

**Q. 48** If  $A, B$  are square matrices of same order and  $B$  is a skew-symmetric matrix, then show that  $A'BA$  is skew-symmetric.

**Sol.** Since,  $A$  and  $B$  are square matrices of same order and  $B$  is a skew-symmetric matrix *i.e.*,  $B' = -B$ .

Now, we have to prove that  $A'BA$  is a skew-symmetric matrix.

$$\begin{aligned} \therefore A'BA' &= A'BA' = BA'A' && [\because AB' = B'A'] \\ &= A'B'A = A'(-B)A = -A'BA \end{aligned}$$

Hence,  $A'BA$  is a skew-symmetric matrix.