Vectors - Class XII

Past Year JEE Questions

Questions

Quetion: 01

Let $\vec{a} = \hat{i} + \hat{j} + \hat{k}$ and $\vec{b} = \hat{j} - \hat{k}$. If $\vec{c}$ is a vector such that $\vec{a} \times \vec{c} = \vec{b}$ and $\vec{a} . \vec{c} = 3$, then $\vec{a} . (\vec{b} \times \vec{c})$ is equal to :

A. –2

B. –6

C. 6

D. 2

Solutions

Solution: 01

Explanation

$|\vec{a}| = \sqrt{3}$; $\vec{a} . \vec{c} = 3$; $\vec{a} \times \vec{b} = -2\hat{i} + \hat{j} + \hat{k}$, $\vec{a} \times \vec{c} = \vec{b}$

Cross with $\vec{a}$,

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

$\Rightarrow (\vec{a} . \vec{c})\vec{a} - a^2\vec{c} = \vec{a} \times \vec{b}$

$\Rightarrow 3\vec{a} - 3\vec{c} = -2\hat{i} + \hat{j} + \hat{k}$

$\Rightarrow 3\hat{i} + 3\hat{j} + 3\hat{k} - 3\vec{c} = -2\hat{i} + \hat{j} + \hat{k}$

$\Rightarrow \vec{c} = \frac{5i}{3} + \frac{2j}{3} + \frac{2\hat{k}}{3}$

$\therefore \vec{a} . (\vec{b} \times \vec{c}) = (\vec{a} \times \vec{b}) . \vec{c} = \frac{-10}{3} + \frac{2}{3} + \frac{2}{3} = -2$