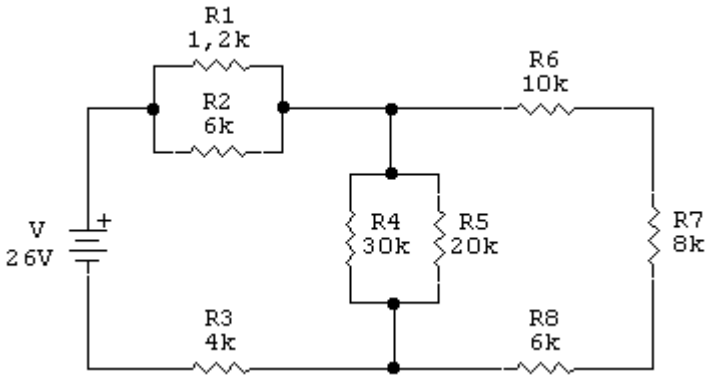
TECNOLOGÍA ELECTRÓNICA
CIRCUITOS I

DIVISORES DE VOLTAJE Y DE CORRIENTE

- Hallar R_T, V_1, V_2, V_3, V_4, V_5, V_6, V_7, V_8, I_T, I_1, I_2, I_3, I_4, I_5, I_6, I_7, I_8, P_T en el siguiente circuito:



Inicialmente hallamos R_T comenzando por el lado opuesto a la fuente de voltaje.

$$R_A = R_6 + R_7 + R_8 \therefore R_A = 24K\Omega$$

$$R_B = \frac{R_4 \times R_5}{R_4 + R_5} \therefore R_B = 12K\Omega$$

$$R_C = \frac{R_A \times R_B}{R_A + R_B} \therefore R_C = 8K\Omega$$

$$R_D = \frac{R_1 \times R_2}{R_1 + R_2} \therefore R_D = 1K\Omega$$

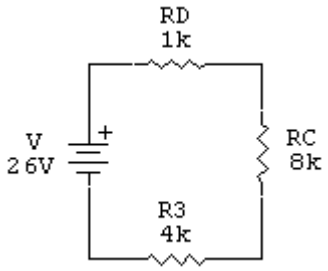
$$R_E = R_D + R_C + R_3 \therefore R_E = 13K\Omega = R_T$$

Divisor de voltaje o tensión:

$$V_D = \frac{R_D}{R_T} \times V \therefore V_D = 2V = V_1 = V_2$$

$$V_C = \frac{R_C}{R_T} \times V \therefore V_C = 16V = V_A = V_B = V_4 = V_5$$

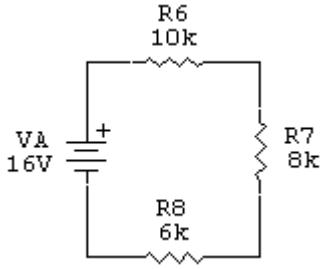
$$V_3 = \frac{R_3}{R_T} \times V \therefore V_3 = 8V$$



$$V_6 = \frac{R_6}{R_A} \times V_A \therefore V_6 = 6{,}66V$$

$$V_7 = \frac{R_7}{R_A} \times V_A \therefore V_7 = 5{,}33V$$

$$V_8 = \frac{R_8}{R_A} \times V_A \therefore V_8 = 4V$$

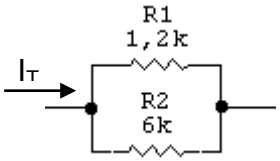


Divisor de corriente:

$$I_T = \frac{V}{R_T} \therefore I_T = 2mA = I_D = I_C = I_3$$

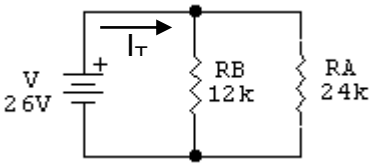
$$I_1 = \frac{R_2}{R_1 + R_2} \times I_T \therefore I_1 = 1{,}66mA$$

$$I_2 = \frac{R_1}{R_1 + R_2} \times I_T \therefore I_2 = 0{,}33mA$$



$$I_B = \frac{R_A}{R_B + R_A} \times I_T \therefore I_B = 1{,}33mA$$

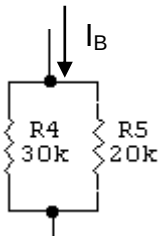
$$I_A = \frac{R_B}{R_A + R_B} \times I_T \therefore I_A = 0{,}66mA = I_6 = I_7 = I_8$$



$$I_4 = \frac{R_5}{R_4 + R_5} \times I_B \therefore I_4 = 0{,}532\,mA$$

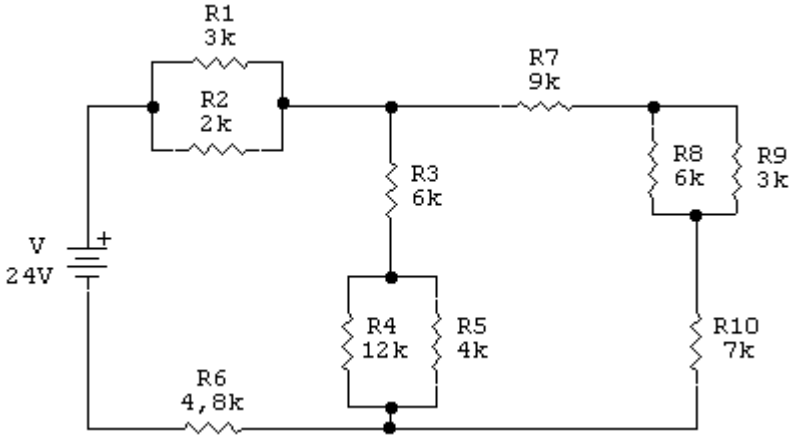
$$I_5 = \frac{R_4}{R_4 + R_5} \times I_B \therefore I_5 = 0{,}798\,mA$$

$$P_T = Vf \times I_T \therefore P_T = 52\,mW$$



Ver archivo de simulación Divisor-VI.dsn

- Hallar R_T, V_1, V_2, V_3, V_4, V_5, V_6, V_7, V_8, I_T, I_1, I_2, I_3, I_4, I_5, I_6, I_7, I_8, P_T en el siguiente circuito:

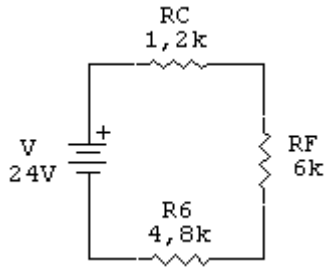


Hallamos R_T comenzando por el lado opuesto a la fuente de voltaje.

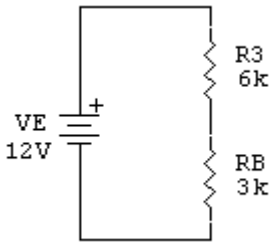
$$R_A = \frac{R_8 \times R_9}{R_8 + R_9} \therefore R_A = 2K\Omega$$
$$R_B = \frac{R_4 \times R_5}{R_4 + R_5} \therefore R_B = 3K\Omega$$
$$R_C = \frac{R_1 \times R_2}{R_1 + R_2} \therefore R_C = 1{,}2K\Omega$$
$$R_D = R_7 + R_A + R_{10} \therefore R_D = 18K\Omega$$
$$R_E = R_3 + R_B \therefore R_E = 9K\Omega$$
$$R_F = \frac{R_E \times R_D}{R_E + R_D} \therefore R_F = 6K\Omega$$
$$R_T = R_C + R_F + R_6 \therefore R_T = 12K\Omega$$

Divisor de tensión o voltaje:

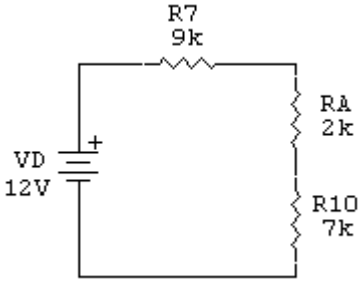
$$V_C = \frac{R_C}{R_C + R_F + R_6} \times V \therefore V_C = 2{,}4V = V_1 = V_2$$
$$V_F = \frac{R_F}{R_C + R_F + R_6} \times V \therefore V_F = 12V = V_E = V_D$$
$$V_6 = \frac{R_6}{R_C + R_F + R_6} \times V \therefore V_6 = 9{,}6V$$



$$V_3 = \frac{R_3}{R_3 + R_B} \times V_E \therefore V_3 = 8V$$
$$V_B = \frac{R_B}{R_3 + R_B} \times V_E \therefore V_B = 4V = V_4 = V_5$$



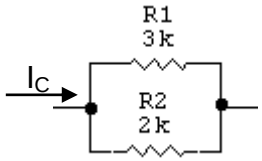
$$V_7 = \frac{R_7}{R_7 + R_A + R_{10}} \times V_D \therefore V_7 = 6V$$
$$V_A = \frac{R_A}{R_7 + R_A + R_{10}} \times V_D \therefore V_A = 1{,}33V = V_8 = V_9$$
$$V_{10} = \frac{R_{10}}{R_7 + R_A + R_{10}} \times V_D \therefore V_{10} = 4{,}66V$$



Divisor de corriente:

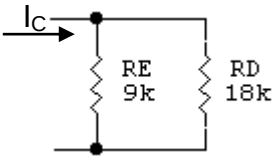
$$I_1 = \frac{R_2}{R_1 + R_2} \times I_C \therefore I_1 = 0{,}8mA$$

$$I_2 = \frac{R_1}{R_1 + R_2} \times I_C \therefore I_2 = 1{,}2mA$$



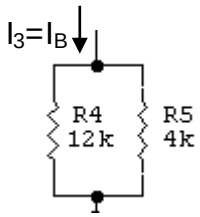
$$I_E = \frac{R_D}{R_E + R_D} \times I_F \therefore I_E = 1{,}33mA = I_3 = I_B$$

$$I_D = \frac{R_E}{R_E + R_D} \times I_F \therefore I_D = 0{,}66mA = I_7 = I_A = I_{10}$$



$$I_4 = \frac{R_5}{R_4 + R_5} \times I_B \therefore I_4 = 0{,}3325mA$$

$$I_5 = \frac{R_4}{R_4 + R_5} \times I_B \therefore I_5 = 0{,}9975mA$$



$$I_8 = \frac{R_9}{R_8 + R_9} \times I_A \therefore I_8 = 0{,}22mA$$

$$I_9 = \frac{R_8}{R_8 + R_9} \times I_A \therefore I_9 = 0{,}44mA$$

$$P_T = Vf \times I_T \therefore P_T = 48mW$$