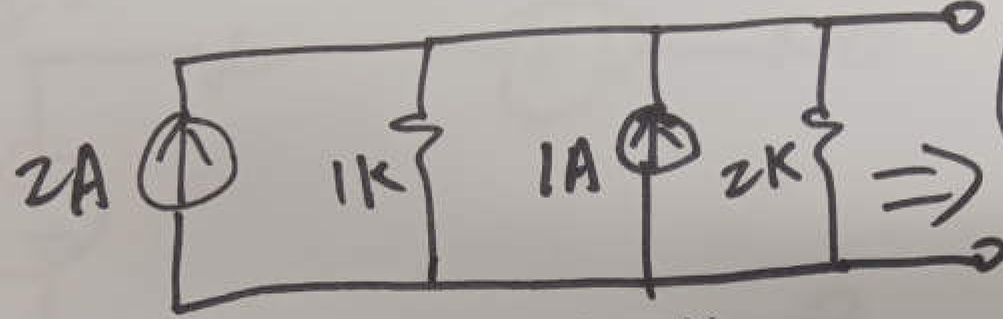
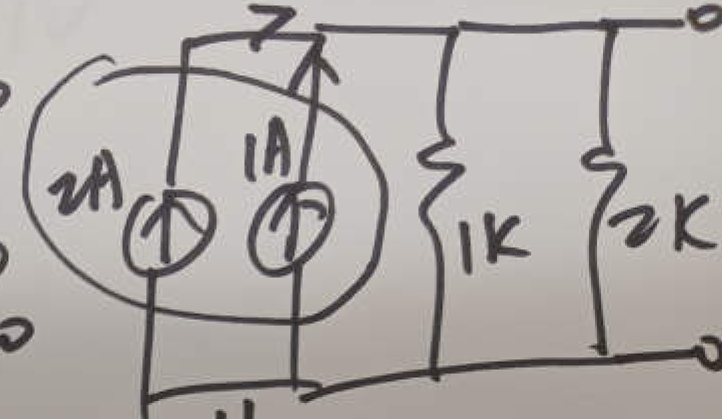
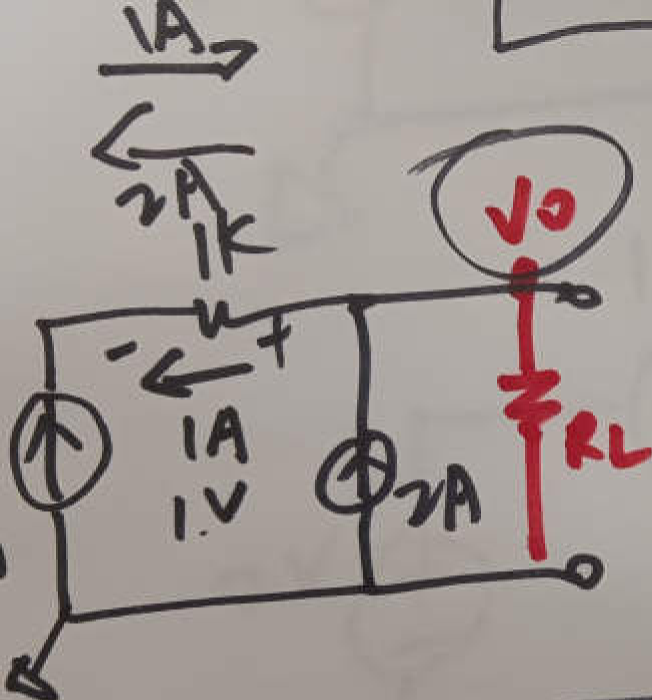
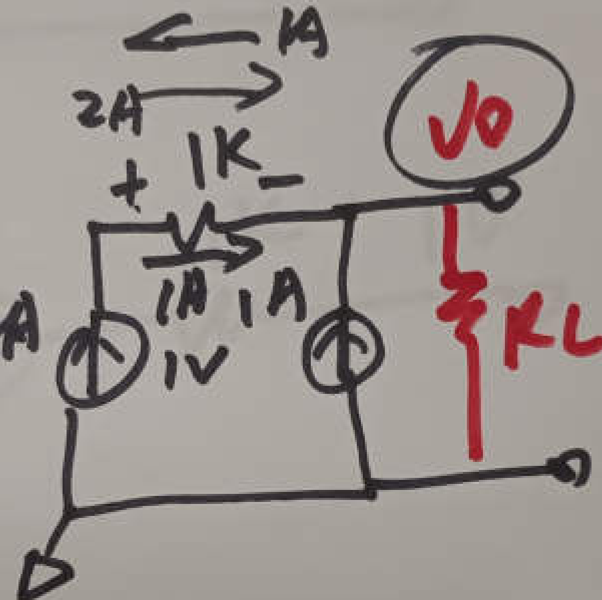
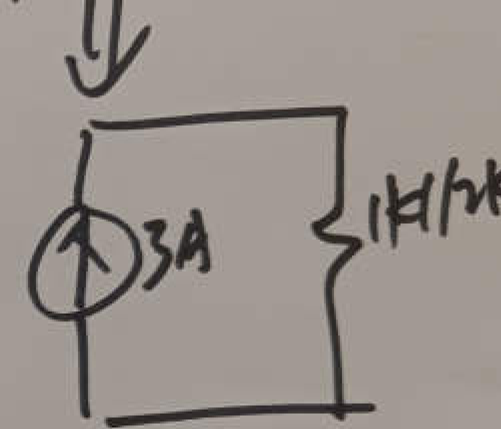
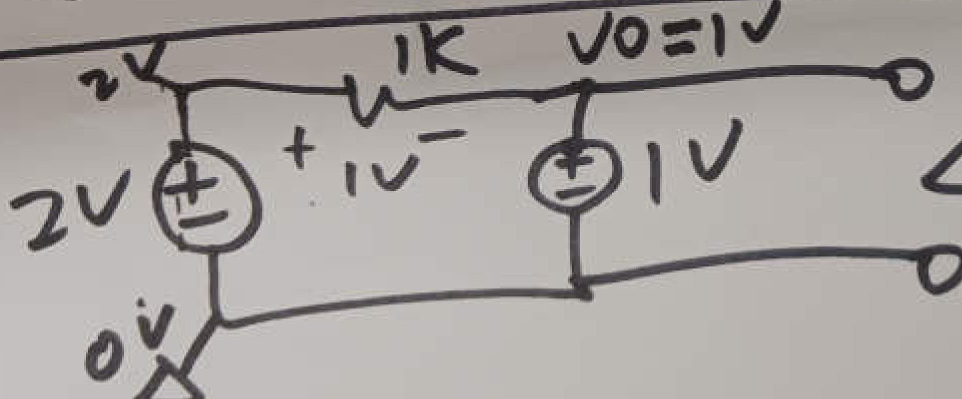

2A
1K
1A
2K

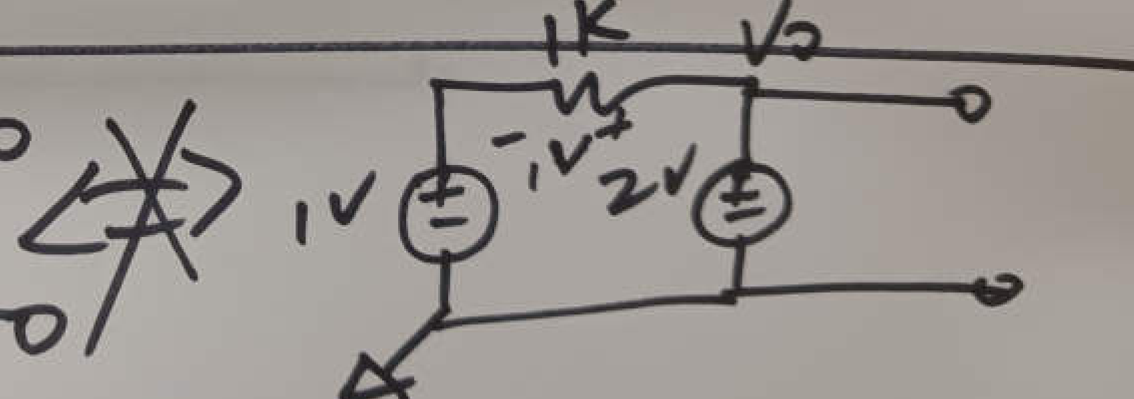

2A
1A
1K
2K

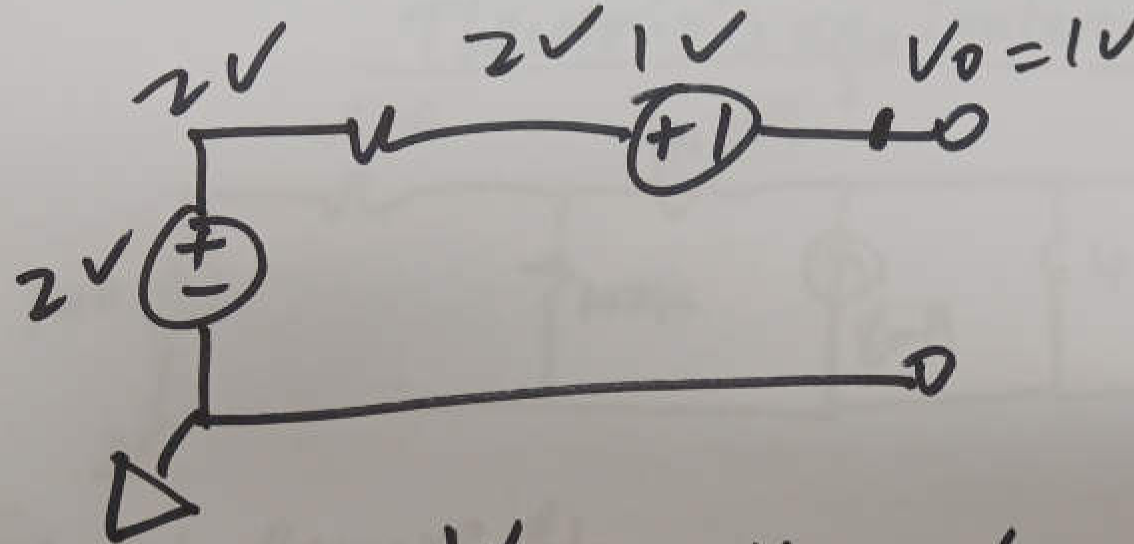

1A
2A
1K
- +
1A
1V
1A
2A
VO
RL

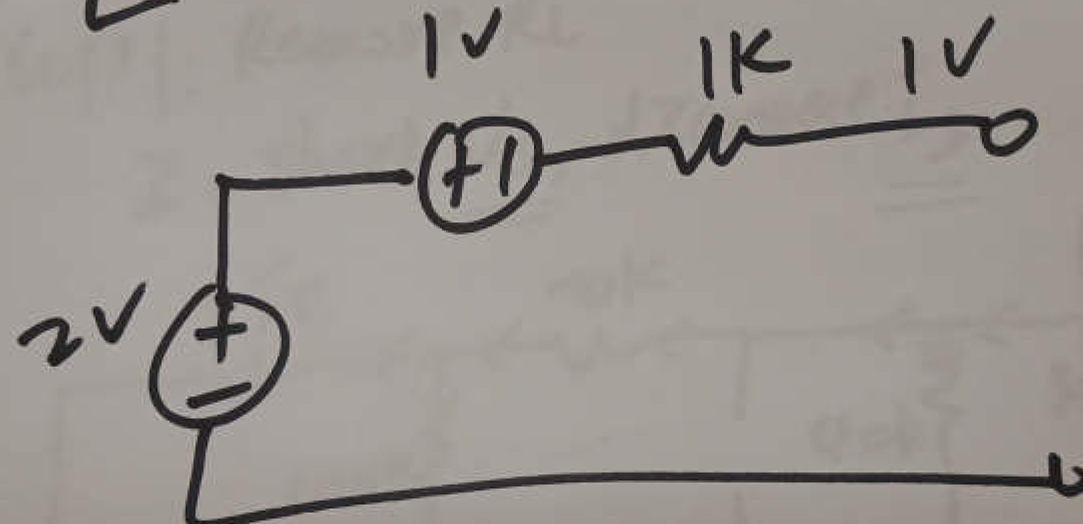

1A
2A
+ 1K -
1A
2A
1A
1V
1A
VO
RL


3A
1K//2K

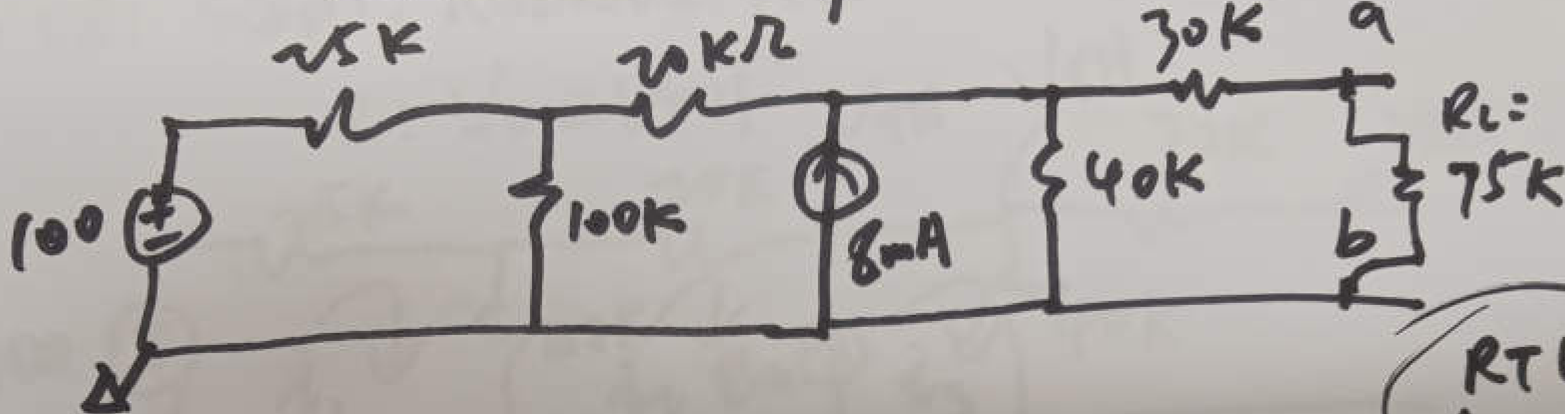

2V
1K
VO=1V
+ 1V -
2V
1V
0V

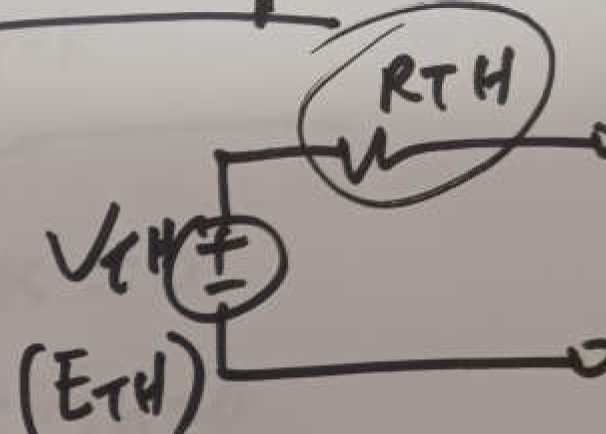

1K
VO
- 1V +
1V
2V


2V
2V
1V
Vo=1V
+1
2V


1V
1K
1V
+1
2V

Thevenin's equivalent.

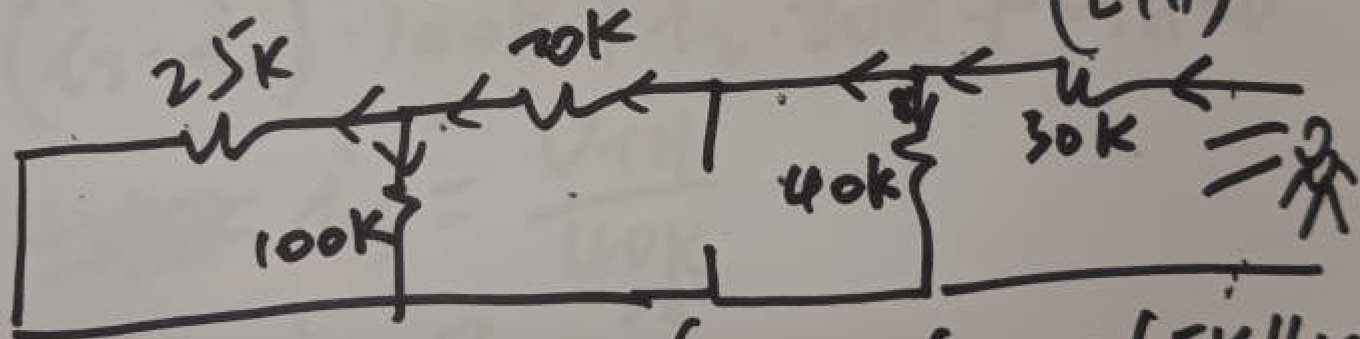




RTH:

Step 1: Remove RL

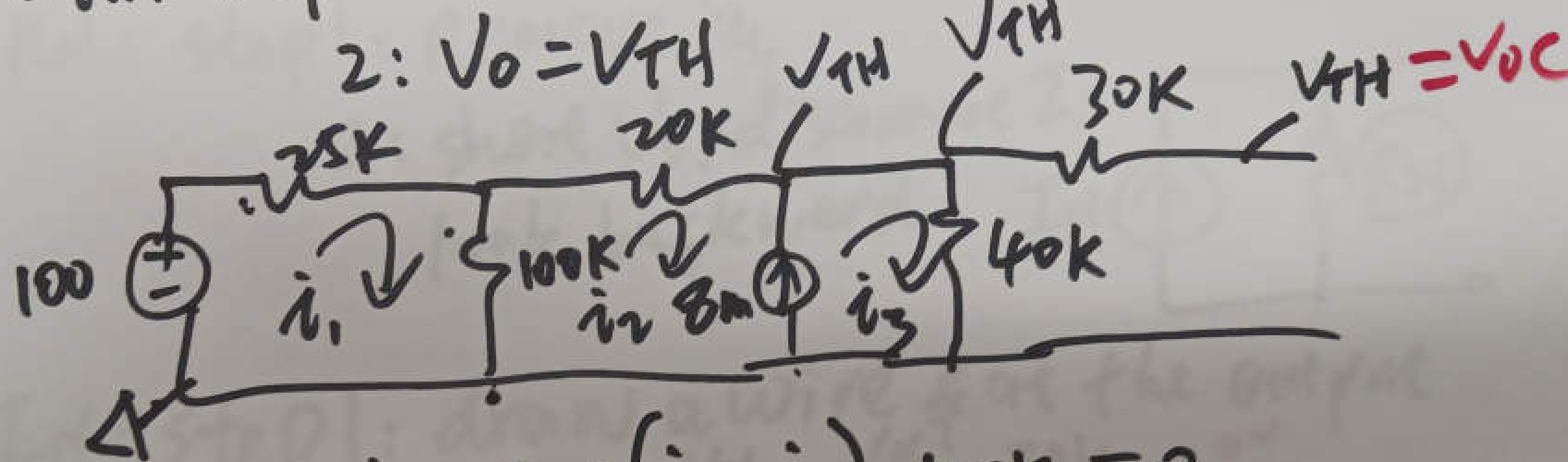
2: Short Vs, disconnect Is



$$R_{TH} = 30K + \left(40K \,||\, \left(20K + (25K \,||\, 100K)\right)\right)$$

V_{TH}: Step 1: Remove R_L

2: $V_0 = V_{TH}$



$$\begin{cases} -100 + i_1 \cdot 25K + (i_1 - i_2) \cdot 100K = 0 \\ (i_2 - i_1) \cdot 100K + i_2 \cdot 20K + V_{TH} = 0 \\ i_3 = \dfrac{V_{TH}}{40K} \\ i_3 - i_2 = 8 \times 10^{-3} \end{cases}$$

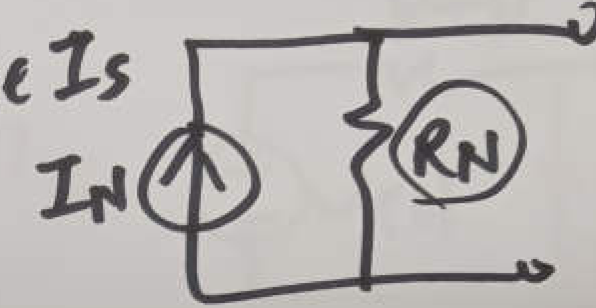
4

Norton's equivalent

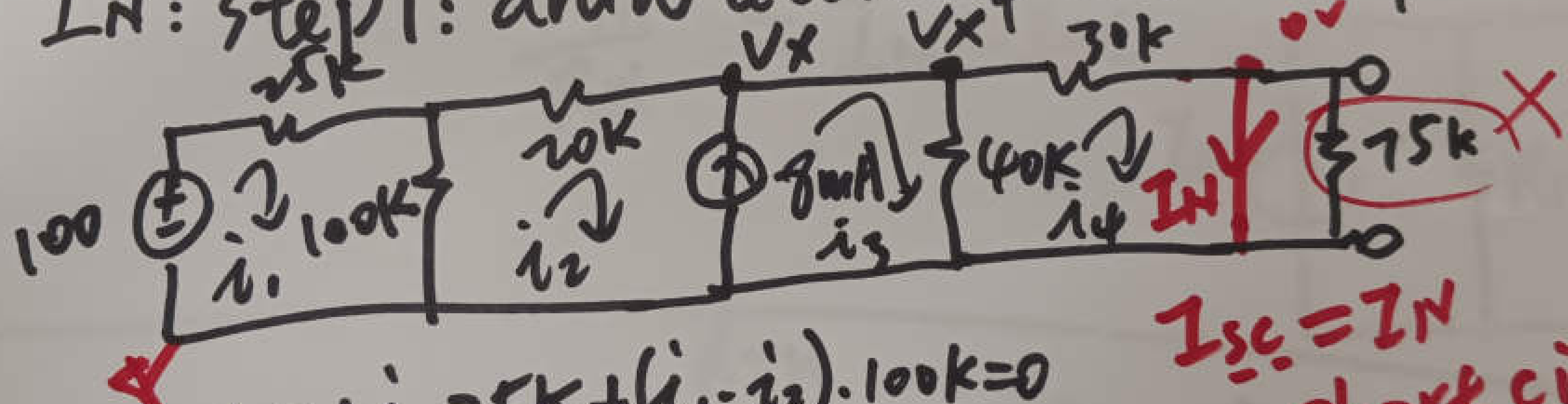
R_N: step 1: Remove R_L

2: short V_s, disconnect I_s

look backward



I_N: step 1: draw a wire at the output



$I_{sc} = I_N$

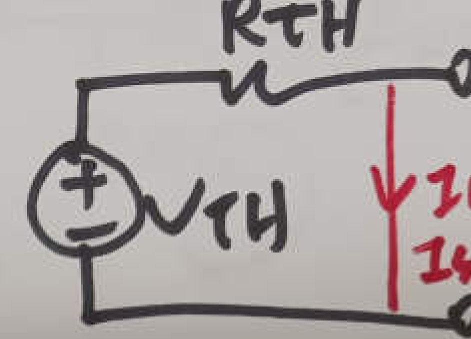
short circuit

$$
\begin{cases}
-100 + i_1 \cdot 25K + (i_1 - i_2) \cdot 100K = 0 \\
(i_2 - i_1) \cdot 100K + i_2 \cdot 20K + V_x = 0 \\
-V_x + (i_3 - i_4) \cdot 40K = 0 \\
(i_4 - i_3) \cdot 40K + i_4 \cdot 30K = 0 \\
(i_3 - i_4) \times 40K = V_x
\end{cases}
$$

$i_4 = I_N$

4

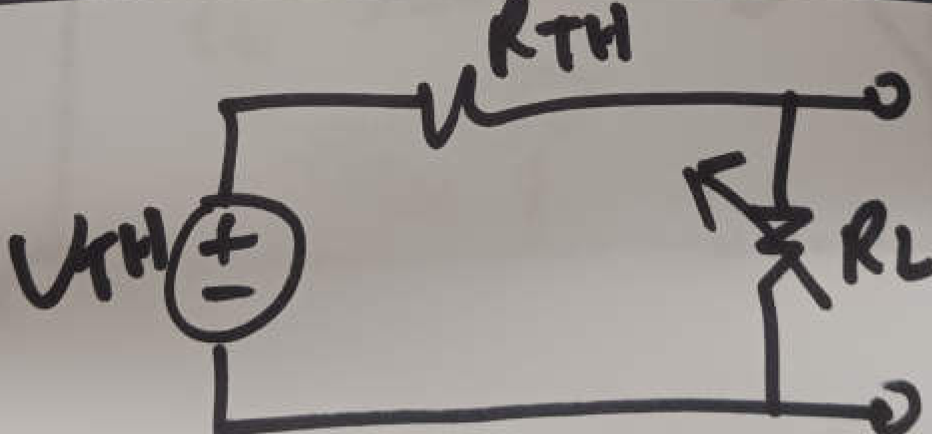
$$R_N = R_{TH}$$



$V_{TH} = V_{OC}$

$$\frac{V_{TH}}{R_{TH}} = I_N = I_{sc}$$

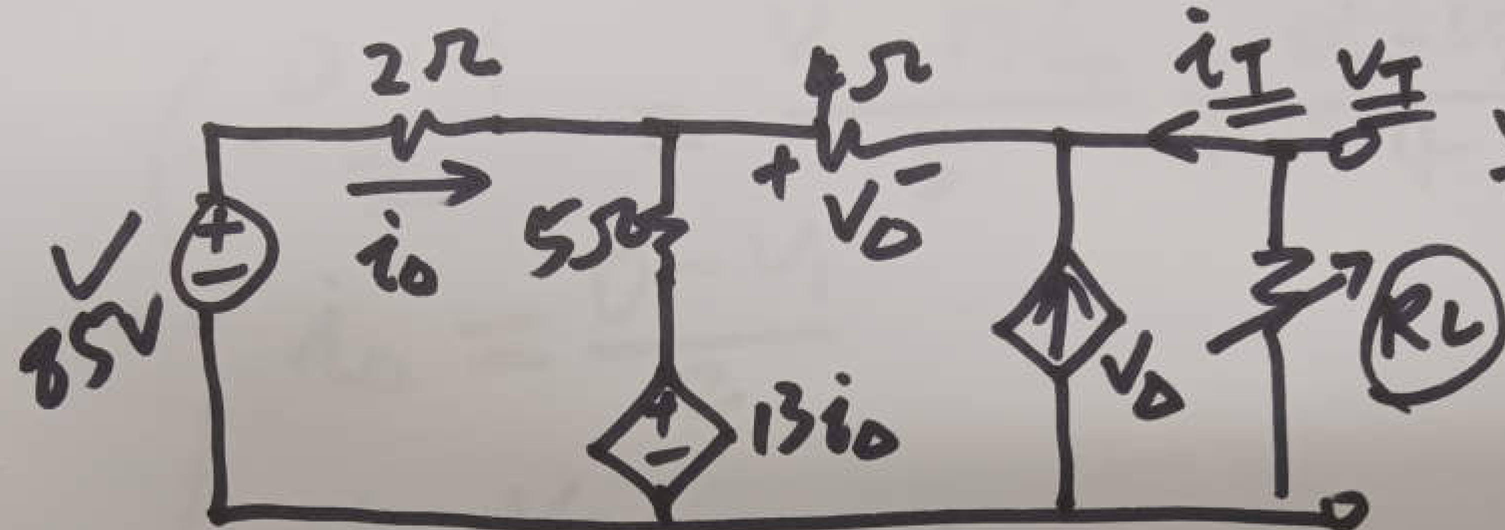
$$\frac{V_{TH}}{R_N} = I_N = I_{sc}$$



Maximum $\underline{\underline{P_{R_L}}}$

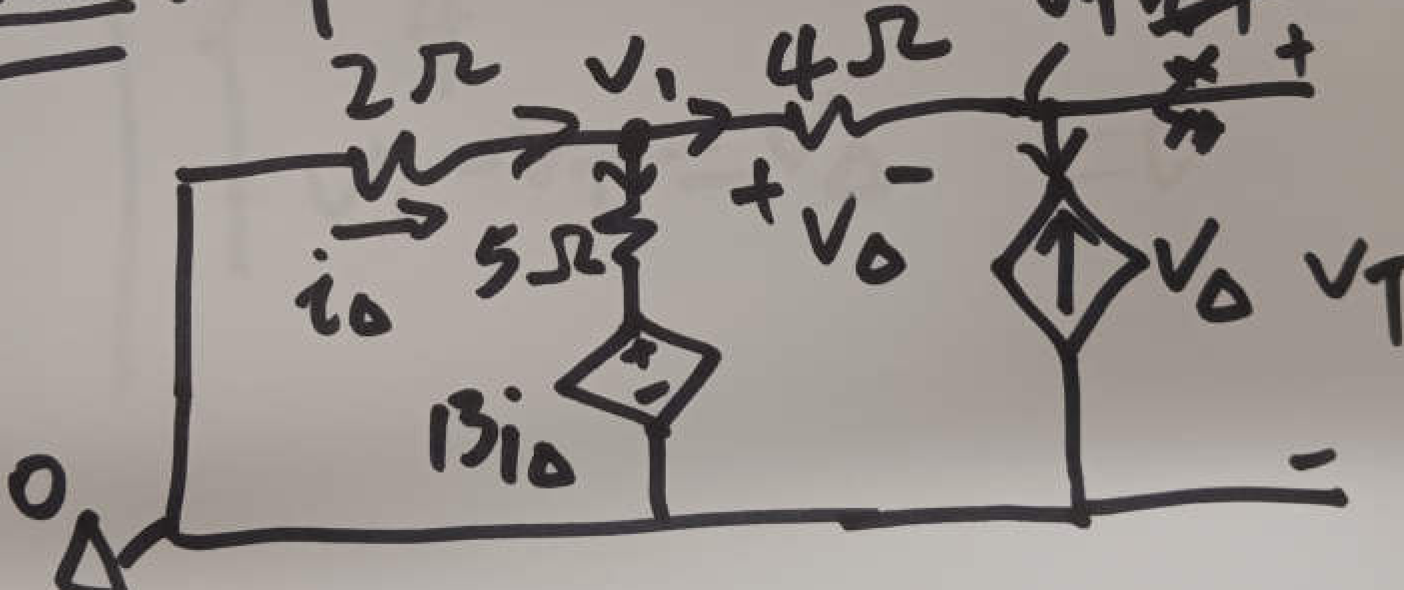
R_L?

$$R_L = R_{TH}$$



$\frac{V_T}{i_T} = R_{TH}$

RTH: step1: Remove RL



6

$$\begin{cases} \dfrac{0-V_1}{2} = \dfrac{V_1 - 13 i_\Delta}{5} + \dfrac{V_1 - V_T}{4} \\ i_\Delta = \dfrac{0 - V_1}{2} \\ \begin{cases} \dfrac{V_1 - V_T}{4} = -V_\Delta \quad = 0 \\ V_1 - V_T = V_\Delta \quad = 0 \end{cases} \end{cases}$$