[redacted]

1)

$$\cancel{\varepsilon = \frac{d\phi}{dt} = \frac{\partial(\vec{B}\,d\vec{s})}{dt} = \frac{\partial(B.S\cos(wt))}{dt} = BSw\,sen(wt)}$$

$$\cancel{I(t) = \frac{\varepsilon(t)}{R} = \frac{BSw\,sen(wt)}{R} = 3{,}4T.}$$

[redacted]

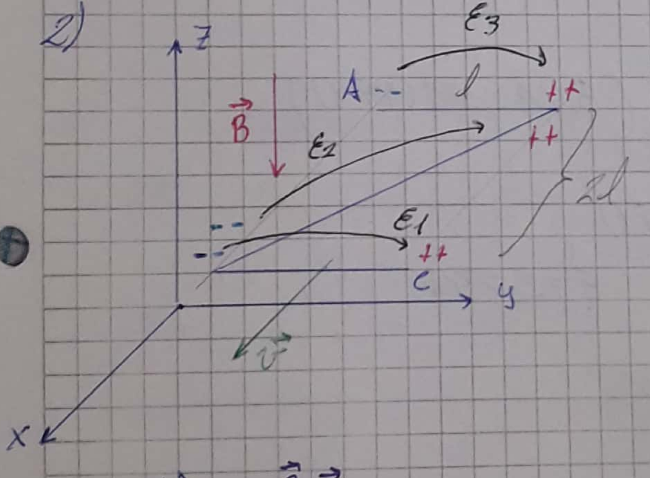
$$\varepsilon = -\frac{d\phi}{dt} = -\frac{\partial}{dt}(N\vec{B}\,d\vec{s}) = -\frac{\partial}{dt}(NBS\cos(wt))$$

$$\varepsilon = NBSw\,sen(wt) \Rightarrow I(t) = \frac{\varepsilon(t)}{R}$$

$$I(t) = \frac{NBSw\,sen(wt)}{R} = \frac{229 \cdot 3{,}4T \cdot (0{,}3m)^2 \cdot 296\,rad/s}{99\,\Omega} \cdot sen(296t)$$

$$I(t) = 209{,}51\,sen(296t)\ A$$

2)

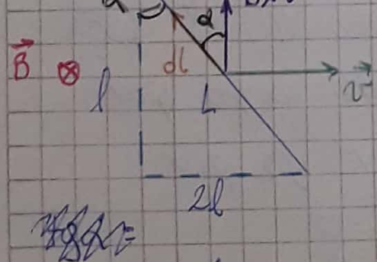


$$|\varepsilon_1| = |\varepsilon_3| = \varepsilon_{BARRA}$$

$$\varepsilon_{BARRA} = \int_0^l \vec{B}\times\vec{v}\,.\,d\vec{l}$$

$$\varepsilon_{BARRA} = Bv\int_0^l dl\,.\,1$$

$$\varepsilon_{BARRA} = Bvl \quad (\text{Horizontal})$$



$$\varepsilon_2 = \int_0^L \vec{B}\times\vec{v}\,.\,d\vec{l} = BvL\,.\cos(\alpha)$$

$$\cancel{tg\alpha =}$$

$$tg\alpha = \frac{2l}{l} \Rightarrow \alpha = 63{,}43 \ \wedge\ L = \sqrt{(2l)^2 + l^2} = 1{,}342\,m$$

$\cancel{VC-VA} = VC - \mathcal{E}_1 + \mathcal{E}_2 - \mathcal{E}_3 - VA = 0$

$\Rightarrow VC - VA = \mathcal{E}_1 - \mathcal{E}_2 + \mathcal{E}_3 = 2 B l v - B L v \cos(\alpha)$

$VC - VA = 2 \cdot 0{,}2T \cdot 0{,}6m \cdot 20 m/s - 0{,}2T \cdot 1{,}342m \cdot 20 m/s \cdot \cos(63{,}43)$

$VC - VA = 2{,}4V$

3)

$Vg = 768\,V \quad f = 205\,Hz \quad V_L = 551\,V \quad V_C = 463\,V \quad R = 298\,\Omega$

$Vg^2 = VR^2 + (V_L - V_C)^2 \Rightarrow VR = \sqrt{Vg^2 - (V_L - V_C)^2}$

$VR = \sqrt{(768V)^2 - (551V - 463V)^2}$

$I_{ef} = \frac{VR}{R} = \frac{762{,}94V}{298\Omega} = \boxed{2{,}56A}$

$VR = 762{,}94\,V$ Ⓐ

4)

$M = \frac{\phi}{I} = \frac{63{,}4\,mWb}{9{,}5A} = 6{,}67\,mH$ Ⓐ

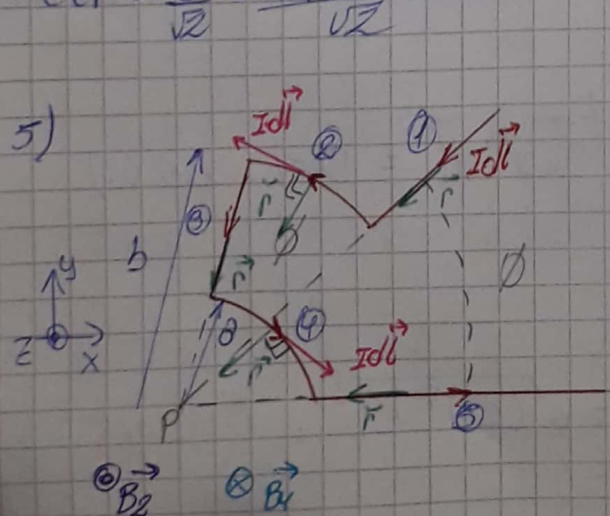
$\mathcal{E} = \frac{d\phi}{dt} = \frac{\partial}{dt}(M \cdot I_{(t)}) = M \frac{\partial}{dt}\left(8{,}4A \cdot \operatorname{sen}(49t)\right)$

$\mathcal{E} = M \cdot 8{,}4A \cdot 49\,1/s \cdot \cos(49t)$

$\mathcal{E} = 2{,}74 \cos(49t)$ $\qquad \hat{\mathcal{E}} = 2{,}74V$

$\mathcal{E}_{ef} = \frac{\hat{\mathcal{E}}}{\sqrt{2}} = \frac{2{,}74V}{\sqrt{2}} = 1{,}94\,V$

5)



En la sección ①, ③ y ⑤ no se genera campo que influya en P ya que

$Id\vec{l} \times \vec{r} = 0$

Porque $Id\vec{l} \wedge \vec{r} = 0$

$Id\vec{l} \wedge \vec{r} = 180°$

[redacted]

$$dB = \frac{\mu_0}{4\pi} \frac{I d\vec{l} \times \breve{r}}{r^2} = \frac{\mu_0}{4\pi} \frac{I R d\theta . \sin 90° : 1}{r^2}$$

$$dB = \frac{\mu_0}{4\pi} \frac{I}{r} d\theta$$

$$\Rightarrow B_2 = \frac{\mu_0 I}{4\pi b} \int_0^{\frac{34,7\pi}{180}} d\theta \Rightarrow B_2 = \frac{\mu_0 I}{4\pi b} \cdot \frac{34,7\pi}{180} = 3,14\ \mu T$$

$$\vec{B_2} = 3,14\ \mu T\ \breve{k}$$

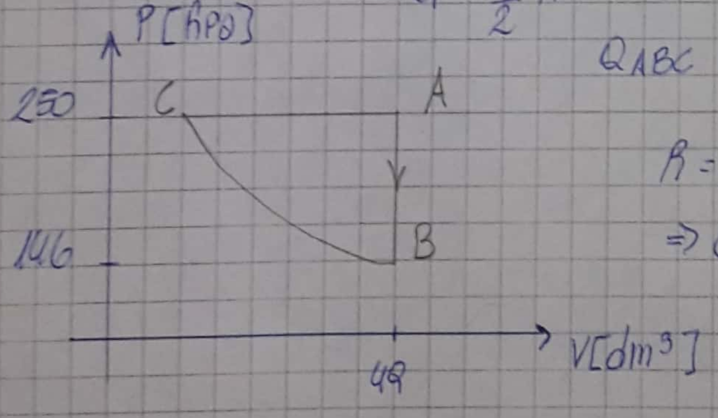
$$\Rightarrow B_4 = \frac{\mu_0 I}{4\pi a} \int_0^{\frac{69,4\pi}{180}} = \frac{\mu_0 I}{4\pi a} \cdot \frac{69,4\pi}{180} = 11,457\ \mu T$$

$$\vec{B_4} = 11,457\ \mu T\ (-\breve{k})$$

$$\vec{B_P} = \vec{B_2} + \vec{B_4} = 3,14\ \mu T\ \breve{k} - 11,457\ \mu T\ \breve{k}$$

$$B_P = -8,32\ \mu T$$

6)



$$C_P = \frac{5}{2} R$$

$$Q_{ABC} = Q_{AB} + Q_{BC}$$

$$R = C_P - C_V$$

$$\Rightarrow C_V = \frac{3}{2} R$$

$$Q_{AB} = n C_V \Delta T = n C_V (T_B - T_A) = \cancel{n} \frac{3}{2} \cancel{R} \left(\frac{P_B V_B}{\cancel{Rn}} - \frac{P_A V_A}{\cancel{Rn}} \right)$$

$$Q_{AB} = \frac{3}{2} (P_B V_B - P_A V_A) = \frac{3}{2} (146\ kPa \cdot 49\ dm^3 - 250\ kPa \cdot 49\ dm^3)$$

$$Q_{AB} = -7,644\ kJ$$

$Q_{BC} = W_{BC} \Rightarrow$ porque $\Delta U = Q_{BC} - W_{BC} = 0$ (iso termo)

$$\Rightarrow Q_{BC} = W_{BC} = \int_{V_B}^{V_C} P\, dV \;\; \cancel{= nRT\, ln}$$

$$Q_{BC} = nRT \ln\left(V_C / V_B\right) \qquad \Rightarrow Q_{BC} = P_B V_B \ln\left(\frac{V_C}{V_B}\right)$$

$$P_B \cdot V_B = P_C \cdot V_C \quad @\ T = cte \qquad \Rightarrow V_C = \frac{P_B V_B}{P_C}$$

$$\Rightarrow Q_{BC} = P_B V_B \ln\left(\frac{P_B}{P_C}\right) = 146\ kPa \cdot 49\ dm^3 \ln\left(\frac{146}{250}\right)$$

$$Q_{BC} = -3,847\ kJ$$

$$Q_{TOT} = Q_{AB} + Q_{BC} = -7,664\ kJ - 3,847\ kJ$$

$Q_{ABC} = -11,5\ kJ$ el sistema cede calor