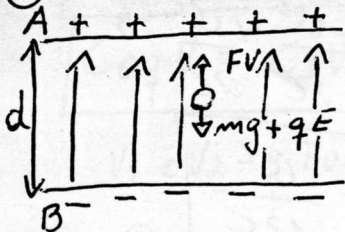


CAPÍTULO 5.

1



$d = 5 \text{ cm}$
 $r = 2 \mu\text{m}$
 $\rho = 0,78 \text{ g/cm}^3$
 $v = \text{cte}$
 $V = 40 \text{ KV}$

$FV = P$

$C V_0 = mg$

$C = \frac{mg}{V_0}$

$FV = mg + qE$

$C 2V_0 = mg + qE$

$\frac{mg}{V_0} 2V_0 = mg + qE$

$2mg - mg = qE$

$qE = mg$

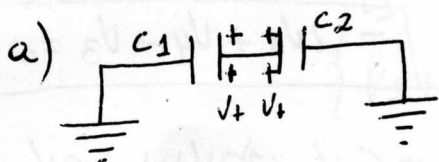
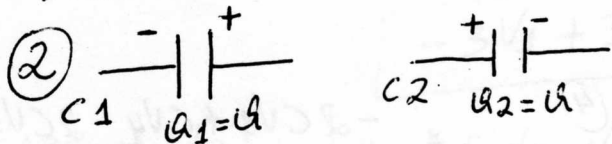
se $m = \rho V$ e $E = \frac{V_{AB}}{d}$, então:

$qE = mg$

$q \frac{V_{AB}}{d} = \rho \cdot V \cdot g$ o volume da gota é $V = \frac{4}{3} \pi r^3$; logo:

$q \frac{V_{AB}}{d} = \rho \cdot \frac{4}{3} \pi r^3 g \Rightarrow q = \frac{\rho \cdot 4 \pi r^3 g d}{3 V_{AB}} \Rightarrow \frac{7,8 \times 10^2 \cdot 4 \pi (2 \times 10^{-6})^3 \cdot 10,5}{3 \cdot 40 \times 10^3}$

$q = 3,2 \times 10^{-19} \text{ C negativa}$



$Q_1 + Q_2 = Q'_1 + Q'_2$

$C_1 V_1 + C_2 V_2 = C_1 V'_1 + C_2 V'_2$

$2U = (C + 2C)V \Rightarrow 2U = 3CV \Rightarrow V = \frac{2U}{3C}$

$$b) U = \frac{1}{2} QV$$

$$U = \frac{1}{2} Q \cdot \frac{2Q}{3C}$$

$$U = \frac{Q^2}{3C}$$

$$U = \frac{1}{2} QV$$

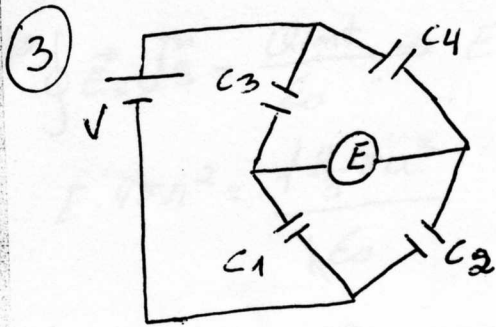
$$U = \frac{1}{2} Q \cdot \frac{Q}{C}$$

$$U = \frac{Q^2}{2C}$$

$$\frac{Q^2}{3C} - \frac{Q^2}{2C} + \frac{Q^2}{2C} \Rightarrow$$

$$U = \frac{Q^2}{12C}$$

c) Teremos outras formas de energia; CALOR, LUZ DA FAÍSCA AO LIGAR, etc



$$Q_3 = Q_4$$

$$Q_4 = Q_2$$

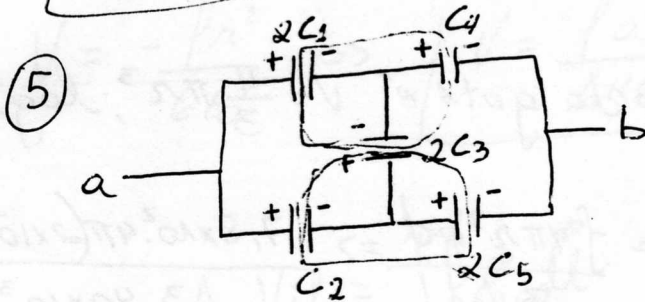
$$C_3 V_3 = C_1 V_1$$

$$C_4 V_4 = C_2 V_2$$

$$\text{Como } \begin{cases} V_3 = V_4 \\ V_1 = V_2 \end{cases}$$

$$\begin{cases} C_3 V_3 = C_1 V_1 \\ C_4 V_4 = C_2 V_2 \end{cases} \div$$

$$\frac{C_3}{C_4} = \frac{C_1}{C_2}$$



$$\begin{cases} V_a - V_2 - V_5 = V_b \\ V_a - V_1 - V_4 = V_b \\ V_a - V_1 + V_3 - V_5 = V_b \end{cases}$$

$$* \begin{cases} -Q_1 + Q_4 - Q_3 = 0 \\ -Q_2 + Q_3 + Q_5 = 0 \end{cases}$$

$$V = V_a - V_b = V_2 + V_5 \quad (4)$$

$$V = V_a - V_b = V_1 + V_4 \quad (3)$$

$$V = V_1 + V_5 - V_3 \quad (5)$$

$$* -2CV_1 + CV_4 - 2CV_3 = 0$$

$$\boxed{-2V_1 + V_4 - V_3 = 0} \quad (2)$$

$$-CV_2 + 2CV_3 + 2CV_5 = 0$$

$$\boxed{-V_2 + 2V_3 + 2V_5 = 0} \quad (1)$$

