

If A is a 3×3 non-singular matrix such that $AA^T = A^T A$ and $B = A^{-1}A^T$, then BB^T equals

(a) $I+B$

(b) I

(c) B^{-1}

(d) $(B^{-1})^T$

Solution:

Given that $AA^T = A^T A$ and $B = A^{-1}A^T$

$$BB^T = (A^{-1}A^T)(A^{-1}A^T)^T$$

$$= A^{-1}A^T A(A^{-1})^T \text{ (since } (A^T)^T = A)$$

$$= A^{-1}A A^T(A^T)^{-1}$$

$$= I.I$$

$$= I$$

Hence option b is the answer.