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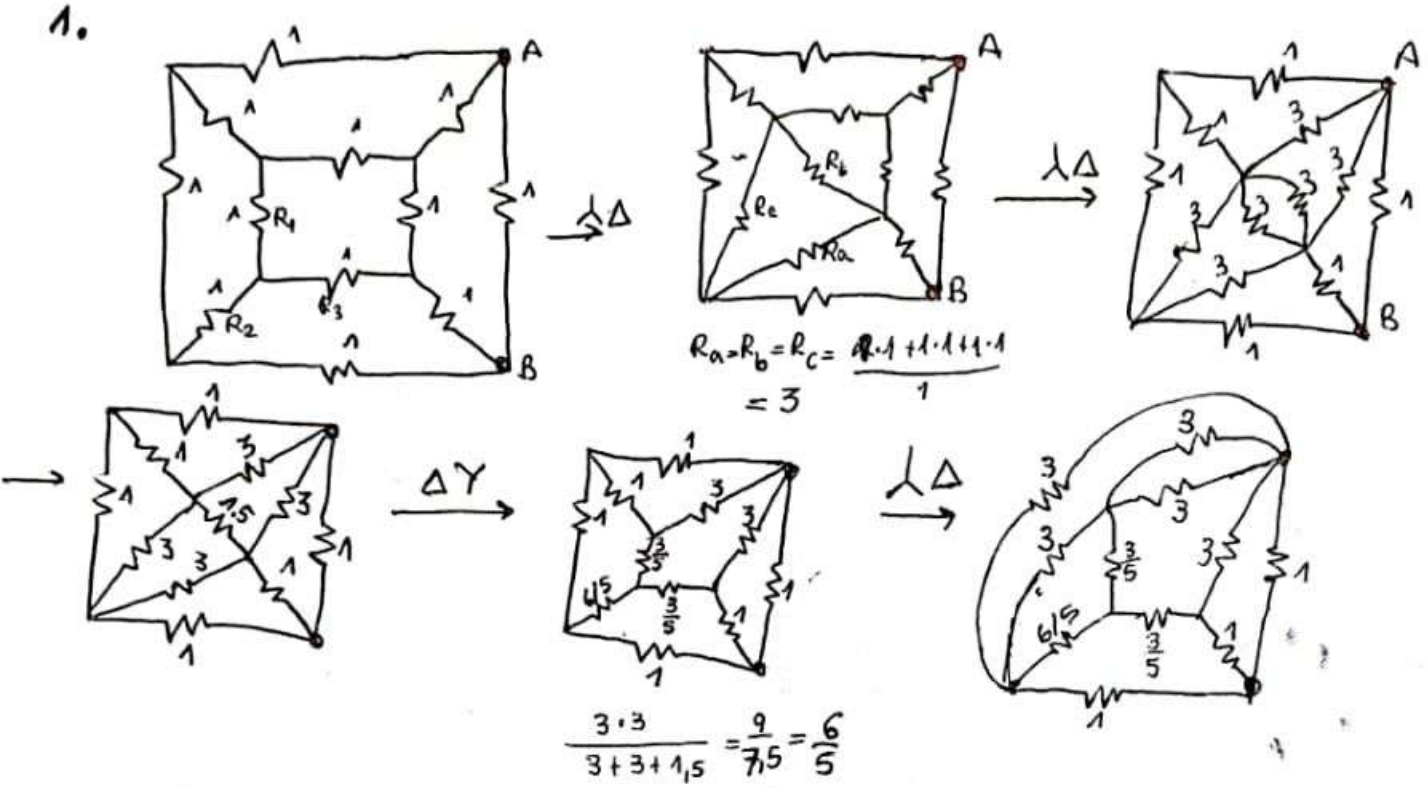
TAREA 1.

1.



$R_a = R_b = R_c = \frac{1\cdot1+1\cdot1+1\cdot1}{1} = 3$

$\frac{3\cdot3}{3+3+1,5} = \frac{9}{7,5} = \frac{6}{5}$

$\frac{3\cdot1,5}{7,5} = \frac{3}{5}$

$\frac{3\cdot6/5}{3+6/5+3/5} = \frac{18/5}{24/5} = \frac{3}{4}$

$\frac{6/5\cdot3/5}{24/5} = 3/20$

$\frac{3\cdot3/5}{24/6} = \frac{3}{8}$

$\frac{3}{8}+1,5 = \frac{15}{8}$

$\frac{3}{20}+\frac{3}{5} = \frac{3}{4}$

$\frac{9}{5}\cdot\frac{9}{5} = \frac{81}{25}$

$\frac{3}{5}\cdot\frac{9}{5} = 27/5$

$R = \frac{81/25}{27/5}$

$R = 3/5$

$\frac{3}{4}\cdot\frac{3}{4}+\frac{3}{4}\cdot\frac{15}{8}+\frac{3}{4}\cdot\frac{15}{8} = \frac{27}{8}$

$\frac{27/8}{3/4} = \frac{9}{2}$

$\frac{27/8}{15/8} = \frac{9}{5}$

$\frac{3\cdot\frac{9}{2}}{3+\frac{9}{2}} = \frac{9}{5}$

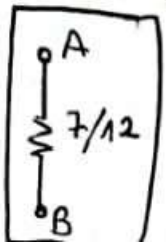
$R = 3/5+\left(\left(\frac{9}{5}+1\right)\|\left(\frac{9}{5}+1\right)\right) = 7/5$

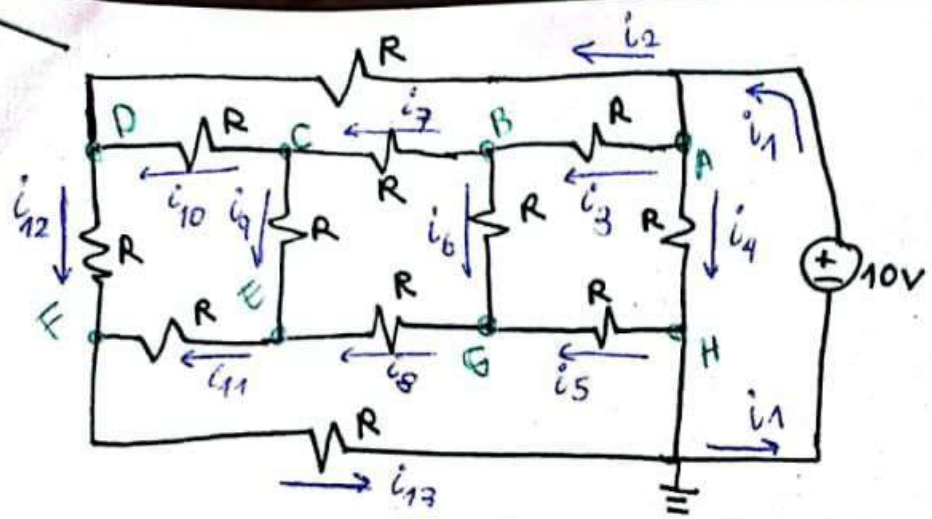
$\frac{7/5}{\frac{7}{5}+1} = \frac{7}{12}$

$\rightarrow \frac{3}{5}+1 = \frac{8}{5}$

$\frac{\frac{8}{5}\cdot\frac{8}{5}}{\frac{8}{5}+\frac{8}{5}} = \frac{\frac{8}{5}}{2} = \frac{4}{5}$

$\frac{4}{5}\|\frac{3}{5} = \frac{7}{15}$





$V = IR$

$I = \frac{V}{R}$

$i_4 = 1A$

$A = 10V$

$H = 0V$

°D $i_2 - i_{10} - i_{12} = 0$

$10 - 3V_D + V_C + V_F = 0$

$V_C - 3V_E + V_G + V_F = 0$

$V_B - 3V_G + V_E = 0$

$V_B - 3V_C + V_E + V_B = 0$

$V_D - 3V_F + V_E = 0$

$V_A - 3V_B + V_C + V_G = 0$

A	V_B	V_C	V_D	V_E	V_F	V_G	B
	0	1	-3	0	1	0	-10
	0	1	0	-3	1	1	0
	1	0	0	1	0	-3	0
	1	-3	1	1	0	0	0
	0	0	1	1	-3	0	0
	-3	1	0	0	0	1	-10

$V_B = 45/7 = 6,43\ V$

$V_C = 40/7 = 5,71\ V$

$V_D = 45/7 = 6,43\ V$

$V_E = 30/7 = 4,28\ V$

$V_F = 25/7 = 3,57\ V$

$V_G = 25/7 = 3,57\ V$

$V_A = 10V$, $V_H = 0V$

Nodo D → $\frac{10 - V_D}{R} + \frac{V_C - V_D}{R} - \frac{(V_D - V_F)}{R} = 0$

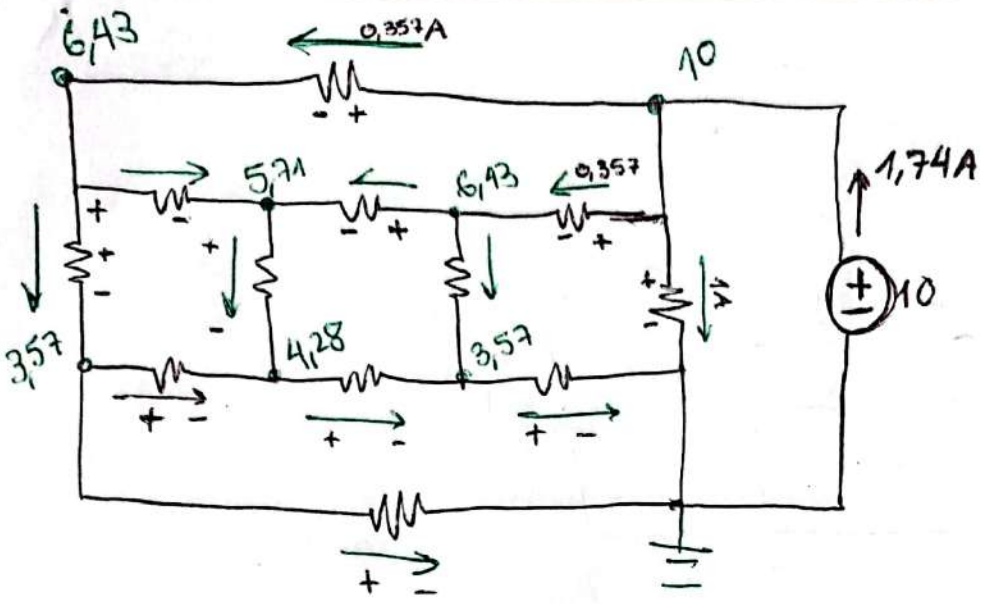
Nodo C → $\frac{V_B - V_C}{R} - \left(\frac{V_C - V_E}{R}\right) - \left(\frac{V_C - V_D}{R}\right) = 0$

Nodo E → $\frac{V_C - V_E}{R} + \frac{V_G - V_E}{R} - \left(\frac{V_E - V_F}{R}\right) = 0$

Nodo F → $\frac{V_D - V_F}{R} + \frac{V_E - V_F}{R} - \left(\frac{V_F - 0}{R}\right) = 0$

Nodo G → $\frac{V_B - V_G}{R} + \frac{V_H - V_G}{R} - \left(\frac{V_G - V_E}{R}\right) = 0$

Nodo B → $\frac{V_A - V_B}{R} - \left(\frac{V_B - V_C}{R}\right) - \left(\frac{V_B - V_G}{R}\right) = 0$



$V = IR$

$I = \frac{V}{R}$

$\frac{10 - 6,43}{10} = 0,357\ A$

$\frac{6,43 - 3,57}{10} = 0,286$

$\frac{6,43 - 5,71}{10} = 0,072$

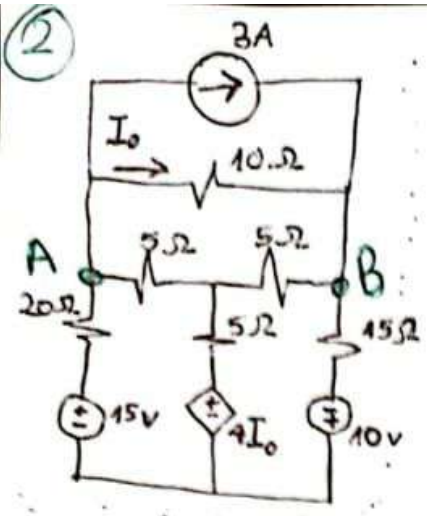
$\frac{}{0}$

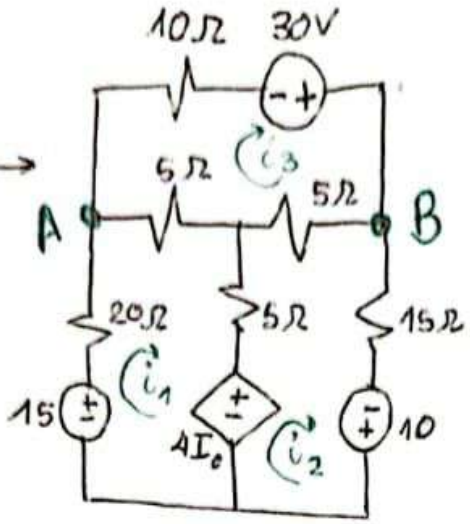
b) ¿Cuál es la potencia entregada por la fuente de voltaje?

$P_{fuente} = V \cdot I$

$P = 10 \cdot 1,74 = 17.4\ W$

(2)





$P = V \cdot I$

$P = I^2 R$

$V = I R$

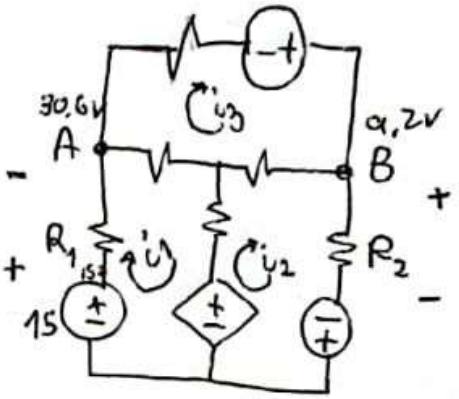
Mallas

$$-15 + 20 i_1 + 5(i_1 - i_3) + 5(i_1 - i_2) + 4 i_o = 0$$
$$-4 i_o + 5(i_2 - i_1) + 5(i_2 - i_3) + 15 i_2 - 10 = 0$$
$$5(i_3 - i_1) - 30 + 10 i_3 + 5(i_3 - i_2) = 0$$

$$\downarrow$$

$$30 i_1 - 5 i_2 - i_3 = 15$$
$$-5 i_1 + 25 i_2 - 9 i_3 = 10$$
$$-5 i_1 - 5 i_2 + 20 i_3 = 30$$

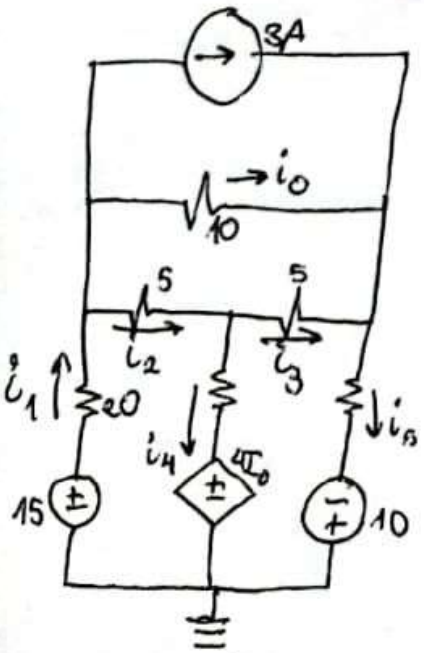
$i_1 = 0,78A$, $i_2 = 1,28A$, $i_3 = 2,01A$



~~$\frac{15V}{R_1} = I_1$~~

~~$V_A = 15 - (20)(0,78)$~~

$$\downarrow$$



$i_1 = i_2 + i_o + 3A$

$i_2 = i_3 + i_4$

$3 + i_o + i_3 = i_5$

$i_2 = -4,37$

$i_o = 1,28$

$i_1 = 0,78$

$i_3 = -3,87$

$i_4 = 0,5$

$i_1 = 0,78$

$i_o = 2,15$

Potencia