

27.1

Datos

$$q = -1.24 \cdot 10^{-8} \text{ C}$$

$$\vec{v} = (4.19 \cdot 10^4 \text{ m/s}) \hat{i} + (-3.85 \cdot 10^4 \text{ m/s}) \hat{j}$$

 $\vec{F}_m = ?$

$$\text{Para } \vec{B} = (1.4 \text{ T}) \hat{i}$$

$$\vec{F}_m = q \vec{v} \times \vec{B}$$

$$\vec{F}_m = q (\vec{v} \times \vec{B})$$

$$\vec{F}_m = (-1.24 \cdot 10^{-8}) \cdot \left[(4.19 \cdot 10^4 \text{ m/s}) \hat{i} (1.4 \text{ T}) \hat{i} + (-3.85 \cdot 10^4 \text{ m/s}) \hat{j} (1.4 \text{ T}) \hat{i} \right]$$

$$\vec{F}_m = (-1.24 \cdot 10^{-8} \text{ C}) (-3.85 \cdot 10^4 \text{ m/s}) \hat{j} (1.4 \text{ T}) \hat{i}$$

El primer término es nulo porque el producto vectorial de los vectores unitarios $\hat{i} \times \hat{i} = 0$

$$\vec{F}_m = (-6.68 \cdot 10^{-4} \text{ N}) \hat{k}$$

El signo negativo lo introduce el producto vectorial entre $\hat{j} \times \hat{i} = -\hat{k}$

$$\text{Para } \vec{B} = (1.40 \text{ T}) \hat{k}$$

$$\vec{F}_m = q \vec{v} \times \vec{B}$$

$$\vec{F}_m = (-1.24 \cdot 10^{-8} \text{ C}) (1.4 \text{ T}) \left[(4.19 \cdot 10^4 \text{ m/s}) \hat{i} \times \hat{k} - (3.85 \cdot 10^4 \text{ m/s}) \hat{j} \times \hat{k} \right]$$

$$\vec{F}_m = (-7.27 \cdot 10^{-4} \text{ N}) (-\hat{j}) + (6.68 \cdot 10^{-4} \text{ N}) \hat{i}$$

Se considera el producto vectorial $\hat{i} \times \hat{k} = -\hat{j}$;
 $\hat{j} \times \hat{k} = \hat{i}$