

Vectors - Class XII

Past Year JEE Questions

Questions

Question: 01

$$\text{If } \vec{a} = \alpha\hat{i} + \beta\hat{j} + 3\hat{k},$$

$$\vec{b} = -\beta\hat{i} - \alpha\hat{j} - \hat{k} \text{ and}$$

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

such that $\vec{a} \cdot \vec{b} = 1$ and $\vec{b} \cdot \vec{c} = -3$, then $\frac{1}{3}((\vec{a} \times \vec{b}) \cdot \vec{c})$ is equal to _____.

Solutions

Solution: 01

Answer

Correct Answer is **2**

Explanation

$$\vec{a} \cdot \vec{b} = 1 \Rightarrow -\alpha\beta - \alpha\beta - 3 = 1$$

$$\Rightarrow \alpha\beta = -2 \dots (i)$$

$$\vec{b} \cdot \vec{c} = -3 \Rightarrow -\beta + 2\alpha + 1 = -3$$

$$2\alpha - \beta = -4 \dots (ii)$$

Solving (i) & (ii) $\alpha = -1, \beta = 2$,

$$\frac{1}{3}((\vec{a} \times \vec{b}) \cdot \vec{c}) = \frac{1}{3} \begin{vmatrix} -1 & 2 & 3 \\ -2 & 1 & -1 \\ 1 & -2 & -1 \end{vmatrix} = 2$$