

Let A & B be two invertible matrices of order 3×3 . If $\det(ABA^T) = 8$ and $\det(AB^{-1}) = 8$, then $\det(BA^{-1}B^T)$ is equal to :

Solution:

$$|ABA^T| = 8$$

$$\Rightarrow |A| |B| |A^T| = 8$$

$$\Rightarrow |A|^2 |B| = 8$$

$$\det(AB^{-1}) = 8$$

$$|AB^{-1}| = 8$$

$$\Rightarrow |A| |B^{-1}| = 8$$

$$\Rightarrow \frac{|A|}{|B|} = 8$$

$$|A|^3 = 64$$

$$\Rightarrow |A| = 4 \quad \& \quad |B| = \frac{1}{2}$$

$$\det(BA^{-1}B^T)$$

$$= |B| \cdot \frac{1}{|A|} \cdot |B|$$

$$= \frac{1}{2} \cdot \frac{1}{4} \cdot \frac{1}{2}$$

$$= \frac{1}{16}$$

JEE MAIN JAN 2019

A

16

B

1

C

$\frac{1}{16}$

D

$\frac{1}{4}$