

The vector  $\vec{a} \times (\vec{b} \times \vec{a})$  is coplanar with:

**A**  $\vec{a}$  only

**B**  $\vec{b}$  only

**C** Both  $\vec{a}$  and  $\vec{b}$

**D** Neither  $\vec{a}$  nor  $\vec{b}$

# Answer

Given

$$\vec{a} \times (\vec{b} \times \vec{a})$$

$$(\vec{a} \cdot \vec{a})\vec{b} - (\vec{a} \cdot \vec{b})\vec{a}$$

on cross product with a in scalar quantity

$$(\vec{a} \times (\vec{a} \cdot \vec{a}))\vec{b} - (\vec{a} \times (\vec{a} \cdot \vec{b}))\vec{a}$$

$$[\vec{a}\vec{a}\vec{a}]\vec{b} - [\vec{a}\vec{a}\vec{b}]\vec{a}$$

$$0 - 0 = 0$$

So it is coplanar with a

on cross product with b in scalar quantity

$$(\vec{b} \times (\vec{a} \cdot \vec{a}))\vec{b} - (\vec{b} \times (\vec{a} \cdot \vec{b}))\vec{a}$$

$$[\vec{b}\vec{a}\vec{a}]\vec{b} - [\vec{b}\vec{a}\vec{b}]\vec{a}$$

$$0 - 0 = 0$$

So it is coplanar with b also