

Q Find torque of a force $7\hat{i} + 3\hat{j} - 5\hat{k}$ about origin. The force acts on a particle whose position vector is $\hat{i} - \hat{j} + \hat{k}$.

sol

$$\vec{r} = \hat{i} - \hat{j} + \hat{k}$$

$$\vec{F} = 7\hat{i} + 3\hat{j} - 5\hat{k}$$

$$\vec{\tau} = \vec{r} \times \vec{F}$$

$$\tau = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & -1 & 1 \\ 7 & 3 & -5 \end{vmatrix} = 2\hat{i} + 12\hat{j} + 10\hat{k}$$