Resumen

Producto Vectorial

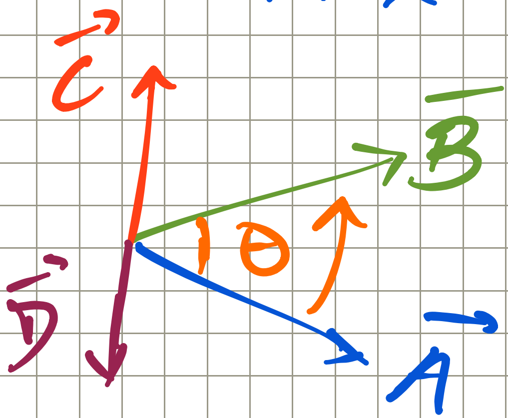
→ producto escalar

vector × vector ⟶ Número

→ producto vectorial

vector × vector ⟶ vector

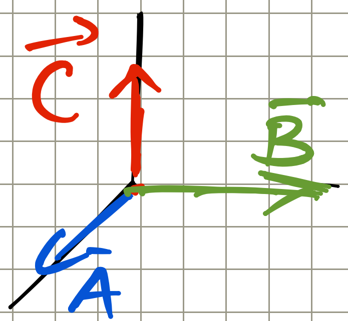
$\vec{A} \times \vec{B} \longrightarrow \vec{C}$



$$\vec{C} = \vec{A} \times \vec{B}$$

$$|\vec{C}| = |\vec{A}|\,|\vec{B}|\,\mathrm{sen}(\theta)$$

$$\vec{D} = \vec{B} \times \vec{A}$$



Fuerza de Lorentz

$$\vec{F} = \vec{F_e} + \vec{F_B}$$

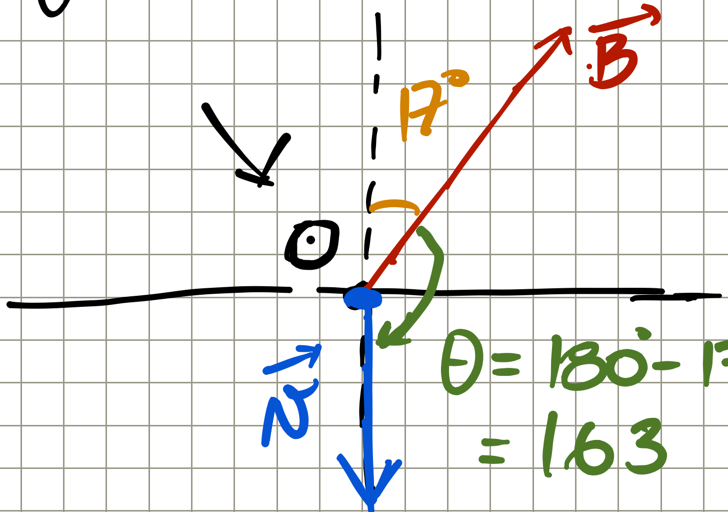
$$\boxed{\vec{F} = Q\left(\vec{E} + \vec{v} \times \vec{B}\right)}$$

Ejercicio 1: P3

$|\vec{B}| = 5{,}8 \times 10^{-5}\,T$

$$\vec{F_B} = q_e\, \vec{v} \times \vec{B}$$

$$|\vec{F_B}| = |q_e|\,|\vec{v} \times \vec{B}|$$



$\theta = 180° - 17°$
$= 163$

$$\Rightarrow |\vec{F_B}| = |q_e|\,|\vec{v}|\,|\vec{B}|\,\text{sen}(\theta)$$

$$= (1{,}6 \times 10^{-19})(1{,}0 \times 10^{5})(5{,}8 \times 10^{-5})\,\text{sen}(163)$$

$$|\vec{F_B}| = \underline{2{,}7 \times 10^{-19}\,N} \leftarrow$$

Parte b: Queremos $\dfrac{|\vec{F_B}|}{|\vec{P_e}|}$

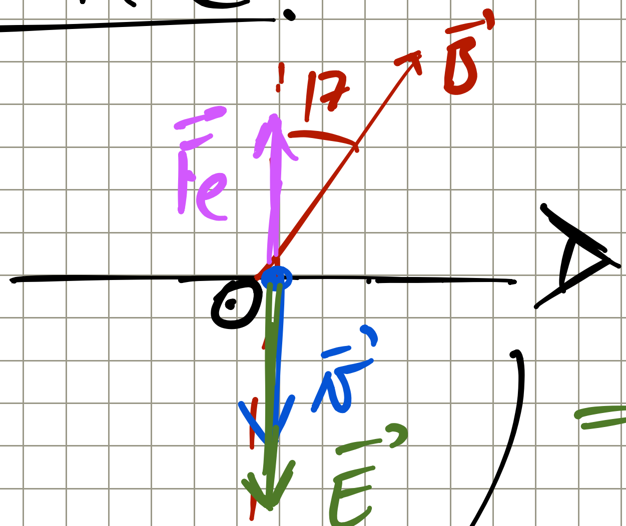
$$P_e = mg = (9{,}11 \times 10^{-31}\,kg) \cdot 9{,}8$$

$$= 8,9\times10^{-30}$$

$$\frac{|F_B|}{|P_e|} = \frac{2,7\times10^{-19}}{8,9\times10^{-30}} = \underbrace{3,0\times10^{10}}_{}$$

$$\underbrace{3\,000\ldots00}_{10 \text{ ceros}}$$

parte c:



$$|\vec{E}| = 120\ V/m$$

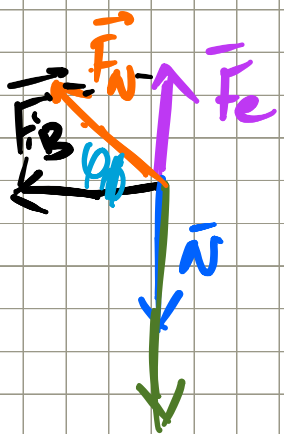
$$= ?$$

$$\Rightarrow \vec{F} = q_e\vec{E}$$

$$= |q_e||\vec{E}|$$

$$= (1,6\times10^{-19}).120$$

$$|\vec{F_e}| = 1,9\times10^{-17}N$$



$$\vec{F_N} = \vec{F_e} + \vec{F_B}$$

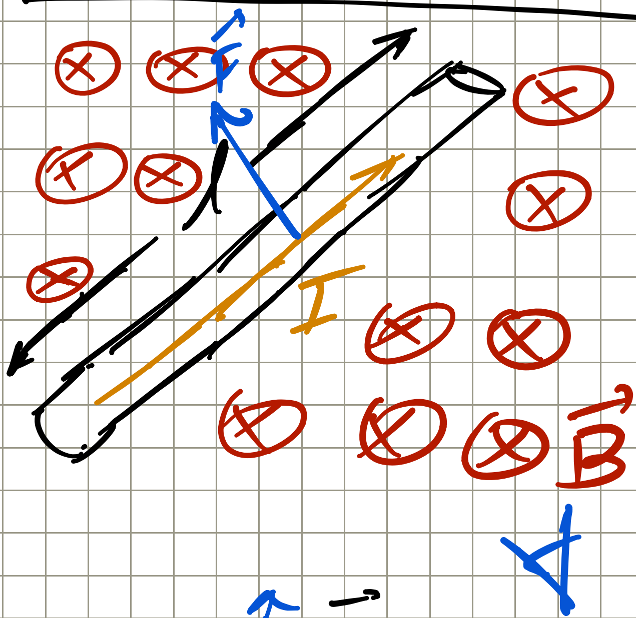
$$|\vec{F_N}| = \sqrt{|\vec{F_e}|^2 + |\vec{F_B}|^2} = 1,9\times10^{-17}N$$

$$Tg(\varphi) = \frac{|\vec{F_e}|}{|\vec{F_B}|} \Rightarrow \varphi = Tg^{-1}\left(\frac{|\vec{F_e}|}{|\vec{F_B}|}\right)$$

$$\vec{F_N} = |\_\_| \measuredangle \_\_^{\circ}$$

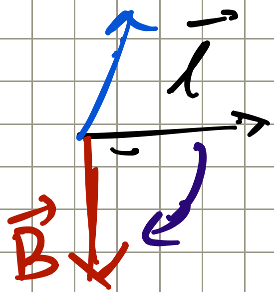
Resumen 2

Fuerza sobre un conductor:



$$\boxed{\vec{F} = I\,\vec{l} \times \vec{B}}$$

$$|\vec{F}| = |I|\,|\vec{l}|\,|\vec{B}|\ \sin(\theta)$$

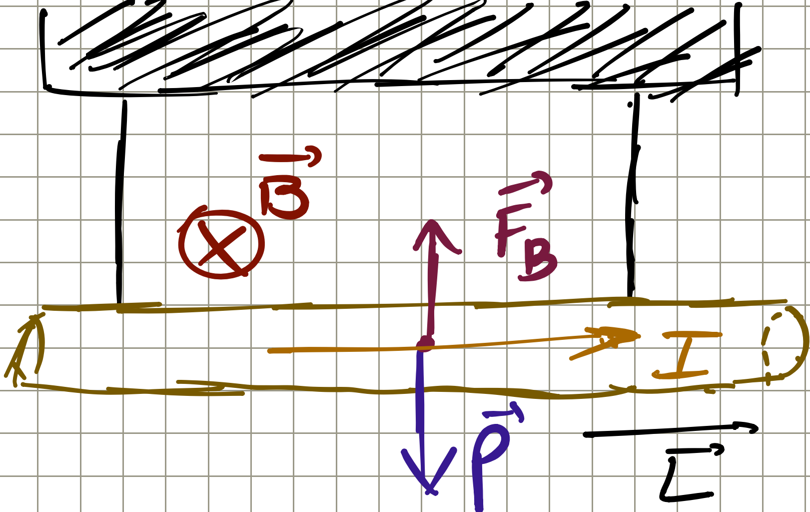


Ejercicio 3.1.7:

$\lambda = 9040\ kg/m$

$$\boxed{\lambda = \frac{M}{l}}$$

$|\vec{B}| = 3{,}6\,T$



Queremos I tal que $\vec{F}_N = 0$

→ Pensemos: I (Izquierda)

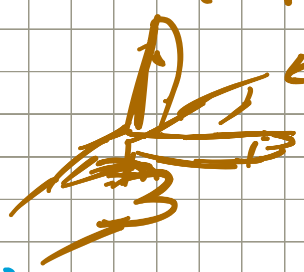
$$\vec{F} = I \vec{l} \times \vec{B}$$

en ese caso $\vec{F}_B$ es hacia abajo

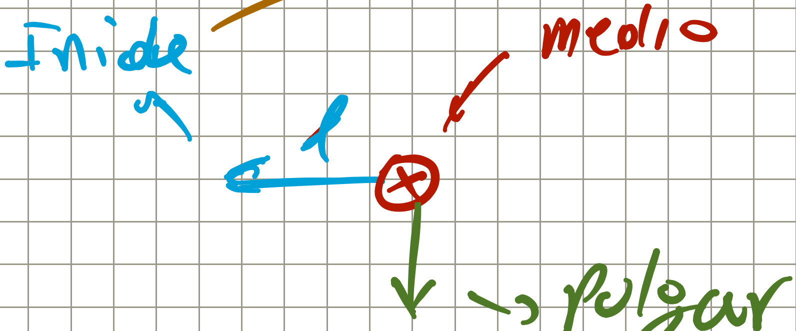
→ Pensamos, I (Derecha)

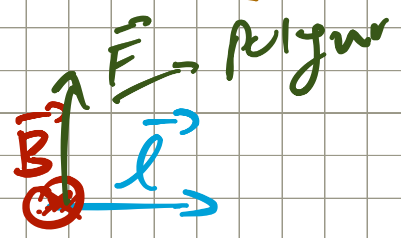
← pulgar en resultado

← medio en 2do vector



← Indice en 1er vector





En el eje Y: $|F_B| - |P| = 0$

$$|F_B| = |P|$$

$$I |\vec{L}| |\vec{B}| . \sin(90) = mg$$

$\sin(90) = 1$

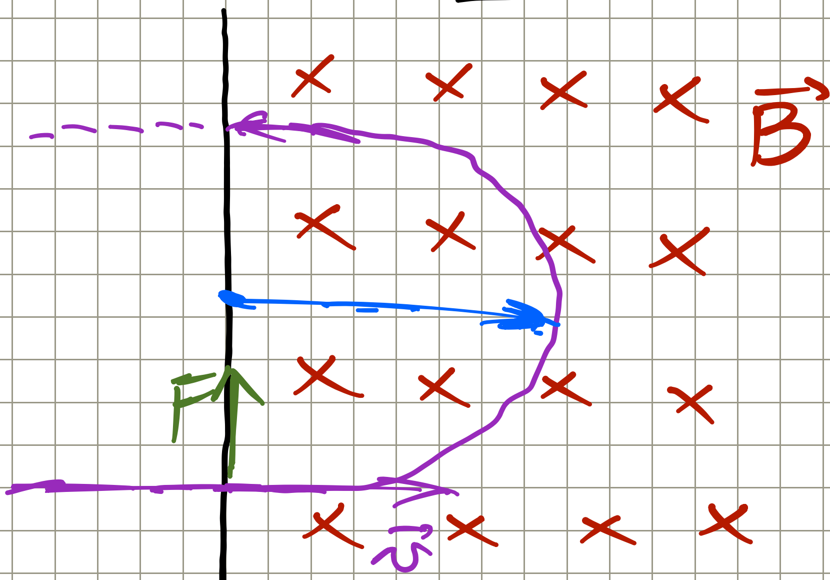
$$\Rightarrow I\,|\vec{L}|\,|\vec{B}| = mg$$

$$m = L\lambda$$

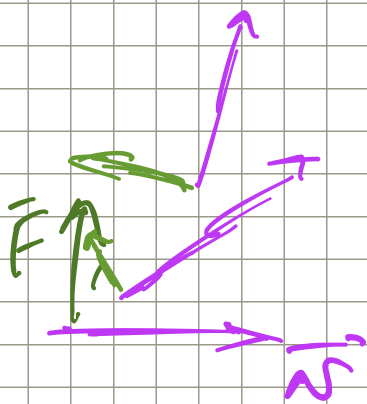
$$I\,|\cancel{\vec{L}}|\,|\vec{B}| = \overbrace{\cancel{L}\cdot\lambda}^{m} g$$

$$\Rightarrow I = \frac{\lambda g}{|\vec{B}|} = 0{,}11\ \mathrm{A}$$

Resumen 3

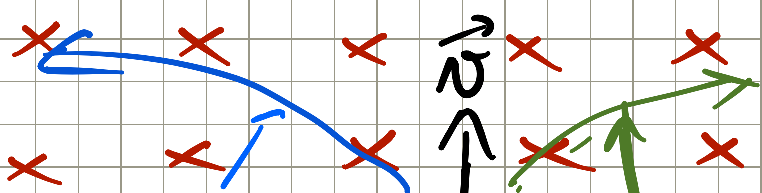


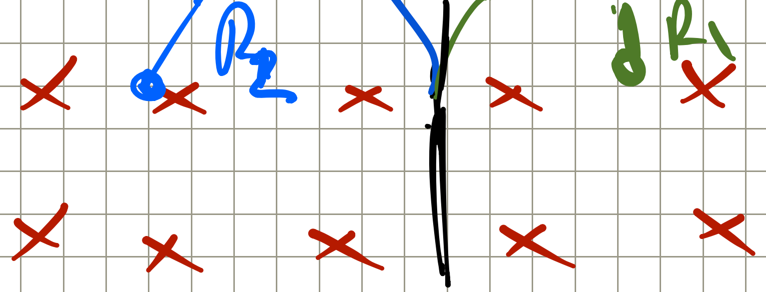
$$\vec{F}_B = q\,\vec{v}\times\vec{B}$$



$$\boxed{R = \frac{m\cdot|\vec{v}|}{|q|\,|\vec{B}|}}$$

Ejercicio 3.1.6





$R_1 < R_2$

Parte a: $\vec{F} = q\,\vec{v} \times \vec{B}$

"mano derecha"

Azul: p^+

Verde: e^-

Parte b: "Cantidad de movimiento" $= \vec{P} = m \cdot \vec{v}$

$$R = \frac{|P|}{|q||\vec{B}|} = \frac{m v}{|q||B|}$$

= para ambas partículas

$\Rightarrow$ Como $R_2 > R_1 \Rightarrow |P_2| > |P_1|$

Parte c:

$$\frac{v_{p^+}}{v_{e^-}} = \frac{\dfrac{R_2 |q_{p^+}| |B|}{m_{p^+}}}{\dfrac{R_1 |q_{e^-}| |B|}{m_{e^-}}}$$

$$\frac{v_{p^+}}{v_{e^-}} = \frac{R_2 / m_{p^+}}{R_1 / m_{e^-}} = \frac{R_2 \, m_{e^-}}{m_{p^+} \, R_1}$$