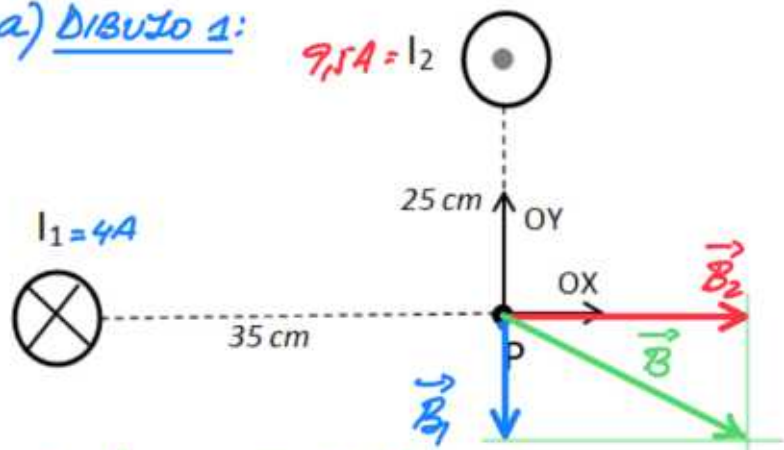


EJERCICIO F2BE3363:

"achiimages.com"

$$\begin{aligned} I_1 &= 4A \\ I_2 &= 9,5A \\ d_1 &= 0,35m \\ d_2 &= 0,25m \\ \mu_0 &= 4\pi \cdot 10^{-7} \frac{T \cdot m}{A} \end{aligned}$$

a) DIBUJO 1:



b) $\vec{B}_1 = ?$ Según la ley de Biot-Savart:

$$B = \frac{\mu_0 I}{2\pi d} \Rightarrow B_1 = \frac{\mu_0 I_1}{2\pi d_1} = \frac{4\pi \cdot 10^{-7} \cdot 4}{2\pi \cdot 0,35} = 2,29 \cdot 10^{-6} T$$

$$\vec{B}_1 = -2,29 \cdot 10^{-6} \vec{j} (T)$$

c) $\vec{B}_2 = ?$

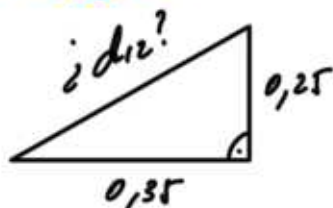
$$B_2 = \frac{\mu_0 I_2}{2\pi d_2} = \frac{4\pi \cdot 10^{-7} \cdot 9,5}{2\pi \cdot 0,25} = 7,6 \cdot 10^{-6} T$$

$$\vec{B}_2 = 7,6 \cdot 10^{-6} \vec{i} (T)$$

d) $\vec{B} = \vec{B}_1 + \vec{B}_2 \Rightarrow \vec{B} = 7,6 \cdot 10^{-6} \vec{i} - 2,29 \cdot 10^{-6} \vec{j} (T)$

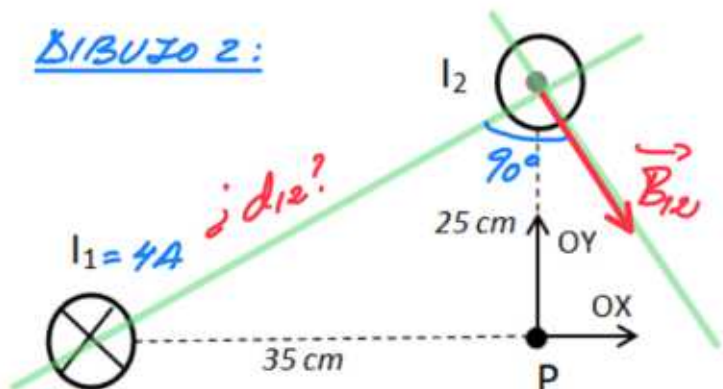
$$|\vec{B}| = \sqrt{(7,6 \cdot 10^{-6})^2 + (-2,29 \cdot 10^{-6})^2} = 7,94 \cdot 10^{-6} T = B$$

e) $\vec{B}_{12} = ?$



$$\begin{aligned} d_{12} &= \sqrt{0,35^2 + 0,25^2} \\ d_{12} &= 0,43m \end{aligned}$$

DIBUJO 2:



$$B_{12} = \frac{\mu_0 I_1}{2\pi \cdot d_{12}} = \frac{4\pi \cdot 10^{-7} \cdot 4}{2\pi \cdot 0,43} = 1,86 \cdot 10^{-6} \text{ T}$$

f) $F_{12} = ?$

$\vec{F} = I_2 \vec{L} \times \vec{B}$ "Modificación de la Ley de Lorentz"
 $(\vec{F} = q\vec{v} \times \vec{B})$
 $|\vec{F}| = I_2 \cdot L_2 \cdot B_{12} \cdot \sin 90^\circ$

$$\frac{F_{12}}{L_2} = I_2 \cdot \frac{\mu_0 I_1}{2\pi d_{12}} = 9,5 \cdot \frac{4\pi \cdot 10^{-7} \cdot 4}{2\pi \cdot 0,43} = 9,5 \cdot 1,86 \cdot 10^{-6}$$

$$\frac{F_{12}}{L} = 1,77 \cdot 10^{-5} \frac{\text{N}}{\text{m}}$$

