Sol(4)

$$\varphi(z) = \frac{\sigma}{2\varepsilon_0}\left(\sqrt{z^2+R_2^2} - \sqrt{z^2+R_1^2}\right)$$

Como $\vec{E} = -\nabla\varphi \Rightarrow$ tenemos

$\frac{\partial\varphi}{\partial x} = 0 \wedge \frac{\partial\varphi}{\partial y} = 0$ por dato. Ahora

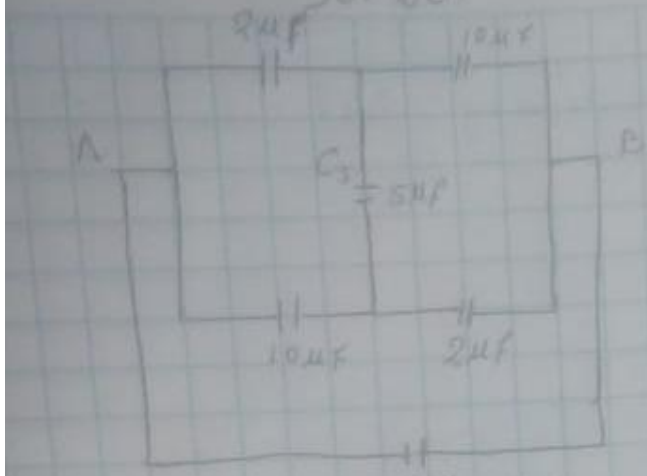
$$\frac{\partial\varphi}{\partial z} = \frac{\sigma}{2\varepsilon_0}\left(\sqrt{z^2+R_2^2} - \sqrt{z^2+R_1^2}\right)$$

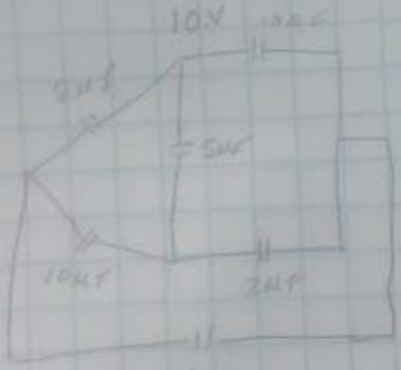
$$= \frac{\sigma}{2\varepsilon_0}\left(2z\cdot\tfrac{1}{2}(z^2+R_2^2) - 2z\cdot\tfrac{1}{2}(z^2+R_1^2)\right)$$

$$= \frac{\sigma}{2\varepsilon_0}\left(z^2+R_2^2 - z^2+R_1^2\right) = \frac{\sigma z}{2\varepsilon_0}\left(R_2^2 - R_1^2\right)$$

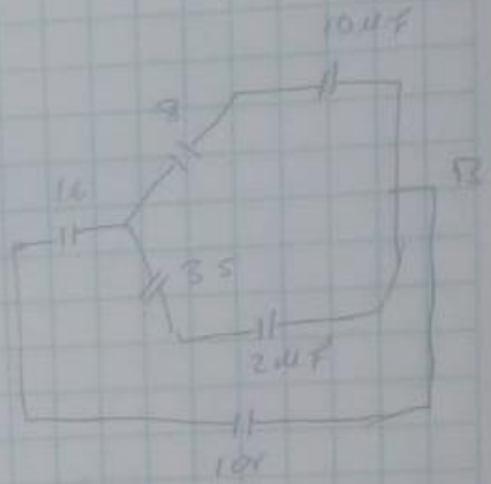
$$\Rightarrow \frac{\sigma z}{2\varepsilon_0}\left(R_2^2 - R_1^2\right) \therefore \vec{E} = \left(0, 0, \frac{\sigma z}{2\varepsilon_0}\left(R_2^2 - R_1^2\right)\right)$$

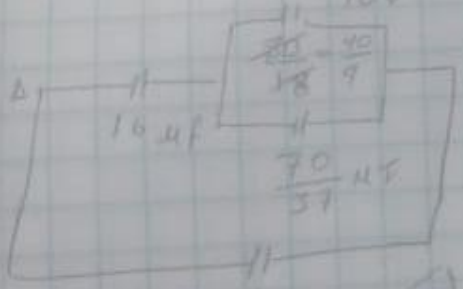
Sol 28)



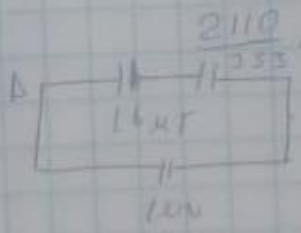




$\Rightarrow$

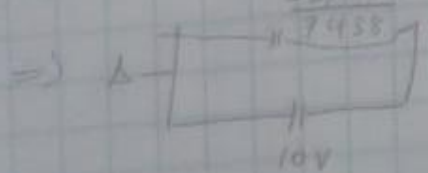



$\Rightarrow$




$$\Rightarrow \frac{16 * \frac{2110}{333}}{16 + \frac{2110}{333}} = \frac{\frac{33760}{333}}{\frac{7438}{333}} \Rightarrow \frac{33760}{7438}$$




$$Ce = \frac{33,760}{7,438}\ \mu F$$

2.b)

donde tenemos por dato q'

$\varphi_A - \varphi_B = 10V$ además se cumple $\varphi_A - \varphi_B = \frac{Q}{C}$

$C = \frac{Q}{\varphi_A - \varphi_B}$

donde $(\varphi_B - \varphi_A) + (\varphi_M - \varphi_B) = \varphi_B - \varphi_B$

$(\varphi_A - \varphi_M) +$

$Q = 10V \times \frac{33,760}{7,438}\ \mu F = 10V \times 4,538854638\ \mu F$

$Q = 45,38854638\ \mu C$ Redondeando

$Q = 45\ \mu C$

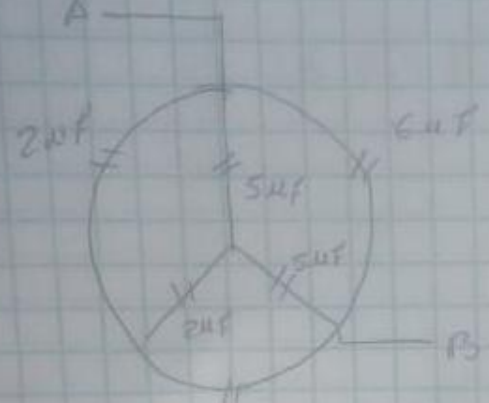
$\Rightarrow (\varphi_A - \varphi_M) = \frac{45}{8} V$ $\Rightarrow$ igualmos $(\varphi_A - \varphi_M) = \frac{45}{10} V$

$(\varphi_M - \varphi_B) = \frac{45}{10} V$ $(\varphi_A - \varphi_M) = \frac{45}{2} V$

$(\varphi_B - \varphi_B) = \frac{81}{5} V$ $(\varphi_M - \varphi_B) = 14V$

$\Rightarrow (\varphi_M - \varphi_B) C_3 = 14.5\mu F = 70\ \mu F$

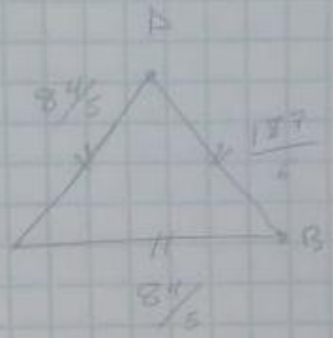
Sol (13)





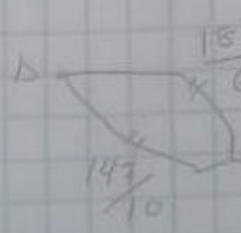


=0




$$\frac{\frac{84}{5}\cdot\frac{84}{5}}{\frac{84}{5}+\frac{84}{5}} = \frac{\frac{84^2}{25}}{\frac{5\cdot 84+84\cdot 5}{25}}$$

$$\frac{\frac{84^2}{25}}{\frac{840}{25}} = \frac{7056}{840} = \frac{147}{10}$$




$$\frac{187}{6}+\frac{147}{10} = \frac{1870+882}{60}$$

$$= \frac{2752}{60} = \frac{688}{15}$$

$\frac{688}{15}$ uF

D —— B