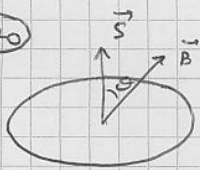


QCM

12.70



$$\theta = 70^\circ$$

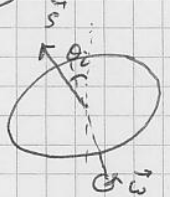
$$B = 2 \text{ T}$$

$$\Rightarrow \Phi = BS \cos \theta = 2 \cdot \pi \cdot \left(\frac{3.3}{100}\right)^2 \cdot \cos 70^\circ \approx \underline{2.3 \cdot 10^{-3} \text{ Wb}}$$

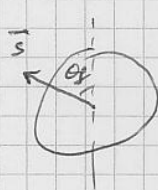
(C)

$$S = \pi \left(\frac{3.3}{100}\right)^2$$

12.71



$$t = 0 \text{ s}$$



$$t = 0.5 \text{ s}$$

Loi de Faraday, $|\mathcal{E}| = \frac{\Delta \Phi}{\Delta t} = \frac{\Phi_f - \Phi_i}{t_f - t_i}$

$$= \frac{BS \cos \theta_f - BS \cos \theta_i}{t_f} = \frac{BS}{t_f} (\cos \theta_f - \cos \theta_i)$$

$$= \frac{2 \cdot \pi \cdot \left(\frac{2}{100}\right)^2}{0.5} (\cos 57^\circ - \cos 11^\circ)$$

$$\approx \underline{2.2 \text{ mV}} \quad (\text{C})$$

12.72

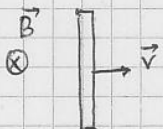
$$R = \rho \cdot \frac{L}{S}$$

avec $\rho = 1.4 \cdot 10^{-8} \Omega \cdot \text{m}$; $L = 2\pi r$; $S = \pi \cdot \left(\frac{1.48}{2000}\right)^2$

$$r = \frac{2}{100} \text{ m}$$

$$\Rightarrow I = \frac{\mathcal{E}}{R} = \mathcal{E} \cdot \frac{S}{\rho L} \approx \underline{2.1 \text{ A}} \quad (\text{d})$$

12.73



$$B_i = 0.65 \text{ T}$$

$$v_i = 2.6 \text{ m/s}$$

$$B_f = 0.48 \text{ T}$$

$$v_f = ?$$

$$\Rightarrow \mathcal{E}_i = B_i l v_i$$

$$\mathcal{E}_f = B_f l v_f$$

$$\mathcal{E}_i = \mathcal{E}_f \Rightarrow B_i l v_i = B_f l v_f$$

$$\Rightarrow v_f = \frac{B_i v_i}{B_f} = \frac{0.65 \cdot 2.6}{0.48} \approx \underline{3.52 \text{ m/s}} \quad (\text{b})$$

12.74

l'ampoule brûle à la puissance donnée. $P = RI^2 \Rightarrow I = \sqrt{\frac{P}{R}}$ et $P = UI = \mathcal{E} \cdot I$

$$\mathcal{E} = B \ell v = \frac{P}{I} = \frac{U^2}{RI} \quad (U = \mathcal{E})$$

$$P = U^2/R$$

$$\Rightarrow B = \frac{1}{\ell v} \cdot \frac{\mathcal{E}^2}{RI} = \frac{\mathcal{E}^2}{\ell v R} \cdot \sqrt{\frac{R}{P}} = \frac{P}{\ell v} \cdot \sqrt{\frac{R}{P}} = \frac{2.5}{1.25 \cdot 3.5} \cdot \sqrt{\frac{13}{2.5}} \approx \underline{1.3 \text{ T}}$$

12.75

la puissance consommée égale à $F_{\text{ext}} \cdot v$

$$\Rightarrow F_{\text{ext}} \propto I_{\text{consommée}}$$

$$\Rightarrow A, B, C \quad (\text{a})$$