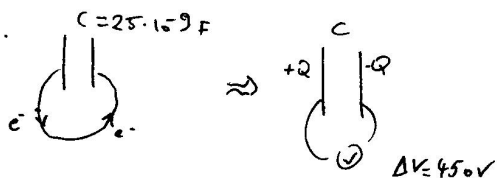


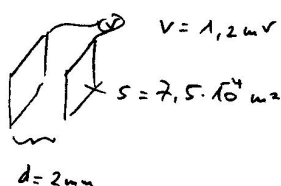
9.32.



$$Q = C \Delta V = 25 \cdot 10^{-9} \cdot 450 = 1,125 \cdot 10^{-5} \text{ C}$$

$$\Rightarrow \text{nombre d'électrons, } n = \frac{1,125 \cdot 10^{-5} \text{ C}}{1,6 \cdot 10^{-19} \text{ C/électron}} \approx \underline{\underline{7 \cdot 10^{13}}}$$

9.36.



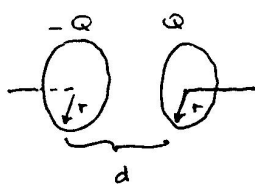
$$Q = C \cdot \Delta V = \frac{\epsilon_0 \epsilon_r S}{d} \cdot \Delta V = \frac{8,85 \cdot 10^{-12} \cdot 7,5 \cdot 10^{-4}}{0,002} \cdot 1200 \approx \underline{\underline{4 \cdot 10^{-15} \text{ C}}}$$

9.37.

$$E_{\max} = 1,4 \cdot 10^7 \frac{\text{V}}{\text{m}}$$

$$Q = 2,2 \cdot 10^{-4} \text{ C}$$

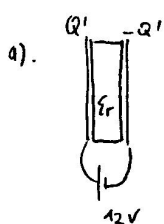
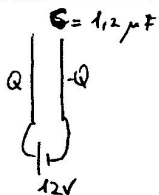
$$\epsilon_r = 3,5$$



$$E = \frac{E_0}{\epsilon_r} = \frac{Q}{\epsilon_r \epsilon_0 S} \Rightarrow E_{\max} = \frac{Q}{\epsilon_r \epsilon_0 S_{\min}} \Rightarrow S_{\min} = \frac{Q}{\epsilon_r \epsilon_0 E_{\max}} = \frac{2,2 \cdot 10^{-4}}{3,5 \cdot 8,85 \cdot 10^{-12} \cdot 1,4 \cdot 10^7} \approx \underline{\underline{5,07 \cdot 10^{-7} \text{ m}^2}}$$

$$\text{Or, } S_{\min} = \pi r_{\min}^2 \Rightarrow r_{\min} = \sqrt{\frac{S_{\min}}{\pi}} \approx \underline{\underline{0,4 \text{ m}}} \quad \text{rayon minimum}$$

9.38.



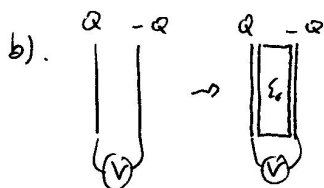
$$\left. \begin{aligned} Q' - Q &= 2,6 \cdot 10^{-5} \text{ C} \\ \Delta V &= \text{constante} \end{aligned} \right\} \Rightarrow$$

$$Q = \frac{\epsilon_0 \epsilon_r S}{d} \cdot \Delta V = C \cdot \Delta V \quad (1)$$

$$Q' = \epsilon_r \cdot \frac{\epsilon_0 S}{d} \Delta V = \epsilon_r C \Delta V \quad (2)$$

$$(2) - (1): (\epsilon_r - 1) C \Delta V = Q' - Q$$

$$\Rightarrow \epsilon_r - 1 = \frac{Q' - Q}{C \Delta V} \Rightarrow \epsilon_r = \frac{Q' - Q}{C \Delta V} + 1 \approx \underline{\underline{2,8}}$$



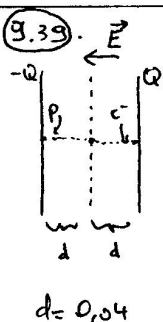
$$\text{sans diélectrique: } Q = \frac{\epsilon_0 S}{d} \Delta V = C \Delta V$$

$$\text{avec diélectrique } Q = \epsilon_r \cdot \frac{\epsilon_0 S}{d} \Delta V' = \epsilon_r C \Delta V'$$

$$\Rightarrow \Delta V = \epsilon_r \Delta V' \Rightarrow \Delta V' = \frac{\Delta V}{\epsilon_r} = \frac{12}{2,8} \approx \underline{\underline{4,29 \text{ V}}}$$

$$\Rightarrow \underline{\underline{\Delta(\Delta V) \approx -7,71 \text{ V} \quad \text{diminution!}}}$$

9.39.



$$\text{accélération du proton: } a_p = \frac{F_{ep}}{m_p} = \frac{q_p \cdot E}{m_p}$$

$$\text{accélération de l'électron: } a_e = \frac{|q_e| \cdot E}{m_e}$$

$$\text{l'électron touche: } d = \frac{1}{2} a_e \cdot t_e^2 \Rightarrow t_e = \sqrt{\frac{2d}{a_e}}$$

$$\text{distance parcourue par le proton: } d_p = \frac{1}{2} a_p \cdot t_e^2 = \frac{1}{2} \cdot \frac{q_p \cdot E}{m_p} \cdot \frac{2d}{|q_e| E} \cdot m_e = \frac{q_p \cdot m_e}{|q_e| \cdot m_p} \cdot d$$

$$\Rightarrow d_p = d \cdot \frac{m_e}{m_p} = 0,04 \cdot \frac{9,1 \cdot 10^{-31}}{1,67 \cdot 10^{-27}} \approx \underline{\underline{2,2 \cdot 10^{-5} \text{ m}}}$$