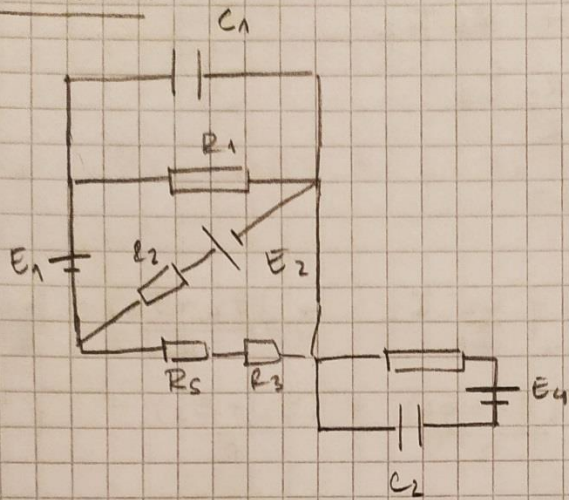


Parcial Biología 2022 AC

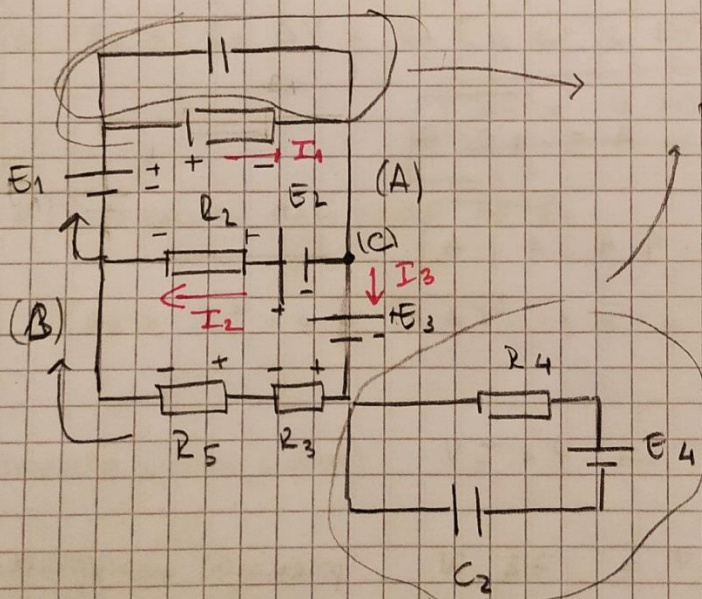
Problema 1



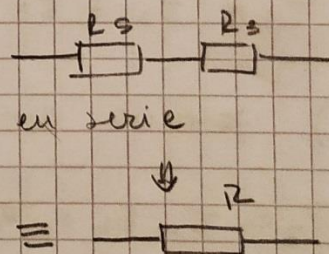
fuera del transistor

a)  $I_1, I_2, I_3$

Redibujar el circuito



por estas 2 ramas no circula corriente



en serie

$$R = R_3 + R_5 = 2R$$

plantar las ec del circuito

node (C)  $\rightarrow I_1 = I_2 + I_3$

mallá (A)  $\rightarrow 0 = -E_1 + R_1 I_1 - E_2 + R_2 I_2$

mallá (B)  $\rightarrow 0 = E_3 + \underbrace{(R_3 + R_5)}_{=R} I_3 - R_2 I_2 + E_2$

despejo  $I_1$  e  $I_3$  en función de  $I_2$



$$(A) \rightarrow R_1 I_1 = E_1 + E_2 - R_2 I_2$$

$$I_1 = \frac{(E_1 + E_2)}{R_1} - \frac{R_2 I_2}{R_1}$$

$$(B) \rightarrow R I_3 = -(E_2 + E_3) + R_2 I_2$$

$$I_3 = -\frac{(E_2 + E_3)}{R} + \frac{R_2 I_2}{R}$$

reemplazo en la ec de nodos

$$I_2 = I_1 - I_3 = \frac{(E_1 + E_2)}{R_1} - \frac{R_2 I_2}{R_1} + \frac{(E_2 + E_3)}{R} - \frac{R_2 I_2}{R}$$

$$I_2 + \frac{R_2 I_2}{R_1} + \frac{R_2 I_2}{R} = \frac{(E_1 + E_2)}{R_1} + \frac{(E_2 + E_3)}{R}$$

$$I_2 \left( 1 + \frac{2R}{1R} + \frac{2R}{2R} \right) = \frac{(28V)}{1R} + \frac{(16V)}{2R}$$

$$I_2 (4) = 36 A$$

$$I_2 = 9 A$$

$$I_1 = \frac{(28V)}{1R} - \frac{2R \cdot 9}{1R} A = 10 A$$

$$I_3 = -\frac{(16V)}{2R} + \frac{2R}{2R} \cdot 9 A = 1 A$$

$$I_1 = I_2 + I_3 \quad \checkmark$$

b) Potencia puede ser disipada o entregada P1 y P2 entregan potencia. Y P3 disipa

$$P_2 = I_2 E_2 = 9 A \cdot 8V = 72 W$$

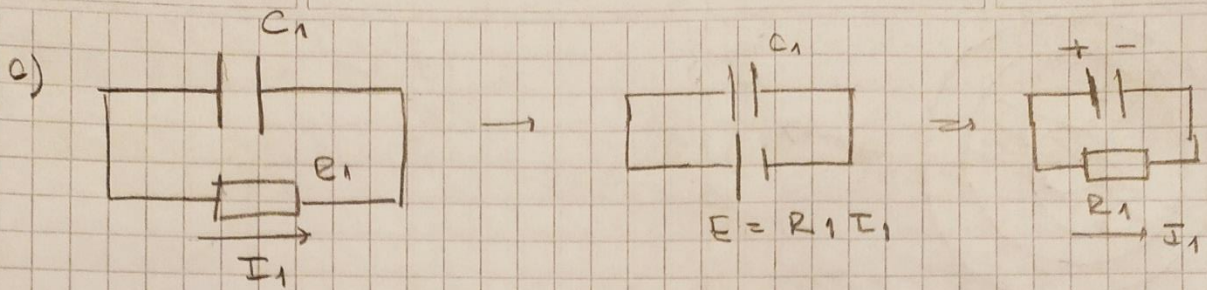
$$P_1 = 10 A \cdot 20 V = 200 \text{ Watts}$$

$$P_3 = I_3 E_3 = 1 A \cdot 8V = 8 W$$

$$P_4 = I_4 E_4 = 0 \cdot 2V = 0$$

$$\uparrow \\ I_4 = 0$$

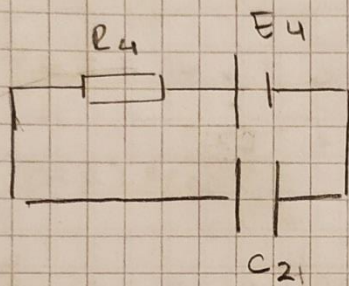
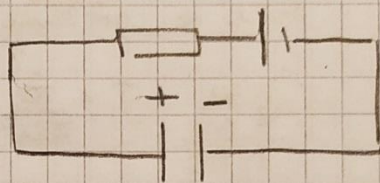




$$Q_1 = C_1 \Delta V = C_1 I_1 R_1 = 2 \text{ pF} \cdot 104 \cdot 1 \Omega$$

$$= 2 \cdot 10^{-12} \text{ F} \cdot 10 \text{ V}$$

$$Q_1 = 2 \cdot 10^{-11} \text{ C}$$


 $\Rightarrow$ 


(no hay  $\Delta V$  en la  
resist)

$$Q_2 = C_2 \Delta V = C_2 E_4 = 2 \cdot 10^{-12} \text{ F} \cdot 2 \text{ V}$$

$$Q_2 = 4 \cdot 10^{-2} \text{ C}$$

d) potencia disipada en  $R_3$

$$P_{R_3} = I_3^2 R_3 = (1 \text{ A})^2 \cdot 1 \Omega = 1 \text{ W}$$

(media hora aprox)