30. If A is a 3×3 non-singular matrix such that $AA' = A'A$ and $B = A^{-1}A'$, then BB' equals: **[JEE M 2014]**

  (a) B^{-1} (b) $\left(B^{-1}\right)'$ (c) $I + B$ (d) I

Soln- $AA' = A'A$ & $B = A^{-1} A'$

$$BB' = (A^{-1} A')(A^{-1} A')'$$
$$= (A^{-1} A')(A (A^{-1})')$$
$$= A^{-1}(A' A)(A^{-1})'$$
$$= A^{-1}(A A')(A')^{-1}$$
$$= (A^{-1} A)(A'(A')^{-1})$$
$$= I \cdot I$$
$$= I$$

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

d) is correct.