Physics 101Rec
Quiz#2-Sect04
Chapter3

Name: Key Id:

The relationship between three vectors is given by $\vec{\tau} = \vec{r} \times \vec{F}$. Take $\vec{r} = 5\hat{j}$, $\vec{\tau} = 10\hat{k}$, and the y component of $\vec{F}$ is zero. Find the vector $\vec{F}$ in unit vector notation.

$$\vec{r} = 5\hat{j} \qquad \vec{F} = F_x \hat{i} + F_z \hat{k}$$

$$\vec{r} \times \vec{F} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 0 & 5 & 0 \\ F_x & 0 & F_y \end{vmatrix}$$

$$10\hat{k} = +5F_y \hat{i} - 5F_x \hat{k}$$

$$\Rightarrow \quad F_y = 0 \quad \text{and} \quad F_x = -2$$

$$\Rightarrow \quad \vec{F} = -2\hat{i}$$