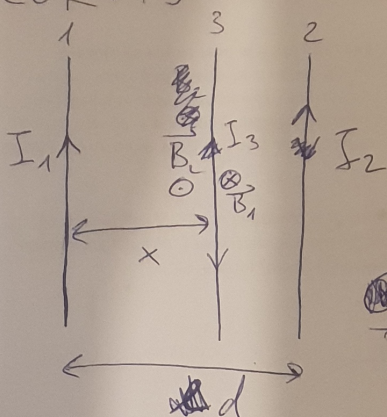


2. KOLOKVIJ

2021/22

(3.)



1, 2 FIXIRANA

$I_1 = 1 \text{ A}$

$I_2 = 2 \text{ A}$

$d = 1 \text{ cm}$

$x = ?$

a) $B = 0$

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

$B_2 = \frac{\mu_0 I_2}{2\pi(d-x)}$

$\vec{F}_{13} = I_3 \vec{l} \times \vec{B}_1$

$\vec{F}_{12} = I_3 \vec{l} \times \vec{B}_2$

$F_{13} = I_3 l \frac{\mu_0 I_1}{2\pi x}$

$F_{12} = I_3 l \frac{\mu_0 I_2}{2\pi(d-x)}$

$F_3 = \frac{I_3 l \mu_0}{2\pi} \left(-\frac{I_1}{x} + \frac{I_2}{d-x} \right) = 0$

$\frac{I_1}{x} = \frac{I_2}{d-x}$

$\frac{d}{x} - 1 = \frac{I_2}{I_1}$

$\frac{d}{x} = \frac{I_2}{I_1} + 1$

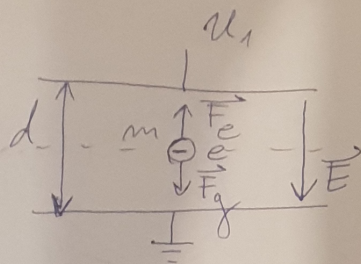
$x = \frac{d}{1 + \frac{I_2}{I_1}} = \frac{1 \text{ cm}}{1 + 2} = \frac{1}{3} \text{ cm}$

b) $B \neq 0$ $x = \frac{d}{2}$

$F_3 = -\frac{I_3 \mu_0 I_1}{2\pi x} + \frac{I_3 \mu_0 I_2}{2\pi(d-x)} - I_3 B = 0$

$B = \frac{\mu_0 I_2}{2\pi(d-x)} - \frac{\mu_0 I_1}{2\pi x} = \frac{\mu_0}{2\pi d} (I_2 - I_1) = 40 \mu\text{T}$

2. KOLOKVIJ 2021/22



$$m = 3 \mu\text{g}$$

$$e = -1800 e_0$$

$$U_2 = 102 \text{ kV} \quad d = 0,5 \text{ mm}$$

$$U_1 = ? \quad a = ? \quad v = ?$$

$$eE_1 = mg \quad \checkmark$$

$$E_1 = \frac{U_1}{d} \quad \checkmark$$

$$e \frac{U_1}{d} = mg$$

$$U_1 = \frac{mgd}{e} = \underline{\underline{51 \text{ kV}}} \quad \checkmark$$

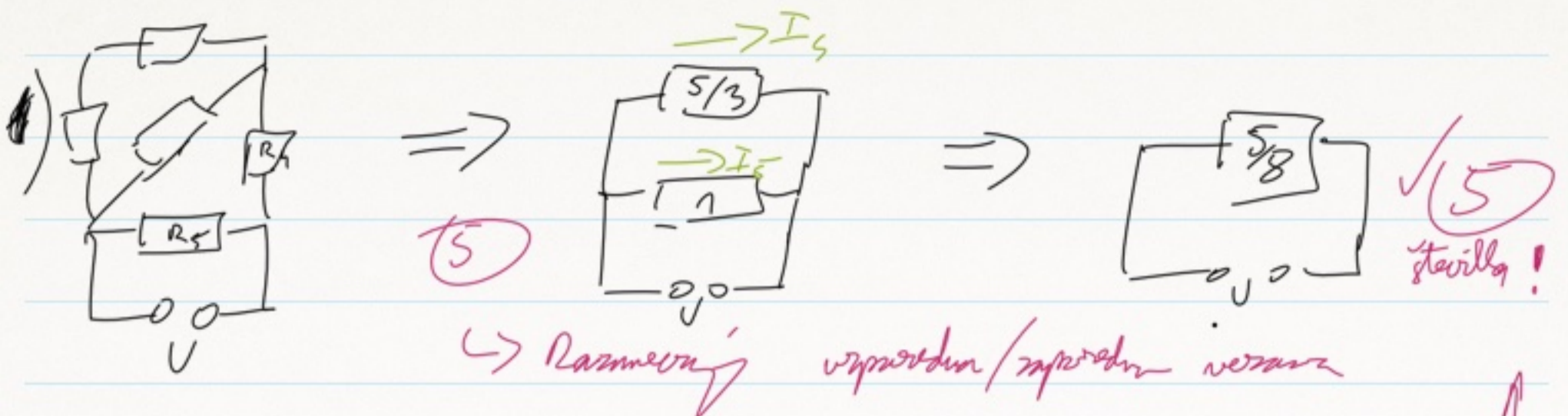
$$eE_2 - mg = ma \quad \checkmark$$

$$E_2 = \frac{U_2}{d} \quad \checkmark$$

$$a = \frac{eU_2}{md} - g = \underline{\underline{9,8 \frac{\text{m}}{\text{s}^2}}} \quad \checkmark$$

$$v = \sqrt{2a \frac{d}{2}} = \sqrt{ad} = \underline{\underline{0,07 \frac{\text{m}}{\text{s}}}} \quad \checkmark$$

5



$$U = R_5 I_5 \Rightarrow I_5 = 3,8 \text{ A} \quad \checkmark (5) \text{ stevilka!}$$

$$U = R_{5/3} I_4 \Rightarrow I_4 = 2,28 \text{ A} \quad \checkmark (5) \text{ to raproba poslednja}$$

napravljena 2 tudi OK

$$P = R_4 I_4^2 = 5,2 \text{ W} \quad \checkmark (5)$$

$$4) \quad \Phi_m = BS \cos \varphi = BS \cos \omega t = BS \frac{\sqrt{3}}{2} = 0,2165 \text{ Tm}^2 \quad \checkmark (5) \text{ stevilka!}$$

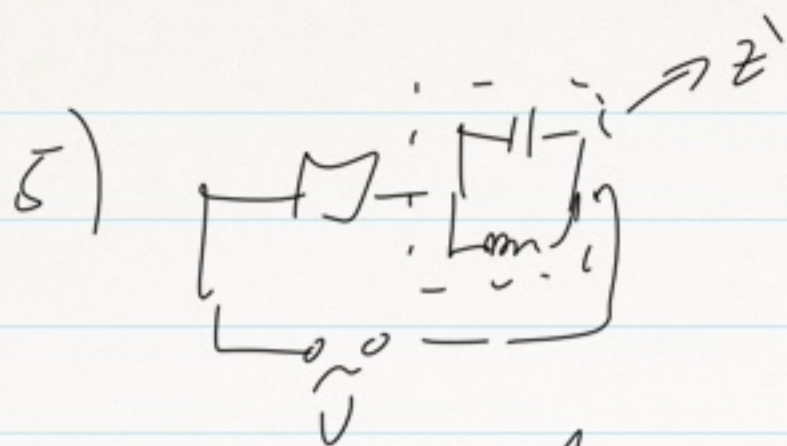
$\varphi = 30^\circ$
formula

$$U_i = - \frac{d\Phi_m}{dt} = BS \omega \sin \omega t = BS \omega \sin \varphi \quad \checkmark (5)$$

$$R = \frac{l}{S} = 0,105 \Omega \quad S = ab \quad \checkmark (5)$$

\rightarrow Razmerjajj, kako iz U_i dobi I preko R , in tako izračunam R !

$$I = \frac{BS \omega \sin \varphi}{R} = 2,38 \text{ A} \quad \checkmark (5) \text{ stevilka!}$$



$$z = 1 + z'$$

$$\frac{1}{z'} = \frac{1}{z_L} + \frac{1}{z_C}$$

⑤ Razmerovij
zaporeden, vzporeden odnos
in tako to izračunamo

$$\Rightarrow \frac{1}{Z_1} = i\omega L + \frac{1}{i\omega L}$$

$$\frac{1}{Z_1} = \frac{1 - \omega^2 LC}{j\omega L}$$

$$\Rightarrow z = 12 + \frac{j\omega L}{1 - \omega^2 LC}$$

$$\omega_0 = \frac{1}{\sqrt{LC}}$$

$$|z| = \sqrt{R^2 + \frac{\omega^2 L^2}{(1 - \omega^2 LC)^2}} = R \sqrt{1 + \frac{\omega^2 (LC)^2}{L^2 (1 - \omega^2 LC)^2}}$$

$$= 12 \sqrt{1 + \frac{\omega^2}{2^2 \omega_0^4 (1 - \omega^2/\omega_0^2)^2}} = 12 \sqrt{1 + \frac{4}{(1-4)^2}} = 12 \sqrt{\frac{13}{9}}$$

$$(R_L)^2$$

$V_{\text{K}} = 1,2 \text{ JZ}$

$$V_C = V - IR = V \left(1 - \frac{R}{Z} \right) = V \left(1 - \frac{R}{|Z| e^{i\varphi}} \right)$$

$$|U_C| = U_0 \left| \frac{z - R}{z} \right| = U_0 \left| \frac{\frac{j\omega L}{1 - \omega^2 LC}}{z} \right| = U_0 \frac{\omega L}{|z|}$$

$$x_i = U_0 \frac{\sqrt{|z|^2 - zR - z^*R + R^2}}{|z|} = U_0 \left(\sqrt{1 - \left(\frac{R}{z_0}\right)^2} \right) = 0,555 U_0$$

Max? Takst \hookrightarrow zu max ($w = w_3$) Min ($w = \infty \sim w = 0$)
 ✓ 5 ✓ steilen!