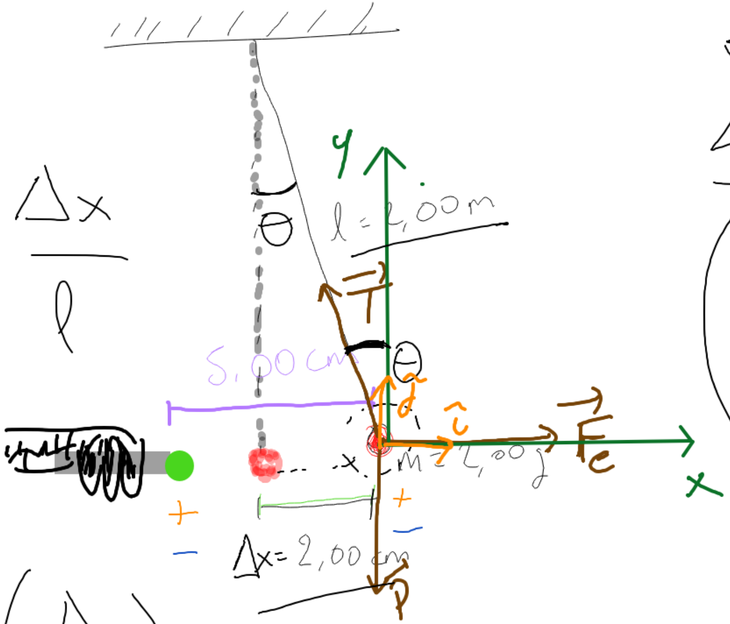
1.1.b)



$$\operatorname{sen}\theta = \frac{\Delta x}{l}$$

$$\theta = \operatorname{sen}^{-1}\left(\frac{\Delta x}{l}\right)$$

$$\begin{cases} \theta = 0.573^\circ \\ \theta = 0.0100\,\text{rad} \end{cases}$$

$$\sum \vec{F} = 0 = m.\vec{a}$$ 2ª ley de Newton.

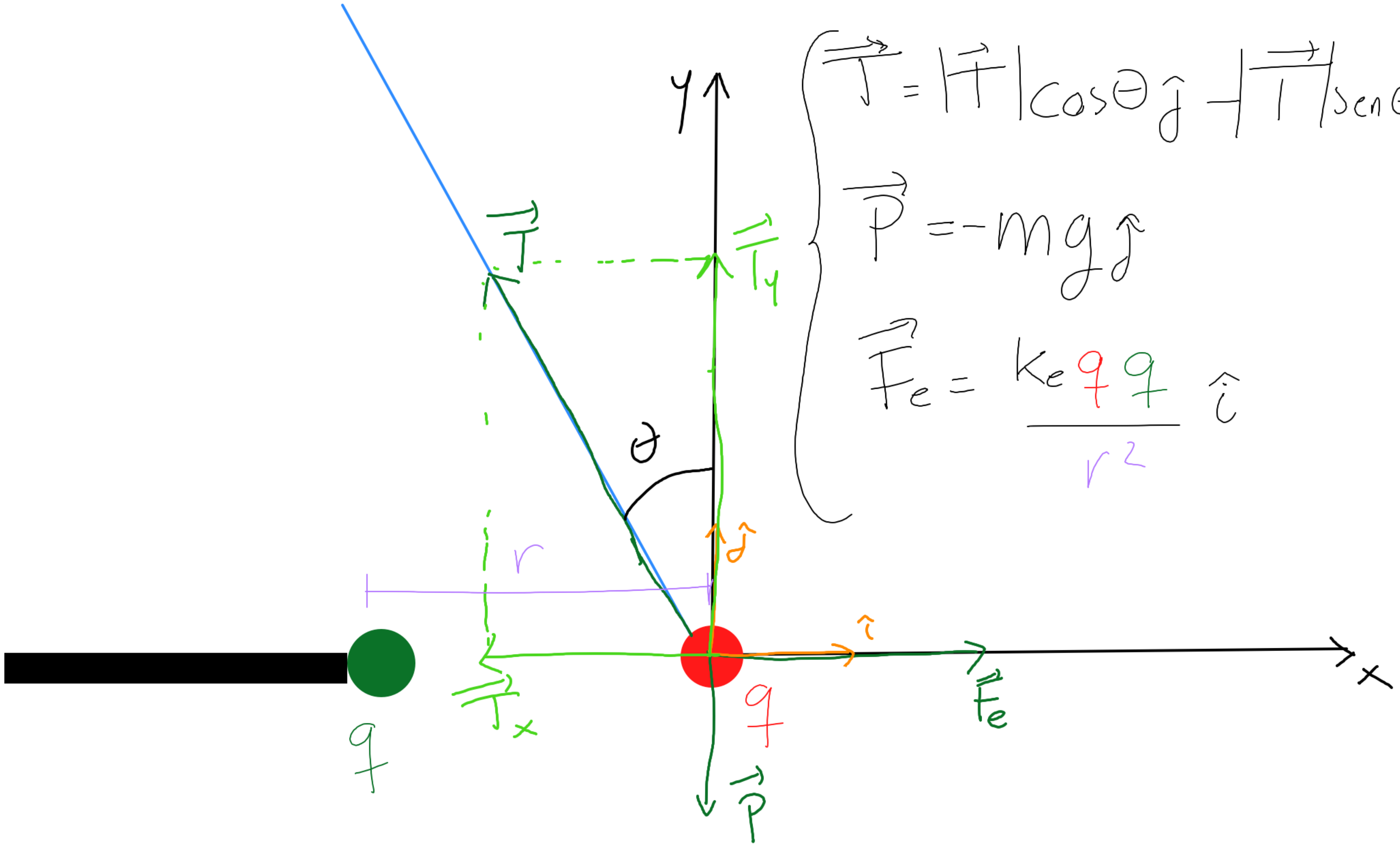
$$\vec{P} + \vec{T} + \vec{F}_e = 0$$

$$\sum \vec{F} = 0 \Longleftrightarrow \begin{cases} \sum \vec{F}_x = 0 \\ \sum \vec{F}_y = 0 \end{cases}$$

$$x: \quad \vec{F}_e + \vec{T}_x = 0$$

$$y: \quad \vec{P} + \vec{T}_y = 0$$

$$\vec{T} = T\cos\theta\,\hat{j}$$



$$
\begin{cases}
\vec{T} = |\vec{T}|\cos\theta\,\hat{j} + |\vec{T}|\,\text{sen}\,\theta\,\hat{i} \\
\vec{P} = -mg\,\hat{j} \\
\vec{F}_e = \dfrac{k_e\,q\,q}{r^2}\,\hat{i}
\end{cases}
$$

$$y:\ T\cos\theta\,\hat{j} - mg\,\hat{j} = 0 \Rightarrow T = \frac{mg}{\cos\theta} = \frac{(\overset{2.00\times10^{-3}\,kg}{\overset{\shortparallel}{2.00\,g}})(9.81\,m/s^2)}{\cos(0.573^\circ)}$$

$$\boxed{T = 0.0196\ N}$$

$$x:\ \frac{k_e q^2}{r^2}\,\hat{i} - T\,\mathrm{sen}\,\theta\,\hat{i} = 0 \Rightarrow q^2 = \frac{T\,\mathrm{sen}\,\theta\, r^2}{k_e}$$

$$k_e = 8.98\times10^{9}\ \frac{Nm^2}{C^2}$$

$$q = \pm\sqrt{\frac{T\,\mathrm{sen}\,\theta\, r^2}{k_e}} = \pm 7.39\times10^{-9}\,C$$

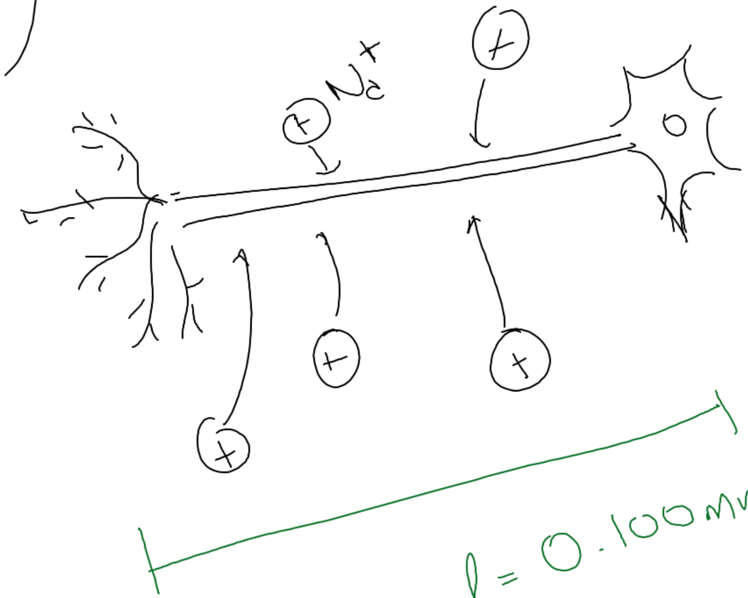
No tiene unidades

$$q = \pm\sqrt{\frac{(0.0196\,\cancel{N})\,\mathrm{Sen}(0.573^\circ)\,(5.00\times10^{-2}\,\cancel{m})^{\cancel{2}}}{8.98\times10^{9}\,\frac{\cancel{N}\,\cancel{m^{2}}}{C^{2}}}}$$

C^2

C

1.17)



$l = 0.100\,mm = \underline{\underline{1.00}} \times 10^{-4}\,m$

Por metro: $\underline{\underline{5.60}} \times 10^{11}$ iones de Na^+

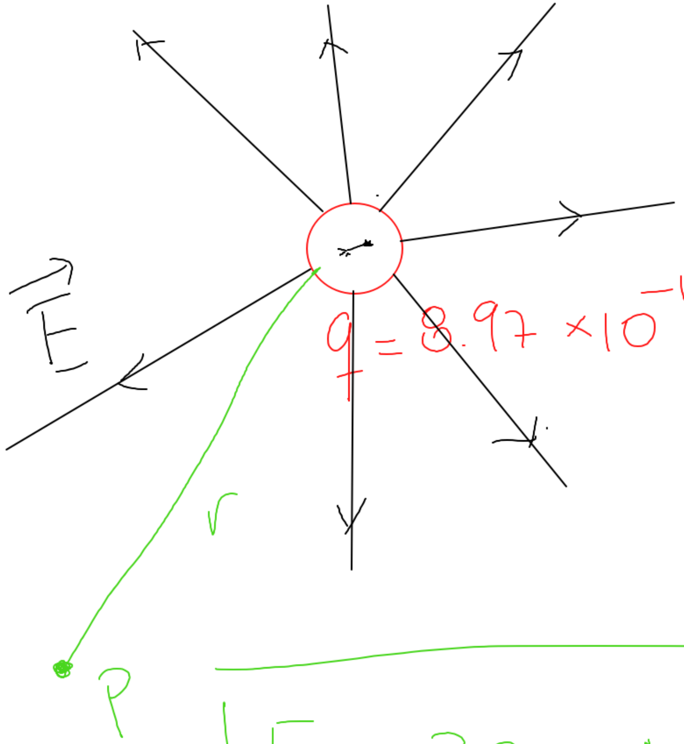
$q_{Na^+} = +e$

$q_{Na^+} = 1.602 \times 10^{-19}\,C$

En el axón: $\underline{5.60} \times 10^{7}$ iones de Na^+

Carga en el axón: $\boxed{Q = 8.97 \times 10^{-12}\,C}$

Campo de una carga puntual: $E = \frac{k_e q}{r^2}$ $\quad \hat{r} = \frac{\vec{r}}{r}$



$q = 8.97 \times 10^{-12}\,C$

$$\vec{E} = \frac{k_e q}{r^2}\underbrace{\hat{r}}_{\text{largo 1}}$$

$$\vec{E} = \frac{k_e q}{r^3}\vec{r}$$ Indica sentido

$$\boxed{E = 32{,}2\ N/C}$$

Un tiburón de testa: $E = 1.00 \times 10^{-6}$ N/C $(1\ \mu N/C)$

Carga del axón: $q = 8.97 \times 10^{-12}$ C

¿A qué distancia? $E = \dfrac{k_e q}{r^2} \longrightarrow r = \sqrt{\dfrac{k_e q}{E}} = 2.82 \times 10^{2}$ m