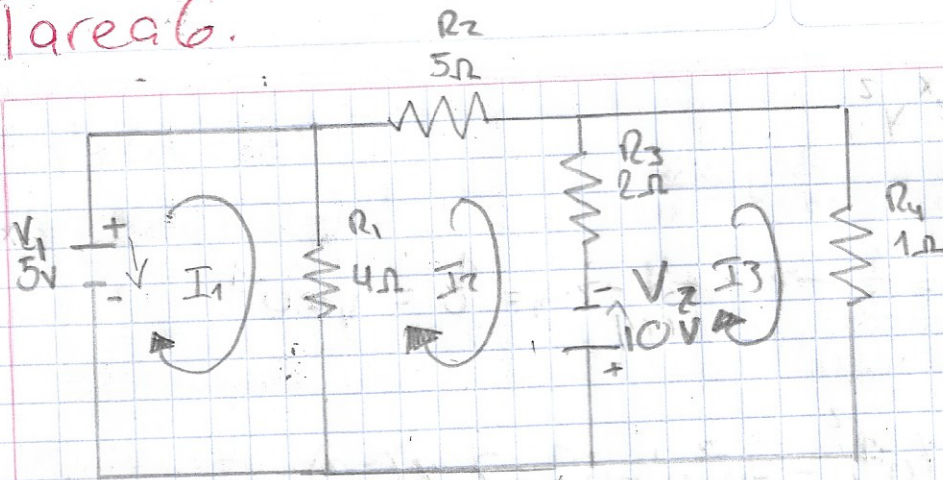# Tarea 6.

$Z_{11} = R_{11} = 4\,\Omega$

$Z_{22} = R_1 + R_2 + R_3 = 4 + 5 + 2 = 11\,\Omega$

$Z_{33} = R_3 + R_4 = 2 + 1 = 3\,\Omega$

$Z_{12} = R_1 = 4\,\Omega$

$Z_{13} = \emptyset$

$Z_{23} = R_3 = 2\,\Omega$

① $Z_{11}i_1 - Z_{12}i_2 - Z_{13}i_3 = V_1(\cdot)$

② $-Z_{21}i_1 + Z_{22}i_2 - Z_{23}i_3 = V_2$

③ $-Z_{31}i_1 - Z_{32}i_2 + Z_{33}i_3 = -V_2$

$\therefore$

$$\boxed{\begin{aligned} ①\ & 4i_1 - 4i_2 = 5v \\ ②\ & -4i_1 + 11i_2 - 2i_3 = 10v \\ ③\ & -2i_2 + 3i_3 = -10v \end{aligned}}$$

$$\begin{pmatrix} 4 & -4 & 0 & | & 5 \\ -4 & 11 & -2 & | & 10 \\ 0 & -2 & 3 & | & -10 \end{pmatrix} (\tfrac{1}{4})$$

$\longrightarrow R_2 + 4R_1$

$$\begin{pmatrix} 1 & -1 & 0 & | & 1.25 \\ 0 & 7 & -2 & | & 15 \\ 0 & -2 & 3 & | & -10 \end{pmatrix} (\tfrac{1}{7})$$

$$\begin{pmatrix} 1 & -1 & 0 & | & 1.25 \\ 0 & 1 & -0.28 & | & 2.14 \\ 0 & -2 & 3 & | & -10 \end{pmatrix} \longrightarrow$$

$R_3 + 2R_2$

$$\begin{pmatrix} 1 & -1 & 0 & | & 1.25 \\ 0 & 1 & -0.28 & | & 2.14 \\ 0 & 0 & 2.42 & | & -5.71 \end{pmatrix} (\tfrac{7}{17})$$

$R_2 + \tfrac{2}{7} R_3$

$$\begin{pmatrix} 1 & -1 & 0 & | & 1.25 \\ 0 & 1 & 0 & | & 1.47 \\ 0 & 0 & 1 & | & -2.35 \end{pmatrix} \longrightarrow$$

$R_1 + R_2$

$$\begin{pmatrix} 1 & 0 & 0 & | & 2.72 \\ 0 & 1 & 0 & | & 1.47 \\ 0 & 0 & 1 & | & -2.35 \end{pmatrix}$$

$\therefore I_1 = 2.72 A$

$I_2 = 1.47 A$

$I_3 = -2.35 A$