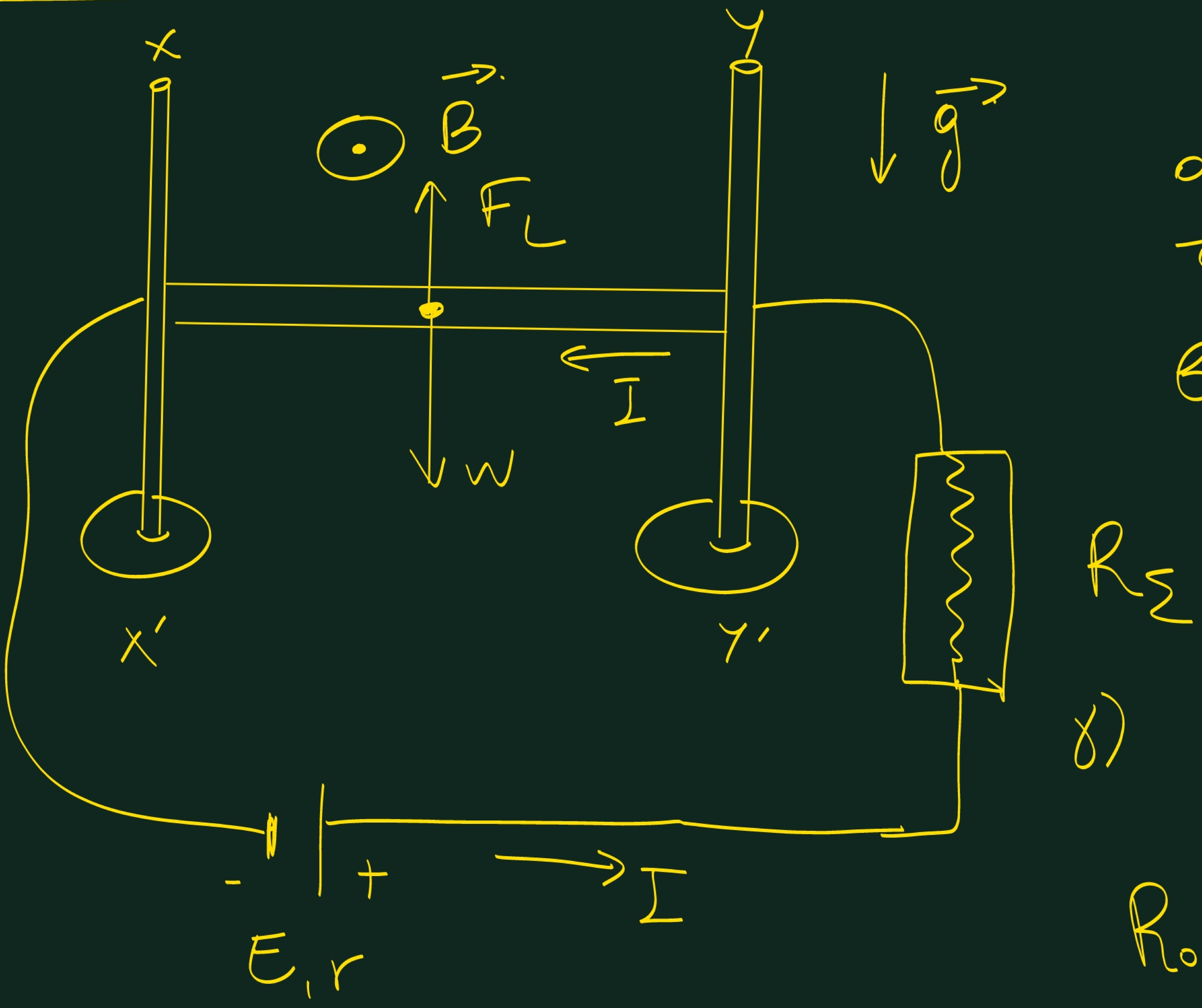
Άσκ. 4.88.

$\ell = 1m$ $\quad m = 0{,}2\ kg$ $\quad R_1 = 4\Omega$ $\quad E = 50V$ $\quad r = 1\Omega$

$B = 0{,}4\ Tesla$



α) Η φορά των δυναμικών γραμμών του $\vec{B}$ είναι προς τα έξω.

β) $mg = BI\ell \Rightarrow$

$0{,}2 \cdot 10 = 0{,}4 \cdot I \cdot 1 \Rightarrow$

$I = 5A$

γ) $R_{ολ} = \dfrac{E}{I} = \dfrac{50}{5} = 10\Omega$

$R_{ολ} = R_1 + r + R_\Sigma \Rightarrow 10 = 4 + 1 + R_\Sigma \Rightarrow$

$R_\Sigma = 5\Omega$

$V_K = I \cdot R_\Sigma \Rightarrow$

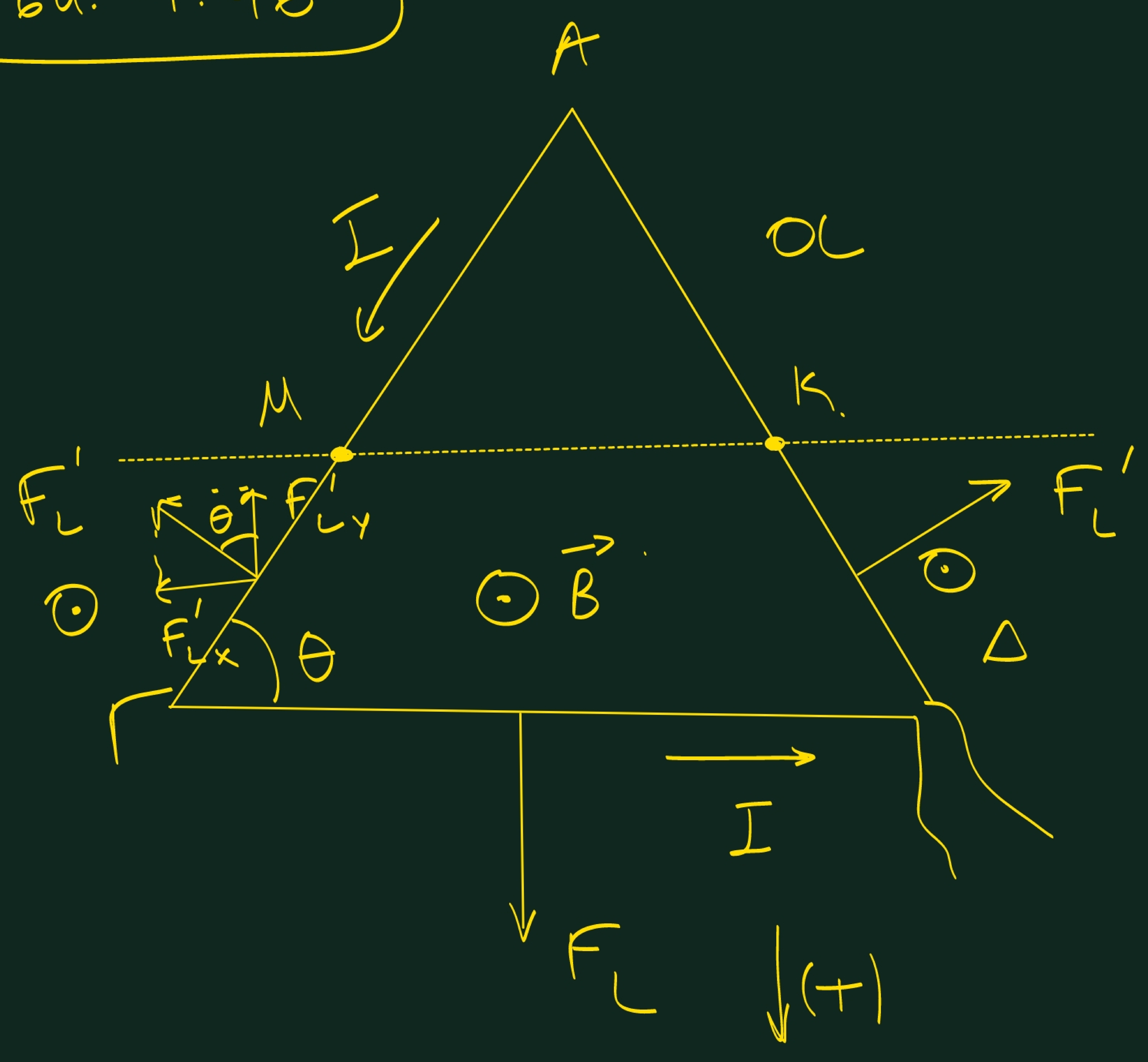
$V_K = 25\ Volt$

$P_K = \dfrac{V_K^2}{R_\Sigma} \Rightarrow$

$P_K = \dfrac{625}{5} \Rightarrow$

$P_K = 125\ Watt$

Ασκ. 4.46.



$$F_L = BI(\Gamma\Delta) = BI\alpha$$

$$F_L' = BI(\Gamma M) = BI\cdot\frac{\alpha}{2}$$

$$F_{Ly}' = F_L'\cdot\sigma\upsilon\nu\theta = BI\frac{\alpha}{2}\cdot\sigma\upsilon\nu 60^\circ = \frac{BI\alpha}{4}$$

$$\Sigma F_x = F_{Lx}' - F_{Lx}' = 0$$

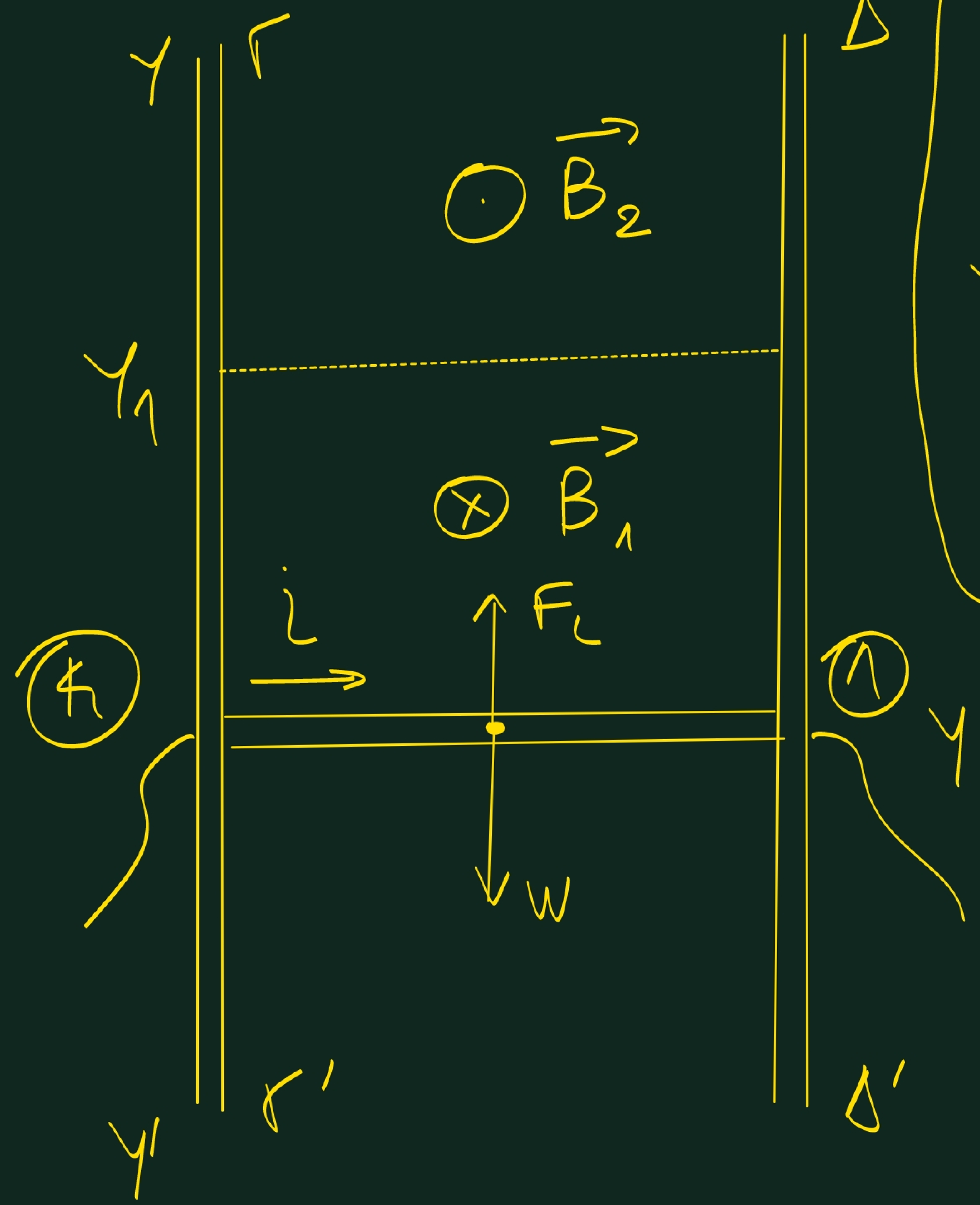
αφού $F'_{L(\Gamma M)} = F'_{L(K\Delta)}$

$$\Sigma F_y = F_L - 2F_{Ly}' = BI\alpha - 2\frac{BI\alpha}{4} \Rightarrow$$

$$\Sigma F_y = \frac{BI\alpha}{2} \Rightarrow \Sigma F = \frac{F}{2}$$

αφού $\Sigma\vec{F} = \Sigma\vec{F}_y + \cancel{\Sigma\vec{F}_x}^{\,0} = \Sigma\vec{F}_y$

Άσκ. 4.91.



$\ell = 2{,}5\,m$

$m = 0{,}5\,kg$

$i = 4 + 2y$ (SI)

$y_1 = +1{,}5\,m$

$B_1 = 0{,}8\,T$

$B_2 = 0{,}4\,T$

α) Στη θέση $y=0$ έχουμε:

$i(0) = 4\,A$

$F_L = B_1 \cdot \ell \cdot i(0) \Rightarrow$

$F_L = 0{,}8 \cdot 2{,}5 \cdot 4 \Rightarrow$

$F_L = 8\,N$ (προς τα πάνω)

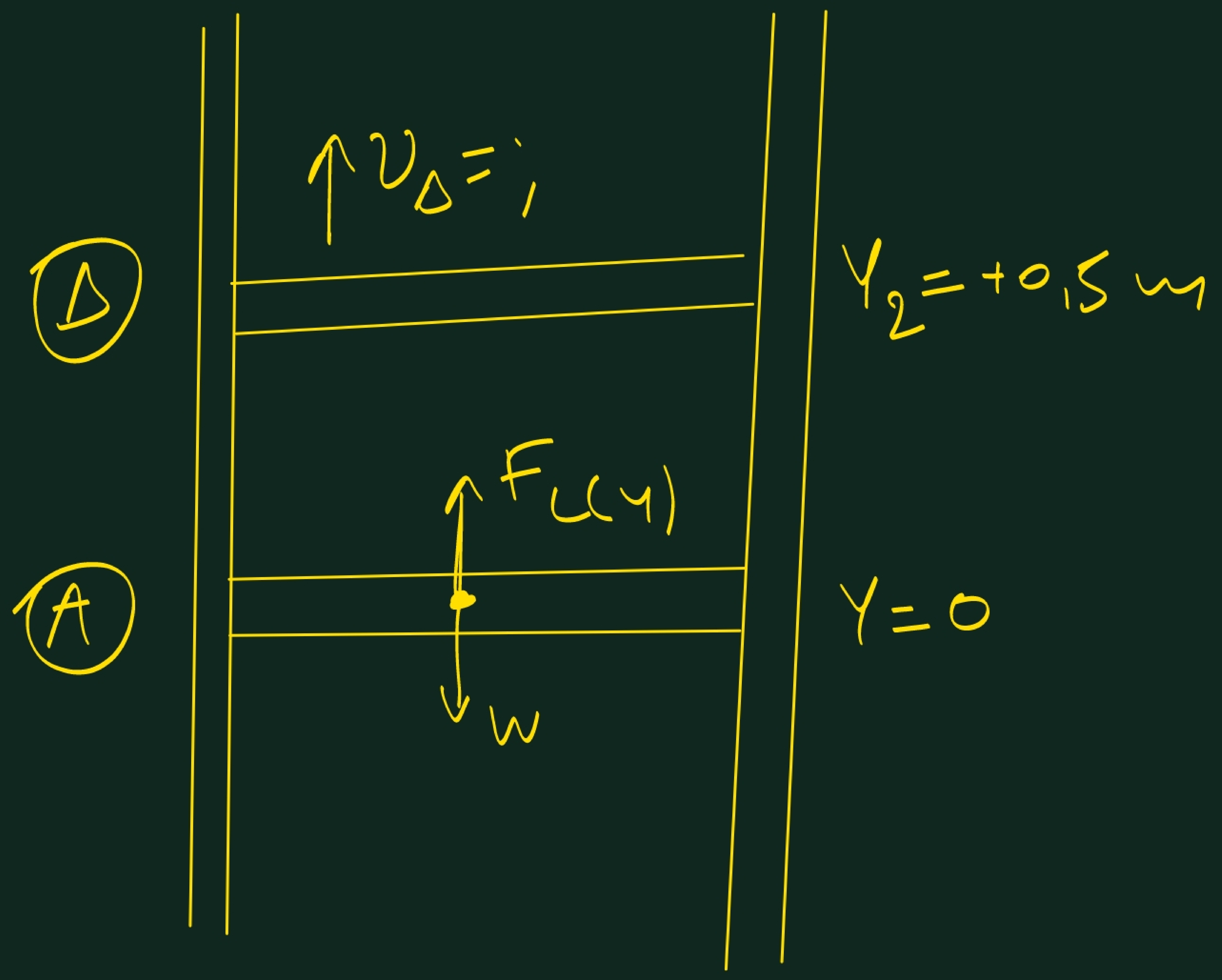
$W = mg = 5\,N$ (προς τα κάτω)

Άρα ο αγωγός ΚΛ αρχικά θα κινηθεί προς τα πάνω με επιτάχυνση:

$m\alpha = F_L - W \Rightarrow 0{,}5\alpha = 8 - 5 \Rightarrow \alpha = 6\,m/s^2$

β) $F_{L(y)} = B_1 \ell i(y) = 0{,}8 \cdot 2{,}5 \cdot (4 + 2y) \Rightarrow$

$F_{L(y)} = 8 + 4y$ (SI)


A
$F_{L(y)}$
W
$Y_2 = +0,5$ m
$Y = 0$