmetric,} \\ \text{So, } M^T = -M, N^T = -N \end{array} \right\}$$

$$\begin{aligned} &= -M^2 N^2 (N^{-1} M^{-1}) \{ (N^{-1})^T (-M) \} \\ &= -M(MN)(NN^{-1})M^{-1} \{ (-N)^{-1} (-M) \} \end{aligned}$$

$$\left\{ \begin{array}{l} MN = NM, \text{ given} \\ (-A)^{-1} = -(A)^{-1} \end{array} \right\}$$

$$\begin{aligned} &= -M(NM)M^{-1}(N^{-1}M) \\ &= -MN(MM^{-1})N^{-1}M \\ &= -M(NN^{-1})M \\ &= -M^2 \end{aligned}$$

option (c) is correct