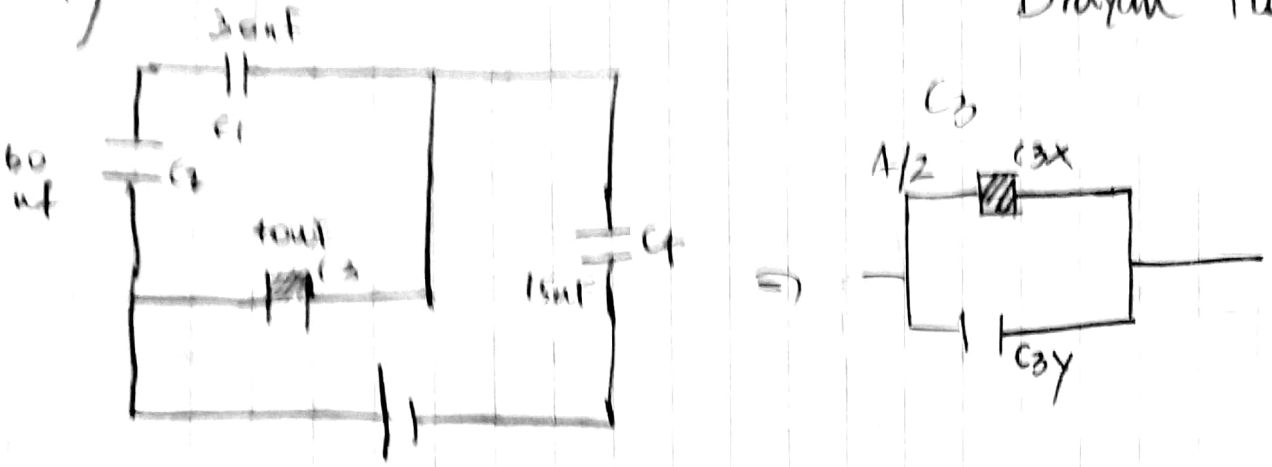
1)

Brayan Maldonado.



$$C_0 = \frac{\varepsilon_0 A}{d} \; ; \; C' = \frac{K \varepsilon_0 A}{2d}$$

$$C_{3x} \Rightarrow \frac{k \varepsilon_0 A}{2d} \rightarrow C_0$$

$$C_{3x} \rightarrow \frac{k}{2} C_0 \Rightarrow \frac{2}{2} C_0 \Rightarrow 40\,uF$$

$$C_{3y} \Rightarrow \frac{\varepsilon_0 A}{2d} C_0 \rightarrow \frac{C_0}{2} = 20\,uF$$

$$\therefore C_3' = 60\,uF.$$

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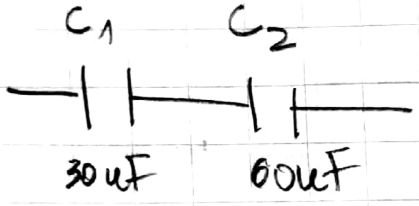
Luego C_1 y C_2

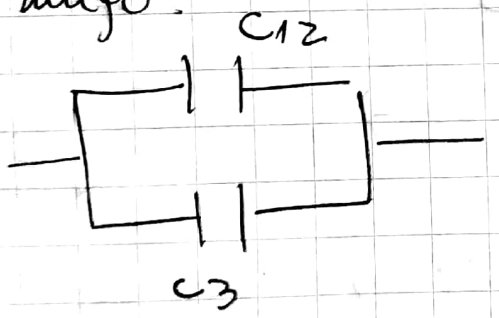


$\Rightarrow$ C_1 y C_2 en (serie)

$$\Rightarrow \frac{1}{C_1} + \frac{1}{C_2} \Rightarrow \frac{C_1 \cdot C_2}{C_1 + C_2} = \frac{30 \cdot 60}{30+60}$$

$$\Rightarrow \frac{1800}{90} = 20\,uF$$

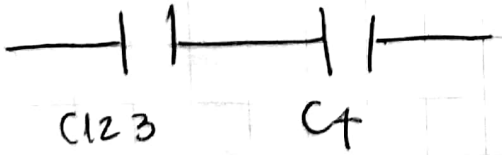
Luego.



C_{12} y C_3 en //

$$C_{123} = C_{12} + C_3 = 20\,uF + 60\,uF$$
$$C_{123} = 80\,uF$$

Luego



C_{123} y C_4 en (serie).

$$C_{eq} = \frac{1}{C_{123}} + \frac{1}{C_4} = \frac{C_{123} \cdot C_4}{C_{123} + C_4}$$

$$\Rightarrow \frac{80 \cdot 15}{80+15} = \frac{1200\,uF}{95\,uF} \Rightarrow 12.63\,uF = C_4$$

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Luego:

$Q_1 = 480\,\mu C$.

Q_1 es serie con Q_2 $\therefore$ $Q_1 = Q_2 = 480\mu C$.

Luego:

$$C = \frac{Q}{\Delta V} \Rightarrow C_{12} = \frac{Q_{12}}{V_{12}} \Rightarrow V_{12} = \frac{Q_{12}}{C_{12}}$$

$$\Rightarrow V_{12} = \frac{480\mu C}{20\mu F} = 24V.$$

Luego $V_{12} = 24v = V_3$

$$\Rightarrow Q_3 = C_3 \cdot V_3 \Rightarrow Q_3 = 60\mu F \cdot 24V$$

$$Q_3 = 1440\,\mu C$$

Luego Q_{12} y Q_3 en Paralelo.

$$Q_{123} = Q_{12} + Q_3$$

$$Q_{123} = 480\mu C + 1440\mu C \Rightarrow Q_{123} = \underline{1920\,\mu C}$$

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Luego

$\Rightarrow Q_{123}$ y Q_4 en serie

C_{123} C_4 $\therefore Q_{123} = Q_4$

$\Rightarrow Q_4 = 1920\,\mu C$

Luego $C_T = \frac{Q_T}{V_T} \Rightarrow V_T = \frac{Q_T}{C_T} = \frac{1920\,\mu C}{12.63\,\mu F}$

$\therefore V_T = 152.02\,V$

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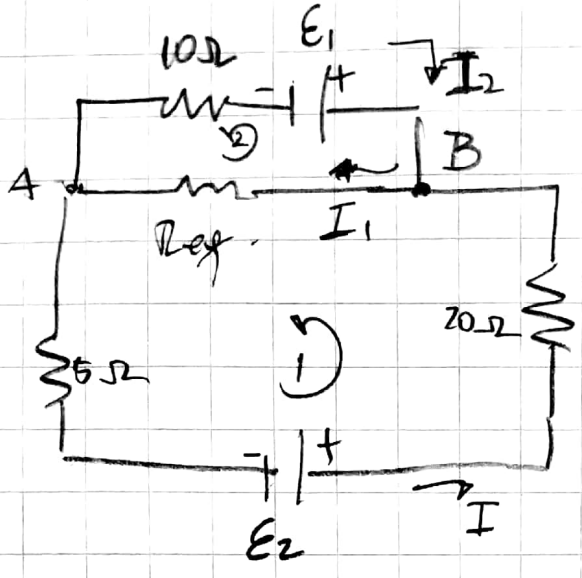
2)



$$\rightarrow \frac{1}{R_{eq}} = \frac{1}{R_2} + \frac{1}{R_3} = \frac{R_3 \cdot R_2}{R_3 + R_2}$$

$\Rightarrow 3.33\,\Omega$

$R_1 = R_2 = 10\,\Omega$
$R_3 = R_4 = 5\,\Omega$
$R_5 = 20\,\Omega$
$\mathcal{E}_1 = 25\,V$
$\mathcal{E}_2 = 10\,V$

a) ΔV entre A y B
b) todas las I.

NODO B

$$I + I_2 - I_1 = 0$$

Malla 1

$$\Rightarrow -R_4 I + \mathcal{E}_2 - R_5 I - R_{eq} I_1 = 0$$

$$\Rightarrow -5I + 10 - 20I - 3.3\,I_1 = 0 \quad (1)$$

Malla 2

$$-R_1 I_2 + \mathcal{E}_1 - R_{eq} I_1 = 0$$

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$$-25I - 3.3I_1 = -10 \quad (1)$$

$$-10I_2 - 3.3I_1 = -25 \quad (2)$$

Luego $-25I = -10 + 3.3I_1$

$$-10I_2 = -25 + 3.3I_1$$

$\Rightarrow I_1 = -4.5$ (A)

$I_2 = 4$ (A) Brayan Maldonado.

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