

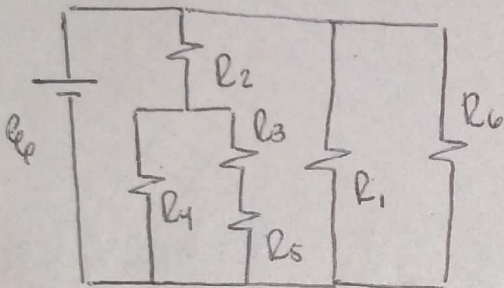
# EYM501 - Taller 3

① No, puede que la dirección de  $\vec{B}$  sea paralela al movimiento, o que existe un  $\vec{E}$  que anula la  $\vec{F}_B$ .

② (a)  $\uparrow$  (b)  $\times$  (c)  $\bullet$

1.0

①  $E = 15V$

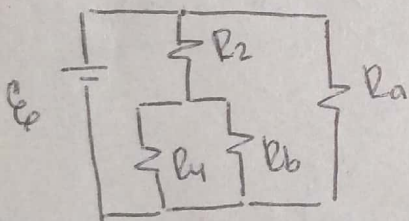


$R_1: 10k\Omega$   
 $R_2: 5k\Omega$   
 $R_3: 8k\Omega$   
 $R_4: 5k\Omega$   
 $R_5: 7k\Omega$   
 $R_6: 10k\Omega$

(a)  $R_{eq} = ?$

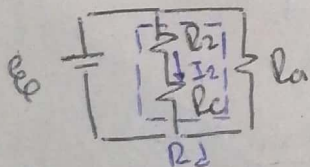
$$R_a = \frac{1}{\frac{1}{10k} + \frac{1}{10k}} \rightarrow R_a = 5k\Omega$$

$$R_b = 8k + 7k \rightarrow 15k\Omega$$



$$R_c = \frac{1}{\frac{1}{5k} + \frac{1}{15k}} \rightarrow R_c = 3.75k\Omega$$

$$R_d = 5k + 3.75k \rightarrow R_d = 8.75k\Omega$$



$$R_{eq} = \frac{1}{\frac{1}{8.75k} + \frac{1}{5k}} \rightarrow \boxed{R_{eq} = 3.18k\Omega} \quad 1.0$$

(b)  $V_{R5} = ?$

$$I_2 = \frac{15}{8.75k} = 1.7mA$$

$$V_c = (1.7m)(3.75k)$$

$$V_c = 6.375V$$

$$I_b = \frac{6.375}{15k} = 0.425mA$$

$$V_5 = (0.425m)(7k) \rightarrow \boxed{V_5 = 2.975V} \quad 1.0$$

(c)  $P_4 = ?$

$$P = \frac{V^2}{R} = \frac{(6.375)^2}{5k} \rightarrow \boxed{P_4 = 8.13mW} \quad 0.5$$

② a) Malla 1

$$-34I_1 + 45 - I_3 - 47I_3 = 0$$

$$\boxed{-34I_1 - 48I_3 + 45 = 0}$$

Nodo d

$$\boxed{I_1 + I_2 - I_3 = 0}$$

1.0

Malla 2

$$47I_3 - 75 + I_2 + 18I_2 - 45 + I_3 = 0$$

$$\boxed{19I_2 + 48I_3 - 120 = 0}$$

⑥

$$I_1: -0.86A$$

$$I_2: 2.41A$$

$$I_3: 1.55A$$

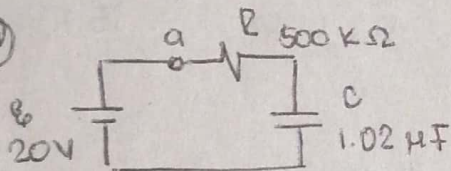
1.0

③ c)  $V_f - 1I_2 - 18I_2 + 45 - V_c = 0$

$$\boxed{V_f - V_c = 0.79V}$$

0.5

③ a)



$$q(t) = Q(1 - e^{-t/\tau})$$

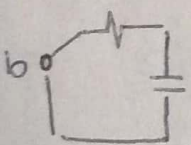
$$t = \ln(0.6) [-\tau]$$

$$0.4Q = Q(1 - e^{-t/\tau})$$

$$\boxed{t = 0.26s}$$

0.8

③ b)



$$I(t) = -I e^{-t/\tau}$$

$$I = -\frac{20}{500k} e^{-\frac{0.75}{0.51}}$$

$$\rightarrow \boxed{I = -9.2 \mu A}$$

0.7

④  $r_2 = \frac{m_2 v}{qB} \rightarrow v = \frac{qB r_2}{m_2} = \frac{(1.602 \times 10^{-19})(1.5)(3.5 \times 10^{-3})}{4.04 \times 10^{-26}}$

$$v = 20.8 \text{ km/s}$$

0.7

$$m_1 = \frac{r_1 q B}{v} = \frac{(1.1 \times 10^{-3})(1.602 \times 10^{-19})(1.5)}{20.8 \times 10^3}$$

$$\boxed{m_1 = 1.27 \times 10^{-26} \text{ kg}}$$

0.8