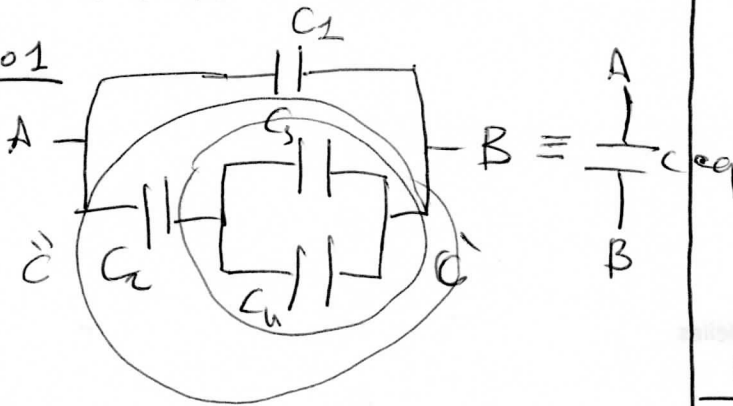


2011/2022
 Long type de la
 série N°4
 Matière : électricité

Exo1

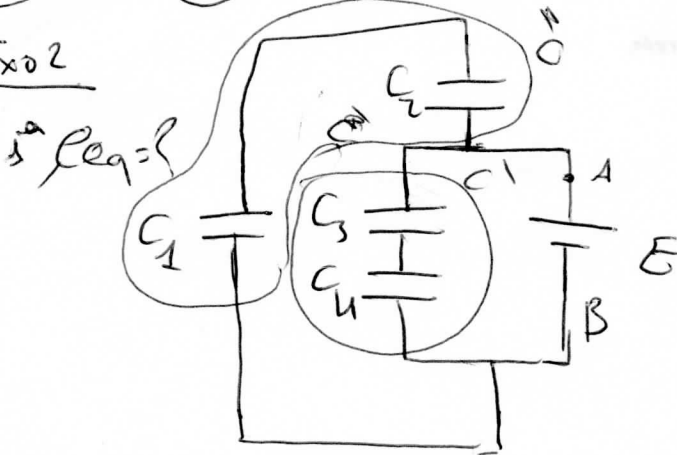


$$C' = C_3 + C_4 = 690 \text{ mF} = 69 \times 10^{-4} \text{ MF}$$

$$C'' = \frac{C' C_2}{C' + C_2}$$

$$C_{eq} = C_1 + C''$$

Exo2



$$C' = \frac{C_3 C_4}{C_3 + C_4} = \frac{2 \cdot 3}{2 + 3} = \frac{6}{5} \text{ mF}$$

$$C'' = \frac{C_1 C_2}{C_1 + C_2} = \frac{2}{3} \text{ mF}$$

$$C_{eq} = C' + C'' = \frac{28}{15} \text{ mF}$$

$$\begin{cases} E = V_3 + V_4 & (1) \\ E = V_1 + V_2 & (2) \end{cases} \quad \begin{matrix} \text{①} \\ \text{②} \end{matrix}$$

$$E = \frac{P_3}{C_3} + \frac{P_4}{C_4} = P_3 \left(\frac{1}{C_3} + \frac{1}{C_4} \right)$$

$$\Rightarrow P_3 = E \cdot C = 6 \mu\text{C}$$

$$P_4 = P_3 = 6 \mu\text{C}$$

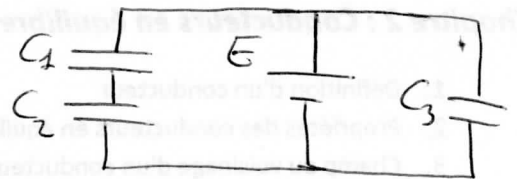
② et ④

$$E = \frac{P_1}{C_1} + \frac{P_2}{C_2} = P_1 \left(\frac{1}{C_1} + \frac{1}{C_2} \right)$$

$$P_1 = E \cdot C'' = 5 \times \frac{2}{3} = \frac{10}{3} \mu\text{C}$$

$$P_1 = P_2 = \frac{10}{3} \mu\text{C}$$

Exo3



$$1. C_1 = C_3 = 2 \mu\text{F}, C_2 = 3 \mu\text{F}$$

$$E = 5 \text{ V}$$

$$\begin{cases} E = V_1 + V_2 & (1) \\ E = V_3 & (2) \end{cases} \quad \begin{matrix} \text{①} \\ \text{②} \end{matrix}$$

$$V_1 = \frac{P_1}{C_1}, V_2 = \frac{P_2}{C_2}$$

$$V_3 = \frac{P_3}{C_3} \Rightarrow P_3 = V_3 \cdot C_3$$

$$P_3 = 10 \mu\text{C}$$

$$\text{① et ②} \Rightarrow E = \frac{P_1}{C_1} + \frac{P_2}{C_2}$$

$$= P_1 \left(\frac{1}{C_1} + \frac{1}{C_2} \right)$$

$$\Rightarrow P_1 = E \frac{C_1 C_2}{C_1 + C_2}$$

$$= 5 \times \frac{2 \cdot 3}{5} = 6 \mu\text{C}$$

$$P_1 = 6 \mu\text{C}$$

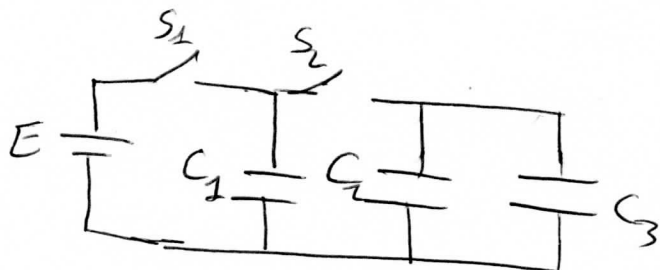
$$P_1 = P_2 = 6 \mu\text{C}$$

$$V_1 = \frac{P_1}{C_1} = \frac{6}{2} = 3 \text{ V} \quad V_2 = \frac{P_2}{C_2} = 2 \text{ V}$$

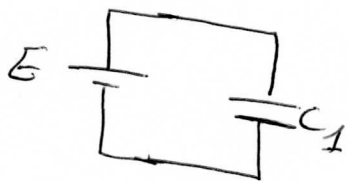
Exo 4

$$C_1 = 2\mu F, C_2 = 3\mu F, C_3 = 5\mu F$$

$$E = 10V$$



1^{ère} cas S_1 est fermé et S_2 est ouvert



$$V_1 = E = \frac{Q_1}{C_1}$$

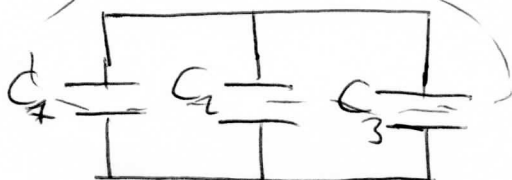
$$V_1 = 10V$$

$$Q_1 = VC_1 \Rightarrow Q_1 = 20\mu C$$

$$V_2 = V_3 = 0$$

$$Q_2 = Q_3 = 0$$

2^{ème} cas S_1 est ouvert et S_2 est fermé



$$V_1 = V_2 = V_3 \quad (1)$$

$$\frac{Q_1}{C_1} = \frac{Q_2}{C_2} = \frac{Q_3}{C_3} \quad (2)$$

$$Q_1 = Q_2 + Q_3 \quad (3)$$

$$(4) \Rightarrow Q_2 = \frac{C_2}{C_1} Q_1 \quad (4)$$

$$Q_3 = \frac{C_3}{C_1} Q_1 \quad (5)$$

(4) et (5) dans (3)

$$Q_1 = Q_1 \left(1 + \frac{C_2}{C_1} + \frac{C_3}{C_1}\right)$$

$$= Q_1 \left(1 + \frac{3}{2} + \frac{5}{2}\right)$$

$$Q_1 = 5 Q_1'$$

$$\Rightarrow Q_1' = \frac{Q_1}{5} \Rightarrow Q_1' = 4\mu C$$

$$(4) \Rightarrow Q_2 = \frac{3}{2} Q_1' \Rightarrow Q_2 = 6\mu C$$

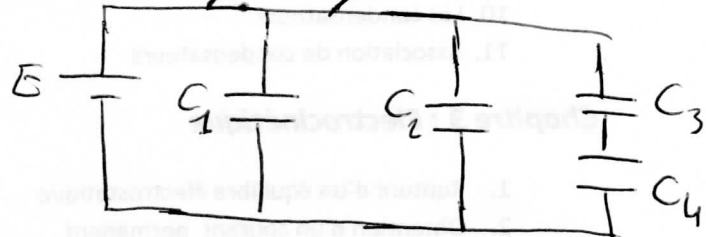
$$(5) \Rightarrow Q_3 = \frac{5}{2} Q_1' \Rightarrow Q_3 = 10\mu C$$

$$V_1 = \frac{Q_1'}{C_1} = 2V$$

$$V_2 = 2V$$

$$V_3 = 2V$$

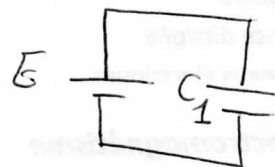
Exo 5



$$C_1 = 1\mu F, C_2 = 2\mu F, C_3 = 4\mu F$$

$$E = 17V$$

1^{ère} cas S_1 est fermé et S_2 est ouvert

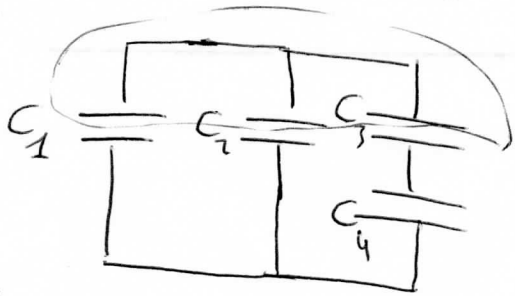


$$E = V_1 = \frac{Q_1}{C_1} \Rightarrow Q_1 = E \cdot C_1$$

$$\Rightarrow Q_1 = 17\mu C$$

$$Q_2 = 0, Q_3 = 0 \text{ et } Q_4 = 0$$

2ème cas S_1 est ouvert et S_2 est fermé



$$\begin{cases} V_1 = V_2 & (1) \\ V_2 = V_3 + V_4 & (2) \\ \Phi_3 = \Phi_4 & (3) \\ \Phi_1 = \Phi_2 + \Phi_3 & (4) \end{cases}$$

$$(1) \Rightarrow \frac{\Phi_1}{C_1} = \frac{\Phi_2}{C_2} \Rightarrow \Phi_2 = \frac{C_2}{C_1} \Phi_1 \quad (5)$$

$$(2) \Rightarrow \frac{\Phi_1}{C_1} = \frac{\Phi_3}{C_3} + \frac{\Phi_4}{C_4} \quad \Phi_2 = 2\Phi_1$$

$$\begin{aligned} \frac{\Phi_1}{C_1} &= \Phi_3 \left(\frac{1}{C_3} + \frac{1}{C_4} \right) = \Phi_3 \frac{C_3 + C_4}{C_3 C_4} \\ \Rightarrow \Phi_3 &= \frac{C_3 C_4}{C_1 (C_3 + C_4)} \Phi_1 \\ &= \frac{8}{6} \Phi_1 = \frac{4}{3} \Phi_1 = \Phi_3 \quad (6) \end{aligned}$$

$$(5) + (6) \text{ ds } (4)$$

$$\Phi_1 = \Phi_1 \left(1 + 2 + \frac{4}{3} \right) = \frac{13}{3} \Phi_1$$

$$\Phi_1 = \frac{3}{13} \Phi_1 \quad \Phi_1 = \frac{51}{13} \mu C$$

$$(5) \Rightarrow \Phi_2 = \frac{102}{13} \mu C$$

$$\Phi_3 = \frac{68}{13} \mu C \quad \Phi_4 = \Phi_3$$

Responsable du matière

O. Assas

[Signature]

03