

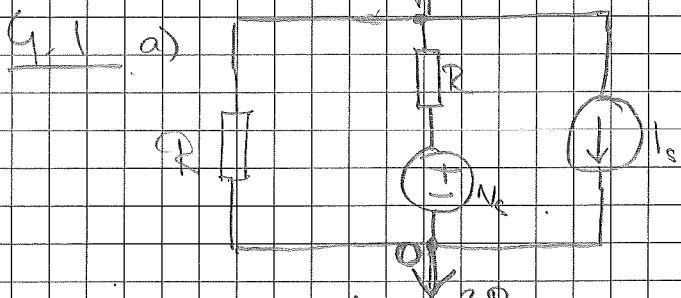
2.15 $R_1 = 70 \Omega$
 $I_1 = 1 \cdot 10^{-3} \text{ A}$
 $I_2 = 200 \cdot 10^{-3} \text{ A}$
 $U_0 = R_1 \cdot I_1$

$R_{\text{rev}} = \frac{R_1 R_2}{R_1 + R_2}$ $U_0 = R_{\text{rev}} \cdot I_2 = \frac{R_1 R_2}{R_1 + R_2} I_2 \Rightarrow$
 $\frac{U_0}{I_2} = R_{\text{rev}} \quad U_0 = 70 \cdot 1 \cdot 10^{-3} \cdot 200 \cdot 10^{-3} = 14 \cdot 10^{-3} \text{ V}$

$\frac{R_1 R_2}{R_1 + R_2} = 0,35 \Rightarrow R_1 R_2 = 0,35 R_1 + 0,35 R_2$

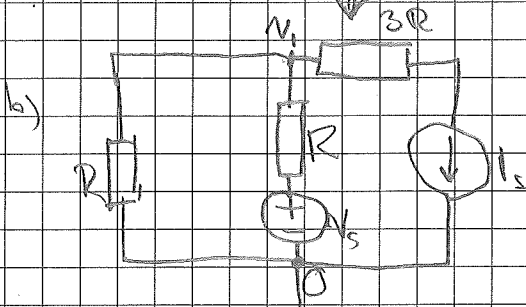
$R_2 (R_1 - 0,35 R_2) = 70 \cdot 0,35 R_2$

$R_2 = \frac{0,35 \cdot 70}{70 - 0,35 R_2}$

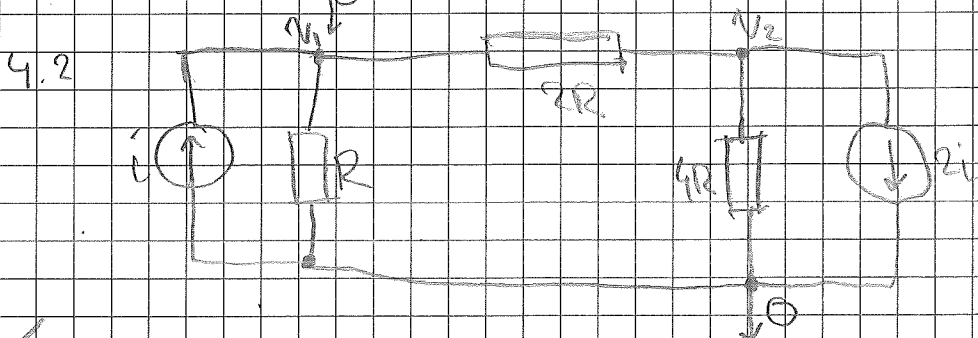


1) $\frac{V_1 - V_s}{R} + I_s + \frac{V_1 - 0}{R} = 0$

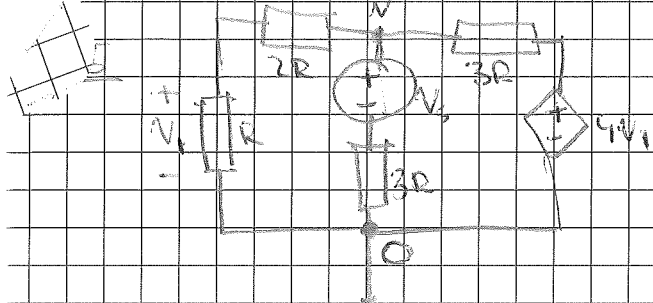
$V_1 - V_s + V_1 = -I_s R$
 $2V_1 = \frac{V_s - I_s R}{2}$



1) Same



1) $\frac{V_1}{R} - i + \frac{V_1 - V_2}{2R} = 0$ $\begin{cases} 3V_1 - 2Ri + V_1 - V_2 = 0 \\ 2V_2 = 2V_1 + V_2 + 8Ri = 0 \end{cases}$
 $\frac{V_2 - V_1}{2R} + \frac{V_2}{4R} + 2i = 0$ $\begin{cases} 3V_1 - V_2 = 2R \cdot i \\ -2V_1 + 3V_2 = -8R \cdot i \end{cases}$
 $\begin{cases} 3V_1 - V_2 = 2R \cdot i \\ 9V_1 = -2R \cdot i \end{cases} \Rightarrow \begin{cases} -\frac{6}{7} R i = V_2 - 2R i \\ V_1 = -\frac{2}{7} R i \end{cases} \Rightarrow \begin{cases} V_1 = -\frac{20}{7} R i \\ V_2 = -\frac{90}{7} R i \end{cases}$



$$\frac{V-0}{2R+R} + \frac{V-V_s}{3R} + \frac{V-4V}{3R} = 0$$

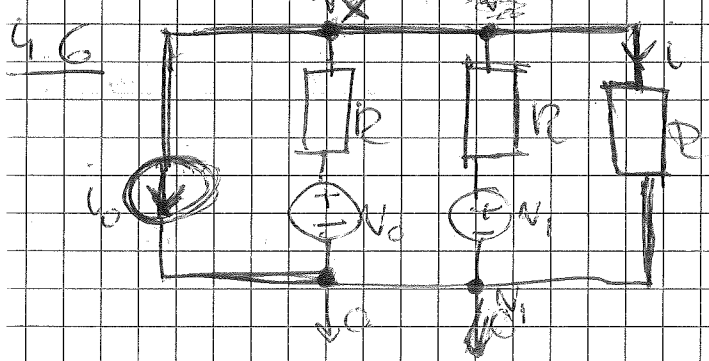
$$V_1 = \frac{R}{R+2R} \quad V = \frac{V}{3}$$

$$\Rightarrow V + V - V_s + V - \frac{4V}{3} = 0$$

$$= 3V - 9V - 3V_s - 4V = 0$$

$$= 5V - 3V_s = 0$$

$$V = \frac{3}{5} V_s$$



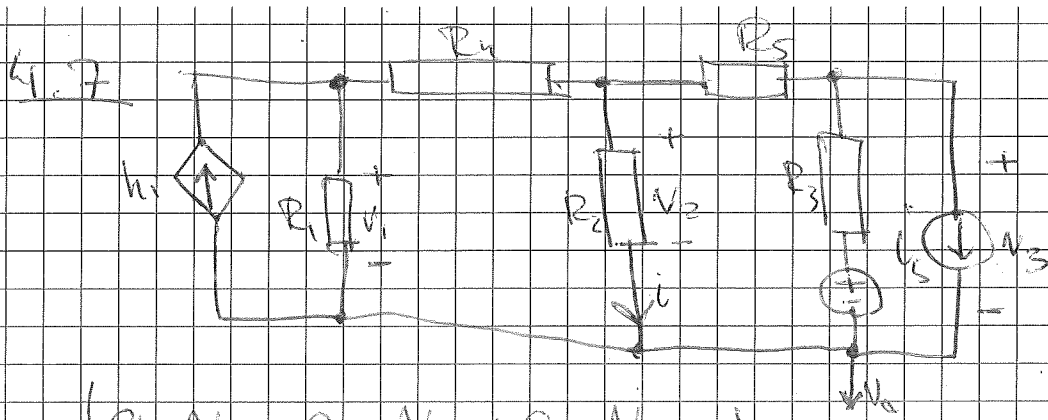
$$I_0 + \frac{V_x - V_0}{R} + \frac{V_x + V_1}{R} + \frac{V_x}{R} = 0$$

$$R I_0 + V_x - V_0 = V_x + V_1 + V_x \quad + V_x = 0$$

$$3V_x = V_0 - V_1 - R I_0$$

$$3R I = V_0 - V_1 - R I_0$$

$$I = \frac{V_0 - V_1}{3R} - \frac{I_0}{3}$$



$$\begin{cases} a_{11}V_1 + a_{12}V_2 + a_{13}V_3 = b_1 \\ a_{21}V_1 + a_{22}V_2 + a_{23}V_3 = b_2 \\ a_{31}V_1 + a_{32}V_2 + a_{33}V_3 = b_3 \end{cases}$$

$$\begin{cases} -h_i + \frac{V_1}{R_1} + \frac{V_1 - V_2}{R_4} = 0 \\ \frac{V_2 - V_1}{R_4} + \frac{V_2}{R_2} + \frac{V_2 - V_3}{R_5} = 0 \Leftrightarrow \left[i = \frac{V_2}{R_2} \right] \Leftrightarrow \begin{cases} -h_i \frac{R_2}{R_2} + \frac{V_1}{R_1} + \frac{V_1}{R_4} - \frac{V_2}{R_4} = 0 \\ \frac{V_2}{R_4} - \frac{V_1}{R_4} + \frac{V_2}{R_2} + \frac{V_2}{R_5} - \frac{V_3}{R_5} = 0 \\ i_s + \frac{V_3}{R_3} - \frac{V_3}{R_5} + \frac{V_3}{R_5} - \frac{V_2}{R_5} = 0 \end{cases} \end{cases}$$

$$\begin{cases} \left(\frac{1}{R_1} + \frac{1}{R_4} \right) V_1 - \left(\frac{h_i}{R_2} + \frac{1}{R_4} \right) V_2 = 0 \\ -\frac{V_1}{R_4} + \left(\frac{1}{R_4} + \frac{1}{R_2} + \frac{1}{R_5} \right) V_2 - \frac{V_3}{R_5} = 0 \\ \frac{V_2}{R_5} + \left(\frac{1}{R_3} + \frac{1}{R_5} \right) V_3 = \frac{V_3}{R_3} - i_s \end{cases}$$

Delta ger:

$$a_{11} = \frac{1}{R_1} + \frac{1}{R_4}; \quad a_{12} = -\frac{h_i}{R_2} - \frac{1}{R_4}; \quad a_{13} = 0 \quad b_1 = 0$$

$$a_{21} = -\frac{1}{R_4}; \quad a_{22} = \frac{1}{R_4} + \frac{1}{R_2} + \frac{1}{R_5}; \quad a_{23} = -\frac{1}{R_5} \quad b_2 = 0$$

$$a_{31} = 0; \quad a_{32} = -\frac{1}{R_5}; \quad a_{33} = \frac{1}{R_3} + \frac{1}{R_5} \quad b_3 = \frac{V_3}{R_3} - i_s$$