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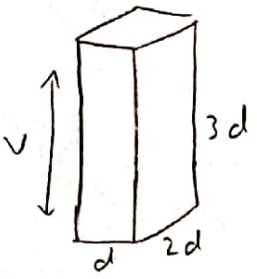
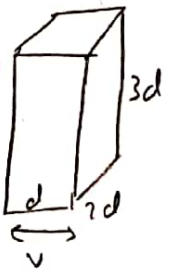
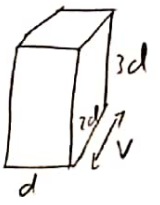
1 a) Akım minimum olması için R maximum olmalı. $R = \rho \frac{L}{A}$



$R_1 = \rho \frac{3d}{2d \cdot d} = \rho \frac{3}{2d}$



$R_2 = \rho \frac{d}{3d \cdot 2d} = \rho \frac{1}{6d}$



$R_3 = \rho \frac{2d}{d \cdot 3d} = \rho \frac{2}{3d}$

R_1 max'tır. $\Rightarrow i_{min} = \frac{V}{R_1} = \frac{V}{\rho \frac{3}{2d}}$

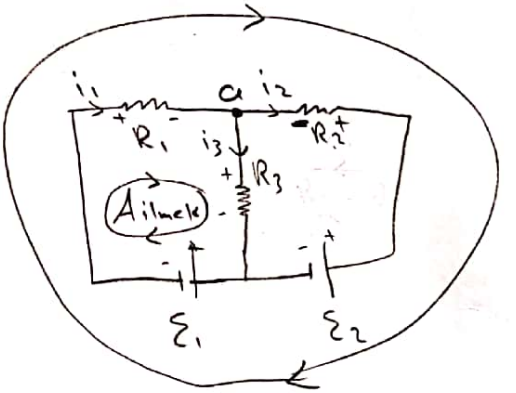
V, y-eksene uygulanır

$$i_{min} = \frac{2dV}{3\rho}$$

b) A ilmek için: $-\mathcal{E}_1 - \dot{I}_1 \cdot R_1 - \dot{I}_3 \cdot R_3 = 0$

$\Rightarrow \mathcal{E}_1 + \dot{I}_1 \cdot R_1 + \dot{I}_3 \cdot R_3 = 0$

$\Rightarrow 7\dot{I}_1 + 4\dot{I}_3 = -12V$ ①



B ilmek için: $-\mathcal{E}_1 - \mathcal{E}_2 - \dot{I}_1 \cdot R_1 + \dot{I}_2 \cdot R_2$

$-7\dot{I}_1 + 8\dot{I}_2 = 21V$ ②

- $\dot{I}_1 + \dot{I}_2 = \dot{I}_3$ ③ Düğüm ada düğüm kuralı.

①'da: $+7I_1 + 4(I_1 + I_2) = -12V \Rightarrow 11I_1 + 4I_2 = -12V \Rightarrow 22I_1 + 8I_2 = -24V$

$-7I_1 + 8I_2 = 21V$

$\Rightarrow 29I_1 = -45 \Rightarrow I_1 = \frac{-45}{29} \simeq -1,55A$

②'da: $-7(-1,55) + 8I_2 = 21V$

$\Rightarrow I_2 \simeq 1,27A$

$I_3 = I_2 + I_1 = -0,28$

① R_1 geçen akım: $I_1 = 1,55\ A$, saatin ters yönünde.

② R_2 geçen akım: $I_2 = 1,27\ A$, saatin ters yönünde

③ R_3 geçen akım: $I_3 = 0,28\ A$, yukarı

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2] a) $\vec{F}_B = q(\vec{v} \times \vec{B}) = (2C)[(300\hat{i} + 400\hat{j}) \times (-3\hat{i} + 4\hat{j})]$

$$= (2) \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 300 & 400 & 0 \\ -3 & 4 & 0 \end{vmatrix} = 2[1200\hat{k} - (-1200\hat{k})] = 2(2400\hat{k})$$

$\Rightarrow \boxed{\vec{F}_B = (4800\hat{k})\ N}$

b) $r = \dfrac{m|\vec{v}|}{q|\vec{B}|} = \dfrac{(1\times10^{-3}\ kg)\cdot\sqrt{(v_i)^2 + (v_j)^2}}{2\cdot\sqrt{(B_i)^2 + (v_j)^2}} = \dfrac{(1\times10^{-3}) \times (500\ m/s)}{(2) \times (5T)} = \boxed{0,05\ m}$

c) $\vec{F}_{net} = 0 \Rightarrow \vec{F}_E + \vec{F}_B = 0 \Rightarrow \vec{F}_E = -\vec{F}_B$

$\Rightarrow q\vec{E} = -q(\vec{v} \times \vec{B})$

$\Rightarrow \vec{E} = -(\vec{v} \times \vec{B})$

$\Rightarrow \vec{E} = -[(300\hat{i} + 400\hat{j}) \times (-3\hat{i} + 4\hat{j})]$

$\boxed{\vec{E} = -2400\hat{k}}$

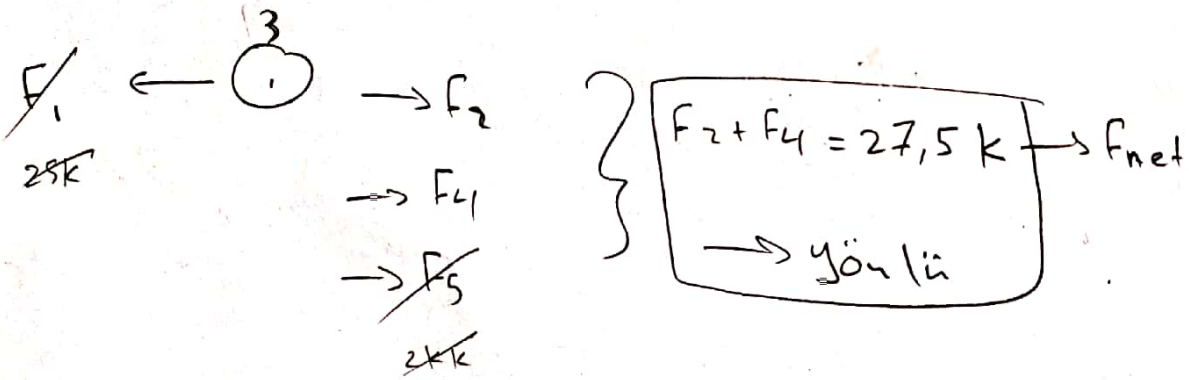
3] $F = \frac{2k \cdot i_1 \cdot i_2}{d}$

$F_{1-3} = \frac{2k \cdot 2 \cdot 5}{2 \cdot 0,4} = 25k$ çeker

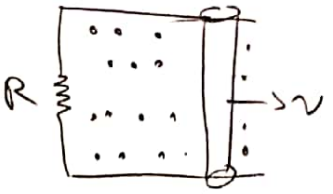
$F_{2-3} = \frac{2k \cdot 0,5 \cdot 5}{0,4} = \frac{25k}{2}$ iter

$F_{4-3} = \frac{2k \cdot 0,6 \cdot 5}{0,4} = 15k$ çeker

$F_{5-3} = \frac{2k \cdot 2 \cdot 5}{2 \cdot 0,4} = 25k$ çeker



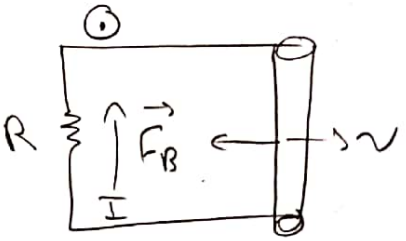
4] a) $\mathcal{E} = \frac{-\Delta\Phi}{\Delta t} = -B\ell \cdot \frac{dx}{dt} = -B\ell v$



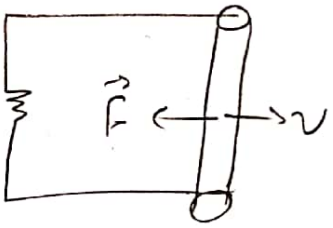
$\mathcal{E} = 0{,}8 \cdot 0{,}5 \cdot 7{,}5 = \boxed{3\,mV}$

b) Sağ el kuralı ile $\Rightarrow$ Akım yukarı yöndedir

$I = \frac{|\mathcal{E}|}{R}$



c) $I = \frac{\mathcal{E}}{R} = \frac{B.\ell.v}{R} = \frac{0{,}8.0{,}5.7{,}5}{1{,}5} = 2\ A$



$F = I.B.\ell = 2.3.0{,}5 = \boxed{3\ N}$ yönünde sola

d) $W = F.X = 3 \times 0{,}5 = 1{,}5\ J$

$P = R.I^2 = 1{,}5 \times (2)^2 = \boxed{6\ W}$

$P = \frac{W}{t} \Rightarrow 6 = \frac{1{,}5}{t} \Rightarrow \boxed{t = 0{,}25\ s}$

$\boxed{E = P.t = 6 \times 0{,}25 = 1{,}5\ J}$