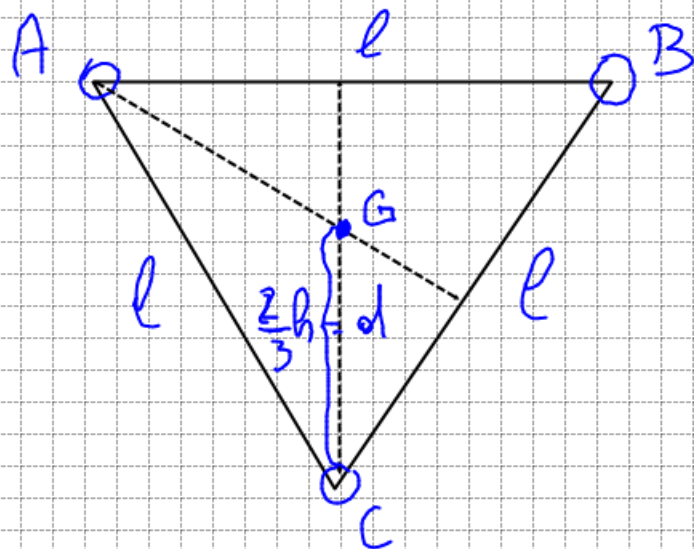


CORREZIONE COMPITO

1)



$$\overline{AB} = \overline{BC} = \overline{AC} = 3,0 \text{ cm} = 0,03 \text{ m}$$

$$q_A = 3,1 \times 10^{-10} \text{ C}$$

$$q_B = 2,7 \times 10^{-10} \text{ C}$$

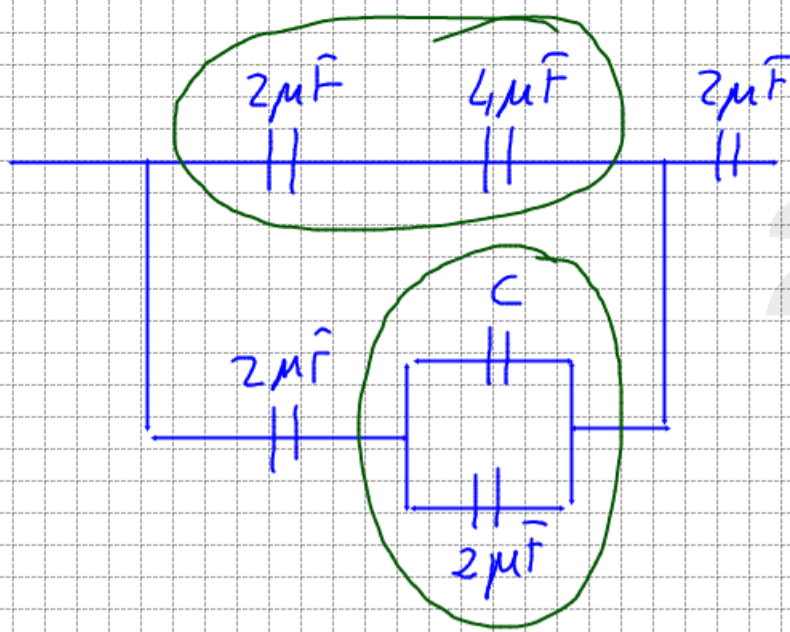
$$V_C = V_A + V_B = k_0 \frac{(q_A + q_B)}{l} = 1,7 \times 10^2 \text{ V}$$

$$W_{C \rightarrow G} = -q_C \Delta V = -q_C (V_C - V_G)$$

$$V_G = V_A' + V_B' = \frac{k_0 (q_A + q_B)}{d} = 306,7 \text{ V}$$

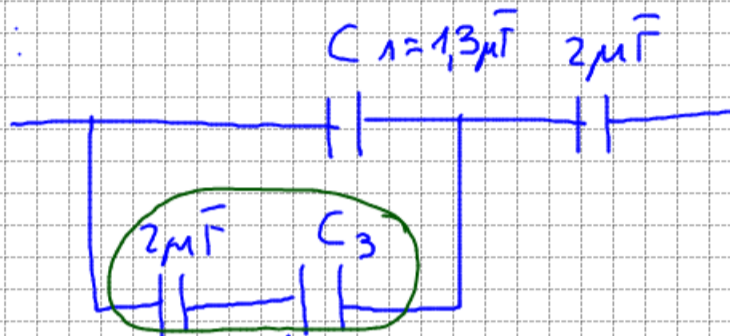
$$\rightarrow -4,1 \times 10^{-8} \text{ J}$$

2)



2/4

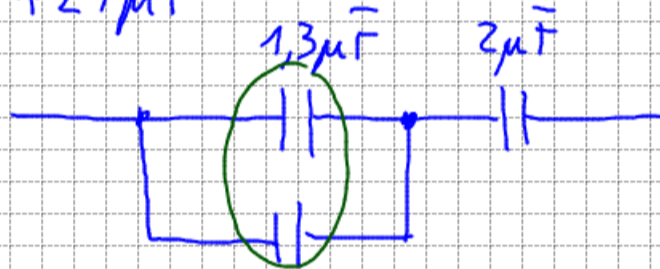
1 passo:



$$C_1 = \left(\frac{1}{2} + \frac{1}{4} \right)^{-1} \mu\text{F} = \frac{4}{3} \mu\text{F} = 1,3 \mu\text{F}$$

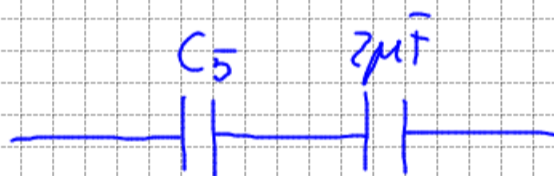
$$C_3 = (C + 2) \mu\text{F}$$

2 passo:



$$C_4 = \left(\frac{1}{2} + \frac{1}{C+2} \right)^{-1} \mu\text{F} = \frac{2(C+2)}{C+4} \mu\text{F}$$

3 passo:



$$C_5 = C_4 + 1,3 \mu\text{F} = \left(\frac{2(C+2)}{C+4} + 1,3 \right) \mu\text{F} = \frac{2C+4+1,3C+5,2}{C+4}$$

4 passo



$$= \frac{3,3C + 9,2}{C+4}$$

$$C_{eq} = \left(\frac{C+4}{3,3C+9,2} + \frac{1}{2} \right)^{-1} \mu\text{F}$$

$$1,21 = \frac{2(3,3C+9,2)}{2C+8+3,3C+9,2}$$

$$1,21 = \frac{6,6C+18,4}{5,3C+17,2}$$

$$3) \Delta V = 110V \quad Q = 20 \mu C.$$

a) energia immagazzinata nel condensatore.

b) armature quadrate di lato $l = 3 \text{ cm}$; $\sigma = ?$

Svolgimento:

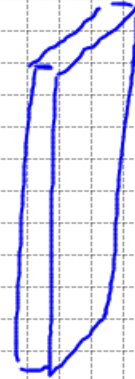
$$\Delta W = \frac{1}{2} Q \Delta V = 1,1 \times 10^{-9} \text{ J}$$

$$\sigma = \frac{\Delta W}{V} \quad \sigma = \frac{\Delta W}{Qh}$$

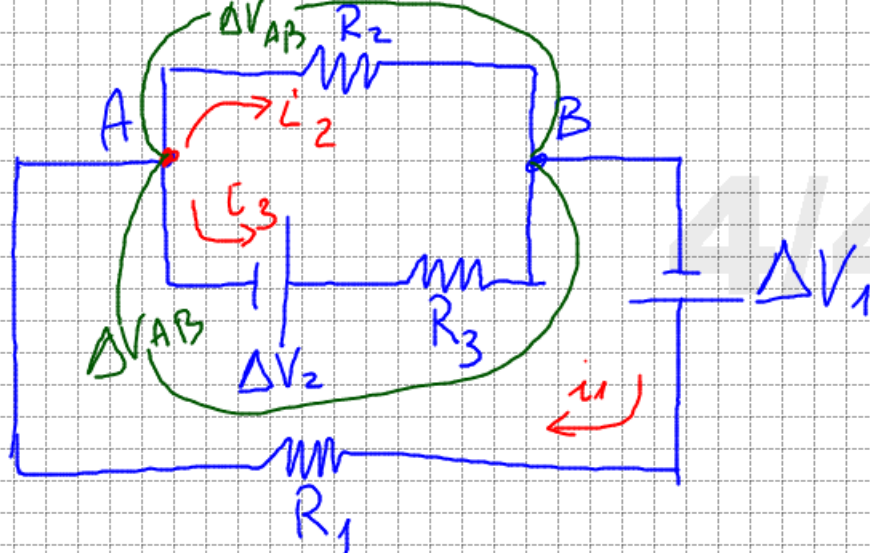
$$C = \frac{Q}{V} = \epsilon_0 \frac{S}{d}$$

$$d = \frac{\epsilon_0 S \Delta V}{Q} = 44 \text{ mm.}$$

$$\sigma = 2,8 \times 10^{-3} \frac{\text{J}}{\text{m}^3}$$



4)



$$\left\{ \begin{array}{l} i_1 = i_2 + i_3 \\ \Delta V_1 - R_1 i_1 + \Delta V_2 - R_3 i_3 = 0 \\ -R_2 i_2 - (-R_3 i_3) - \Delta V_2 = 0 \end{array} \right. \quad \left\{ \begin{array}{l} i_1 = i_2 + i_3 \\ \Delta V_1 + \Delta V_2 - R_1 i_1 - R_3 i_3 = 0 \\ -\Delta V_2 - R_2 i_2 + R_3 i_3 = 0 \end{array} \right.$$

$$\left\{ \begin{array}{l} i_1 = i_2 + i_3 \\ \Delta V_1 - R_1 i_1 - R_2 i_2 = 0 \\ \Delta V_2 = R_3 i_3 - R_2 i_2 \end{array} \right. \quad \left\{ \begin{array}{l} i_1 = i_2 + i_3 \\ \Delta V_1 = R_1 i_2 + R_1 i_3 + R_2 i_2 \\ \Delta V_2 = R_3 i_3 - R_2 i_2 \end{array} \right.$$

$$\left\{ \begin{array}{l} i_1 = i_2 + i_3 \\ i_2 = \frac{\Delta V_1 - R_1 i_3}{R_1 + R_2} \\ i_3 = \frac{\Delta V_2 + R_2 \left(\frac{\Delta V_1 - R_1 i_3}{R_1 + R_2} \right)}{R_3} \end{array} \right.$$

$$\rightarrow R_3 i_3 + \frac{R_1 R_2}{R_1 + R_2} i_3 = \Delta V_2 + \frac{R_2 \Delta V_1}{R_1 + R_2}$$