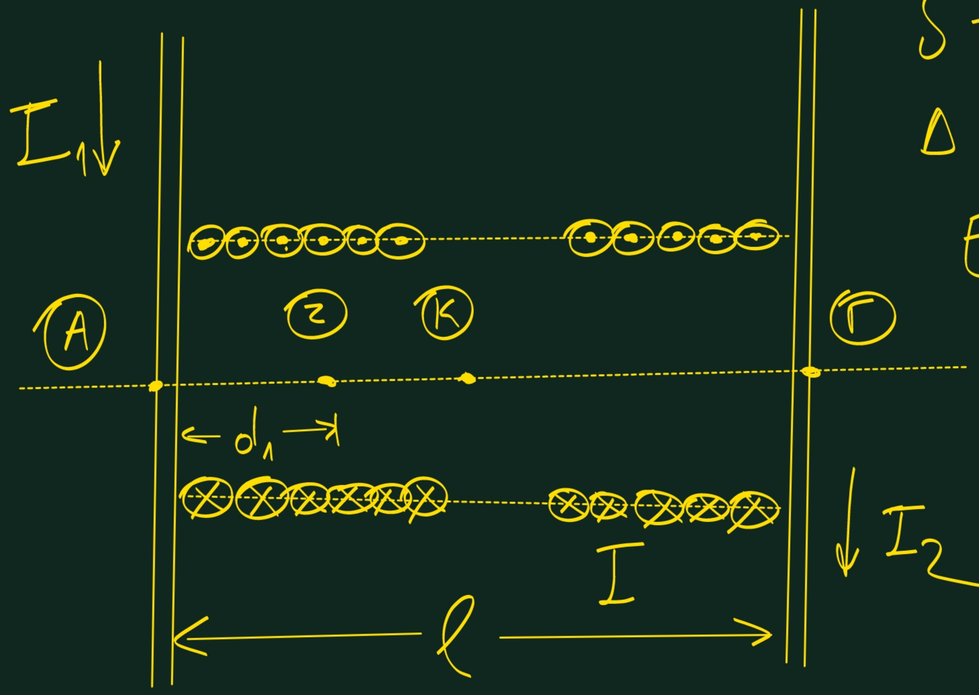
Άσκ. 2.259.



$L = 32\pi$ m

$S = 1$ mm

$\Delta = 4$ cm

$E = 3$ V.M

$r = 2{,}2\,\Omega$

$I = 80\pi$ A

$d_1 = 0{,}2$ m

α) $L = N \cdot \pi\Delta \Rightarrow$

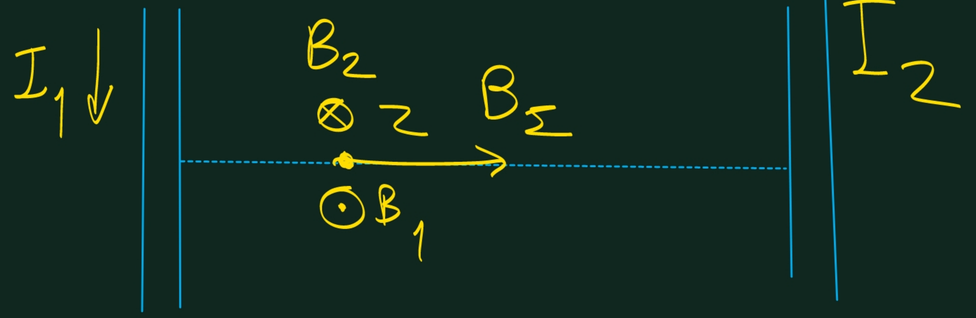
$32\pi = N \cdot \pi \cdot 4 \cdot 10^{-2} \Rightarrow$

$N = \dfrac{32}{4 \cdot 10^{-2}} \Rightarrow N = 800$ σπείρες.

β) $\ell = N \cdot S \Rightarrow$

$\ell = 800 \cdot 10^{-3} = 0{,}8$ m

Άρα: $n = \dfrac{N}{\ell} = \dfrac{800}{0{,}8} = 10^3$ σπ/m



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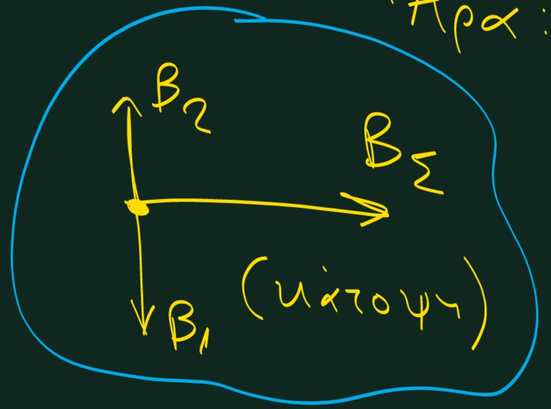

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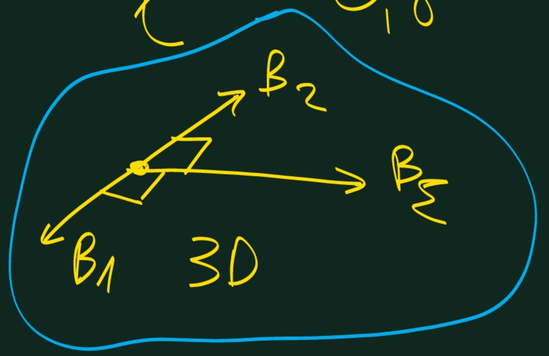


$\delta)$ $B_1 \cdot 2\pi d_1 = \mu_0 I_1 \Rightarrow$

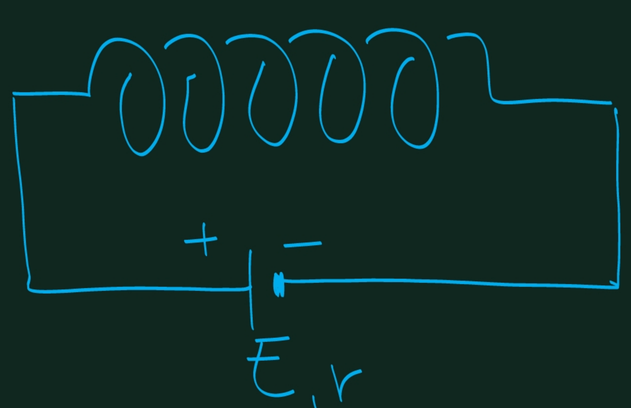
$$B_1 = \frac{\mu_0 I_1}{2\pi d_1}$$

$$B_2 = \frac{\mu_0 I_2}{2\pi(\ell - d_1)}$$

$B_1 = B_2 \Rightarrow \frac{I_1}{d_1} = \frac{I_2}{\ell - d_1} \Rightarrow \frac{80\pi}{0,2} = \frac{I_2}{0,8-0,2} \Rightarrow$

$$\frac{80\pi}{0,2} = \frac{I_2}{0,6} \Rightarrow I_2 = 240\pi \text{ A}.$$

$\varepsilon)$



$$I = \frac{E}{R_\Sigma + r} = \frac{3}{2,2+12,8} = \frac{3}{15} \Rightarrow$$

$$I = 0,2 \text{ A}.$$

$$B_\Sigma = \mu_0 n \cdot I = 4\pi \cdot 10^{-7} \cdot 10^3 \cdot 0,2 = 0,8\pi \cdot 10^{-4} \Rightarrow$$

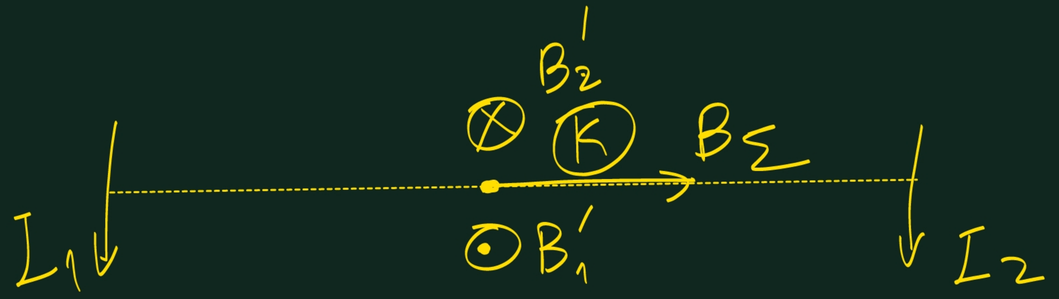
$8\pi \cdot 10^{-5}$ Tesla

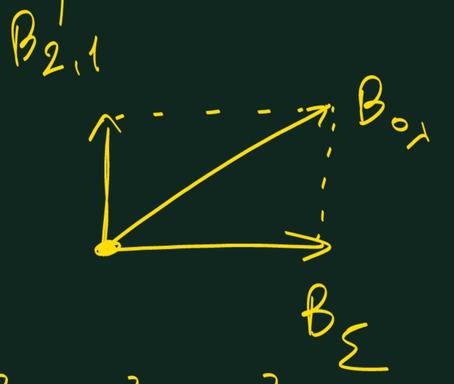
$$R_\Sigma = \rho \cdot \frac{L}{A} = \frac{\rho L}{\frac{\pi S^2}{4}} \Rightarrow$$

$$R_\Sigma = \frac{4\rho L}{\pi S^2} \Rightarrow$$

$$R_\Sigma = \frac{4 \cdot 10^{-7} \cdot 32\pi}{\pi \cdot 10^{-6}} = 128 \cdot 10^{-1} =$$

$$= 12,8\ \Omega$$





$$B_{2,1}' = B_2' - B_1' =$$

$$8\pi \cdot 10^{-5} \text{ Tesla}.$$

$$B_\Sigma = 8\pi \cdot 10^{-5} \text{ T}$$

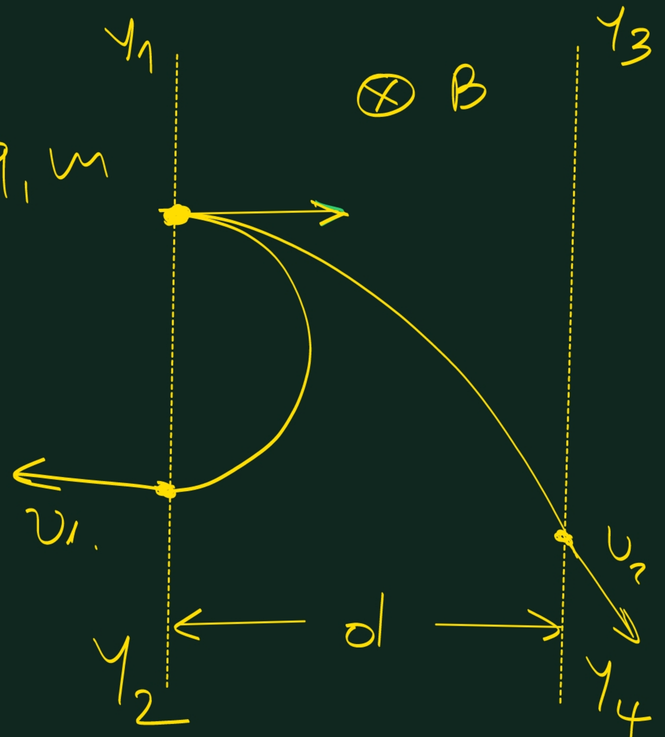
Αρα: $B_{o\lambda}^2 = B_\Sigma^2 + B_{2,1}'^2 = 2(8\pi \cdot 10^{-5})^2 \Rightarrow B_{o\lambda} = 8\sqrt{2}\pi \cdot 10^{-5}$ Tesla.

$$B_1' = \frac{\mu_0}{2\pi} \cdot \frac{I_1}{\frac{\ell}{2}} = \frac{4\pi \cdot 10^{-7}}{2\pi} \cdot \frac{80\pi}{0{,}4} = 2 \cdot 10^{-7} \cdot 200\pi = 4\pi \cdot 10^{-5} \text{ Tesla}.$$

$$B_2' = \frac{\mu_0}{2\pi} \cdot \frac{I_2}{\frac{\ell}{2}} = 3B_1' \quad (\text{αφού } I_2 = 3I_1)$$

Αρα: $B_2' = 12\pi \cdot 10^{-5}$ Tesla

Ασκ. 3.82.



Ταχύτητα v_1 βγαίνει από το Y_1Y_2 σε χρονική διάρκεια

$$\Delta t_1 = \frac{T}{2}$$

Ταχύτητα v_2 βγαίνει από το Y_3Y_4 σε χρόνο $\Delta t_2 = \frac{\Delta t_1}{6} = \frac{T}{12}$