



If P is an orthogonal matrix and $Q = PAP^T$ and $B = P^T Q^{1000} P$, then B^{-1} is (where A is involutory matrix)

Solution: $B = P^T Q^{1000} P$

$$= P^T (PAP^T)^{1000} P$$

$$= P^T PAP^T \cdot PAP^T \dots PAP^T P \quad P^T P = I$$

$$= A^{1000} = I \quad A^{2k} = I$$

$$B = I$$

$$B^{-1} = I$$

A

A

B

A^{1000}

C

I

D

None of these