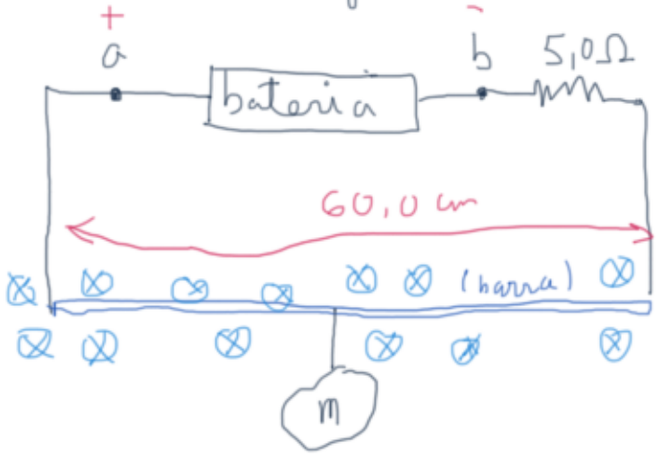
# 27.40, p. 235

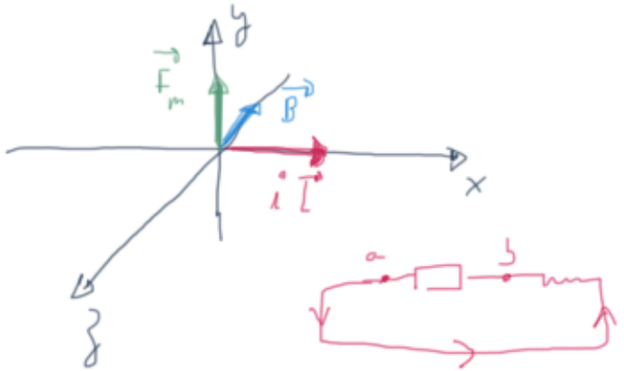
(Balança magnética)




$B = 1{,}50\,T$

a)


$$\vec{F}_m = i\,\vec{L} \wedge \vec{B}$$



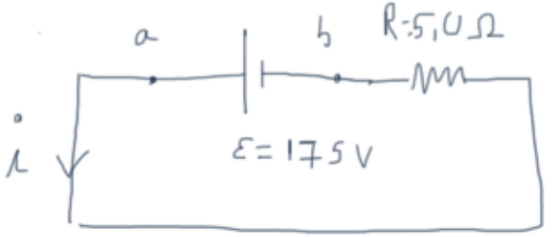

A corrente precisa estar no sentido anti-horário, de modo que a é o terminal positivo.

b) $V_a - V_b = V_{ab} = 175\,V$ (máximo)

$$F_m = P$$

$$i \cdot L B \sin\theta = mg$$

$$i\,LB = mg \rightarrow m = \frac{i\,LB}{g}$$




Partindo de a: $-5{,}0 \cdot i + \varepsilon = 0$

$$i = \frac{\varepsilon}{5{,}0} = \frac{175}{5{,}0} = 35\,A$$

$$m = \frac{35 \cdot 0{,}600 \cdot 1{,}50}{9{,}8}$$

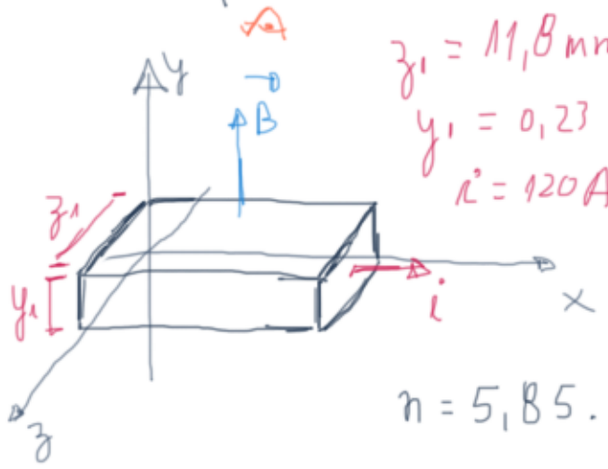
$$\boxed{m = 3{,}2\,kg}$$

$$m(i) = i \cdot C$$

$\sigma_m$ ↓ $\sigma_i$ ↓ $\sigma_c$

# 27.51, p.237

(Efeito Hall)




$z_1 = 11,8\ mm$ $B = 0,95\ T$

$y_1 = 0,23\ mm$

$i = 120\ A$

$n = 5,85 \cdot 10^{28} \frac{eletrons}{m^3}$

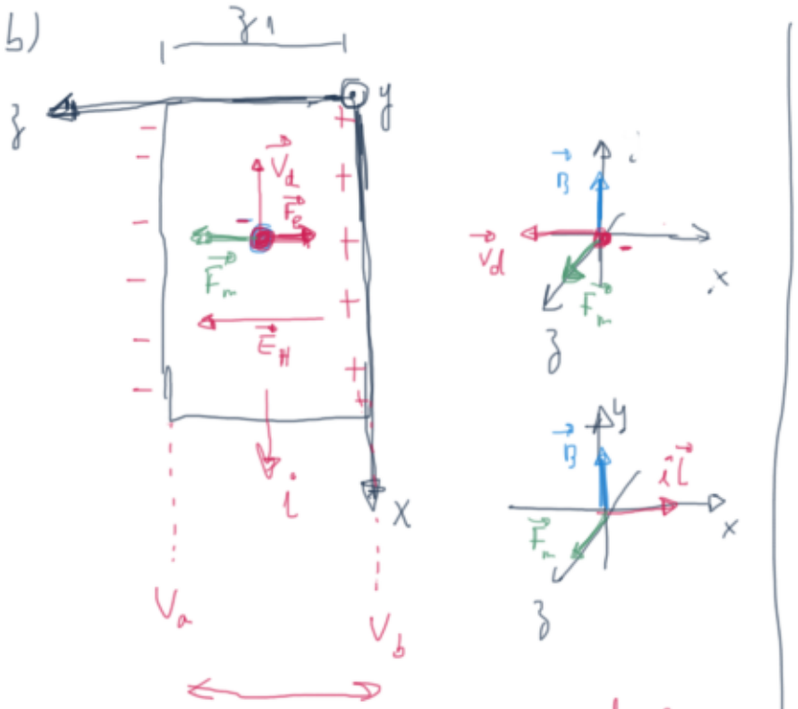
a) $V_d = ?$

$$V_d = \frac{J}{nq} = \frac{i}{neA} = \quad (J = i/A)$$

$$= \frac{120}{5,85 \cdot 10^{28} \cdot 1,60 \cdot 10^{-19} \cdot 11,8 \cdot 10^{-3} \cdot 0,23 \cdot 10^{-3}}$$

$$= 4,17 \cdot 10^{-3}\ m/s = 4,17\ \frac{mm}{s}$$

b)







$V_a - V_b < 0 \rightarrow$ portadores são NEGATIVOS

No equilíbrio:

$$F_m = F_e$$

$$\cancel{e} V_d B = \cancel{e} \cdot E_H$$

$$\boxed{E_H = V_d \cdot B}$$

$$\left(V_d = \frac{E_H}{B}\right)$$

$$E_H = 4,17 \cdot 10^{-3} \cdot 0,95$$

$$\boxed{E_H = 4,5 \cdot 10^{-3}\ \frac{V}{m}}$$

c) $\Delta V_H = E_H \cdot z_1$

$$= 4,5 \cdot 10^{-3} \cdot 11,8 \cdot 10^{-3}$$

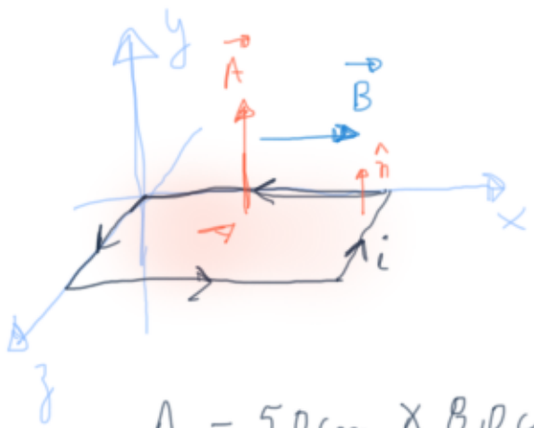
$$\boxed{\Delta V_H = 53 \cdot 10^{-6}\ V}$$

Mais: $\boxed{V_d = \frac{E_H}{B} = \frac{\Delta V_H}{z_1 \cdot B}}$

$$V_d = \frac{i}{neA} \rightarrow \boxed{n = \frac{iB}{e \cdot y_1 \cdot \Delta V_H}}$$

## 27.42, p. 236

(torque numa espira)




$A = 5{,}0\,cm \times 8{,}0\,cm$

$B = 0{,}19\,T$

$i = 6{,}2\,A$

$|\vec{\tau}| = \mu \cdot B \cdot \operatorname{sen}\theta$

a) $\vec{\tau} = \vec{\mu} \wedge \vec{B}$

$\vec{\mu} = N \cdot i \cdot \underbrace{A \cdot \hat{n}}_{\vec{A}}$

$\vec{\tau} = \underbrace{N}_{1} \cdot i \cdot A \underbrace{\hat{n}}_{\hat{j}} \wedge (0{,}19\hat{i})$

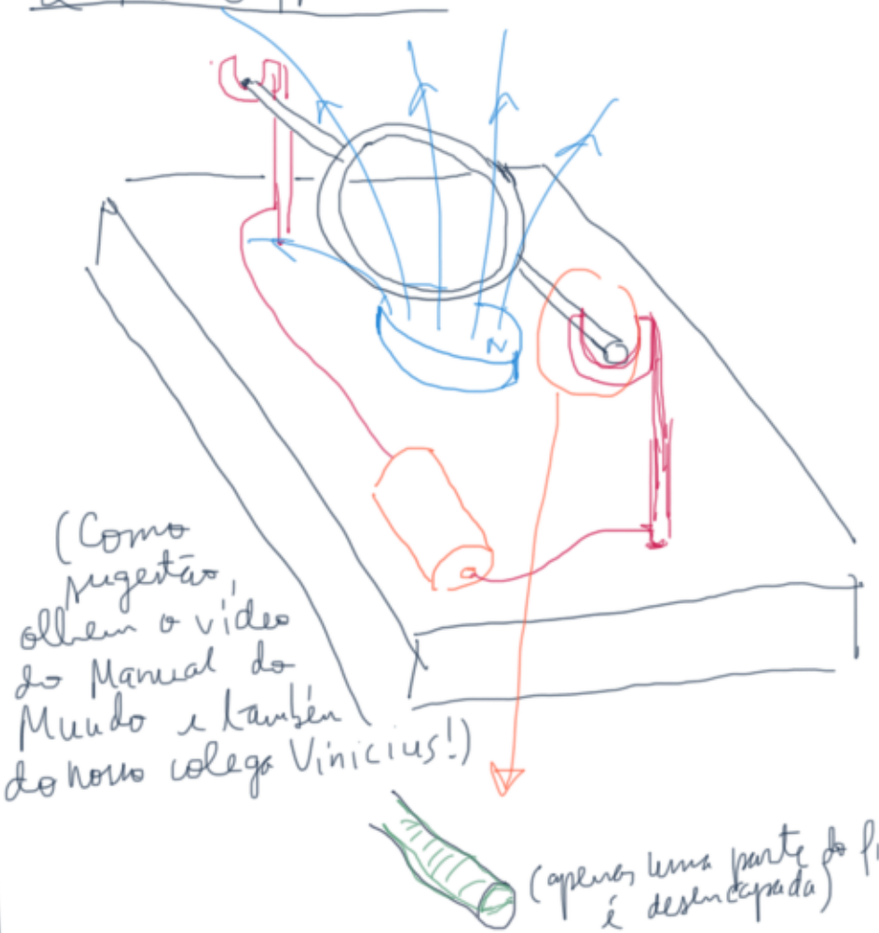
$\vec{\tau} = 1 \cdot 6{,}2 \cdot 40 \cdot 10^{-4} \cdot 0{,}19\, \hat{j} \wedge \hat{i}$

$\boxed{\vec{\tau} = 4{,}7 \cdot 10^{-3}\,(-\hat{k})\ (N \cdot m)}$

b) $\vec{\mu} = N \cdot i \cdot A \cdot \hat{n}$

$\boxed{\vec{\mu} = 2{,}5 \cdot 10^{-2}\,\hat{j}\ (A \cdot m^2)}$

## 27.48, p. 236




(Como sugestão, olhem o vídeo do Manual do Mundo e também do nosso colega Vinicius!)

Tentem resolver esse exercício e na próxima aula conversamos!