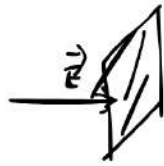
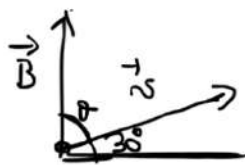


$$\phi(\vec{E}) = \vec{E} \cdot \vec{A} = E \cdot 4\pi R^2 = \frac{1}{\cancel{4\pi\epsilon_0}} \frac{Q}{\cancel{R^2}} \cdot \cancel{4\pi R^2}$$



$$\phi(\vec{E}) = \frac{Q}{\epsilon_0}$$





$$e = 1,6 \cdot 10^{-19} \text{ C}$$

$$\vec{v} \times \vec{B} = v B \sin \theta$$

$$\theta = 60^\circ$$

$$v = 10^5 \frac{\text{m}}{\text{s}}$$

$$\theta = 30^\circ$$

$$F_B = 1,4 \cdot 10^{-6} \text{ N}$$

$$B = ?$$

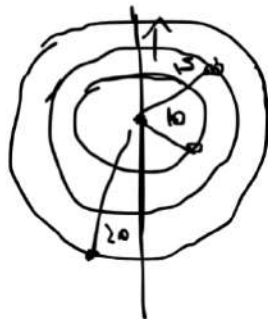
$$\vec{F}_B = e \cdot \vec{v} \times \vec{B}$$

$$F_B = e \cdot v \cdot B \sin \theta$$

$$B = \frac{F_B}{e v \sin \theta} = \frac{1,4 \cdot 10^{-6} \text{ N}}{1,6 \cdot 10^{-19} \text{ C} \cdot 10^5 \frac{\text{m}}{\text{s}} \cdot \sin 60^\circ}$$

$$= \frac{1,4}{1,6 \cdot \sin 60^\circ} \cdot \frac{10^{-6} \cdot 10^{19} \cdot 10^{-5}}{\text{T}} =$$

$$= \underline{1,01 \cdot 10^8 \text{ T}} \approx \underline{10^8 \text{ T}}$$



$$I = 10 \text{ mA}$$

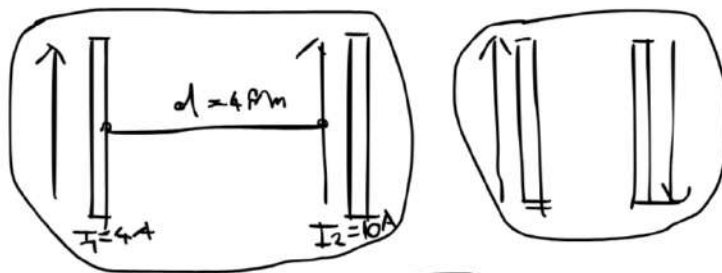
$$B = \frac{\mu_0 I}{2\pi r} \quad r = 10 \text{ cm}$$

$$\mu_0 = 4\pi \cdot 10^{-7} \frac{\text{N}}{\text{A}^2}$$

$$B = \frac{4\pi \cdot 10^{-7} \frac{\text{N}}{\text{A}^2} \cdot 10 \cdot 10^{-3} \text{ A}}{2\pi \cdot 0,1 \text{ m}}$$

$$B = \frac{2 \cdot 10^{-7} \cdot 10^{-2} \frac{\text{N}}{\text{A} \cdot \text{m}}}{10^{-1}}$$

$$B = 2 \cdot 10^{-9} \cdot 10^1 \frac{\text{N}}{\text{A} \cdot \text{m}} \quad \boxed{B = 2 \cdot 10^{-8} \text{ T}}$$



$$F_A = B I_2 L = \frac{\mu_0 I_1 I_2 L}{2\pi d}$$

$$\frac{F_A}{L} = \frac{\mu_0 I_1 I_2}{2\pi d} = \frac{2 \cdot 10^{-7} \frac{N}{A^2} \cdot 4A \cdot 10A}{4 \cdot 10^{-2} m}$$

$$\frac{F_A}{L} = 2 \cdot \frac{10^{-7} \cdot 10}{10^{-2}} \frac{N}{m}$$

$$\frac{F_A}{L} = 2 \cdot 10^{-4} \frac{N}{m} = 0,2 \cdot 10^{-3} \frac{N}{m}$$