

Ch 12 p. 332 #40

$$\begin{aligned} 40) \quad \vec{F} &= -10\hat{j} \text{ N} \\ \vec{r} &= (5\hat{i} + 5\hat{j}) \text{ m} \end{aligned}$$

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

$$\begin{aligned} &= (5\hat{i} + 5\hat{j}) \times (-10\hat{j}) \\ &= (5\hat{i} \times -10\hat{j}) + (5\hat{j} \times -10\hat{j}) \\ &= -50(\hat{i} \times \hat{j}) - 50(\hat{j} \times \hat{j}) \end{aligned}$$

$$= -50\hat{k} - 0$$

$$= \boxed{(-50\hat{k}) \text{ Nm}}$$