

# Laboratório de Eletricidade

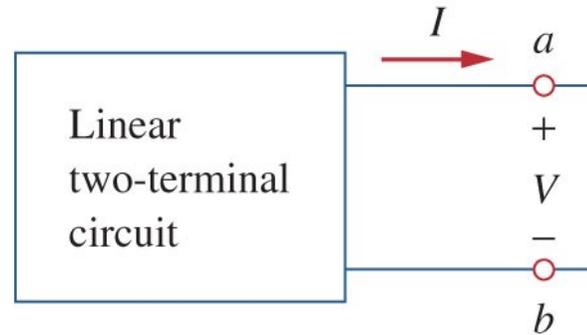
## Prática 3 : Teorema de Thevenin e Norton

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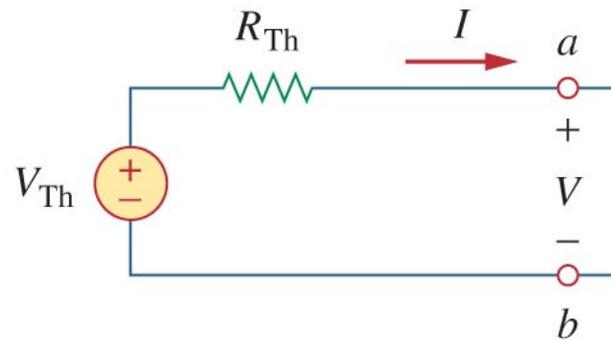
# Objetivos

- Demonstrar os Teoremas de Thevenin e Norton em um circuito específico de dois terminais a-b;
- Determinar as grandezas  $V_{Th}$ ,  $R_{Th}$ ,  $V_N$  e  $R_N$  do circuito;
- Introduzir cargas nos terminais **a b** e medir as tensões e correntes nas cargas.

# Conceitos teóricos: Teorema Thevenin



(a)

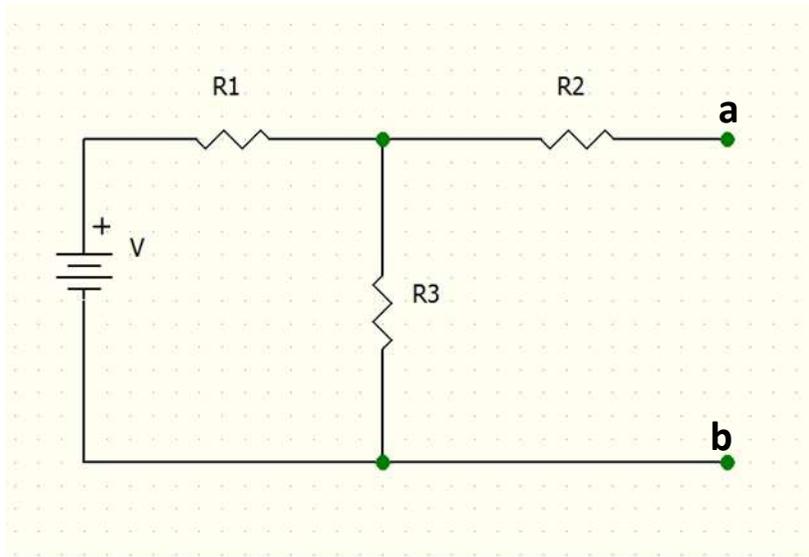


(b)

$V_{Th}$  – Tensão de Thevenin

$R_{Th}$  – Resistência de Thevenin

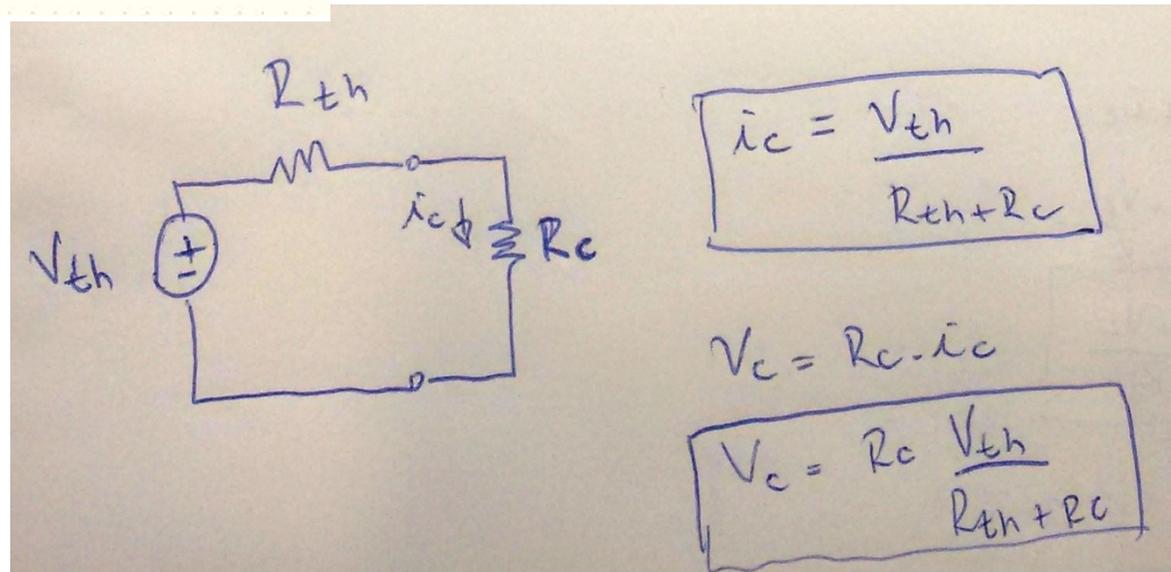
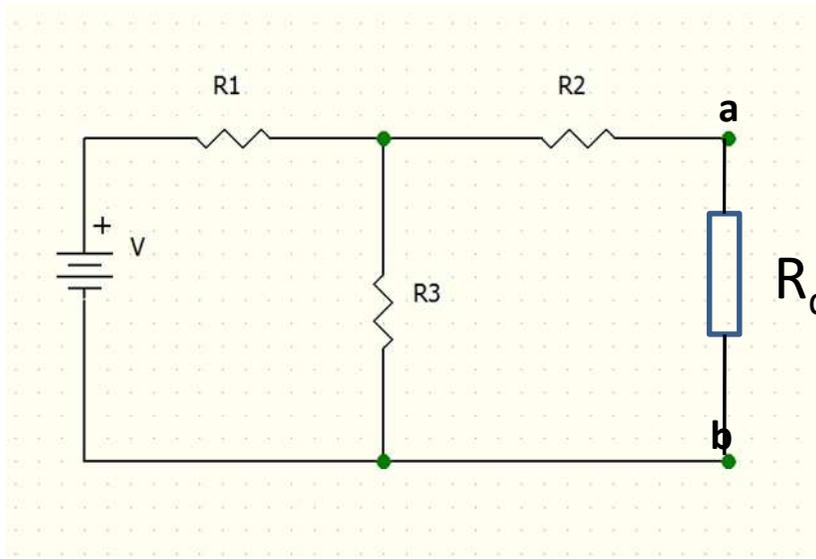
# Circuito a ser estudado



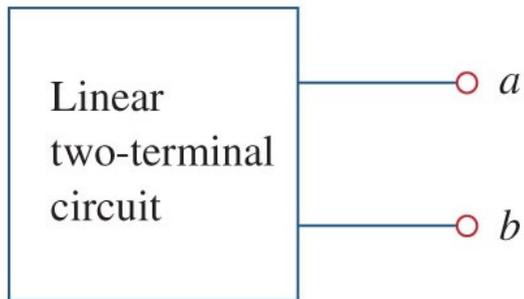
Handwritten analysis of the circuit. The top diagram shows the circuit with terminals  $a$  and  $b$  open. The equivalent resistance is calculated as  $R_{th} = R_{ab} = R_1 // R_3 + R_2$ . This result is boxed as  $R_{th} = \frac{R_3 \cdot R_1}{R_3 + R_1} + R_2$ .

The bottom diagram shows the circuit with the voltage source  $V$  and a current  $i$  flowing through resistor  $R_3$ . The open-circuit voltage is  $V_{th} = V_{ab} = R_3 i$ . The current  $i$  is given by  $i = \frac{V}{R_1 + R_3}$ . The final result for the open-circuit voltage is boxed as  $V_{th} = \frac{R_3 V}{R_1 + R_3}$ .

# Conectando a carga em a-b

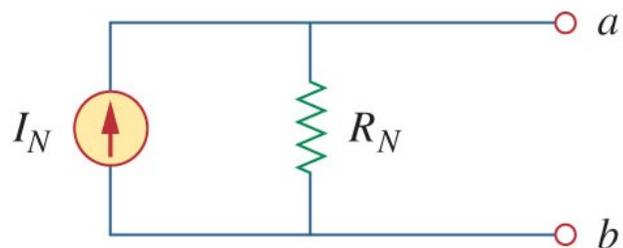


# Teorema de Norton



(a)

Circuito equivalente de Norton é uma **transformação de fonte** do circuito eq. de Thevenin!



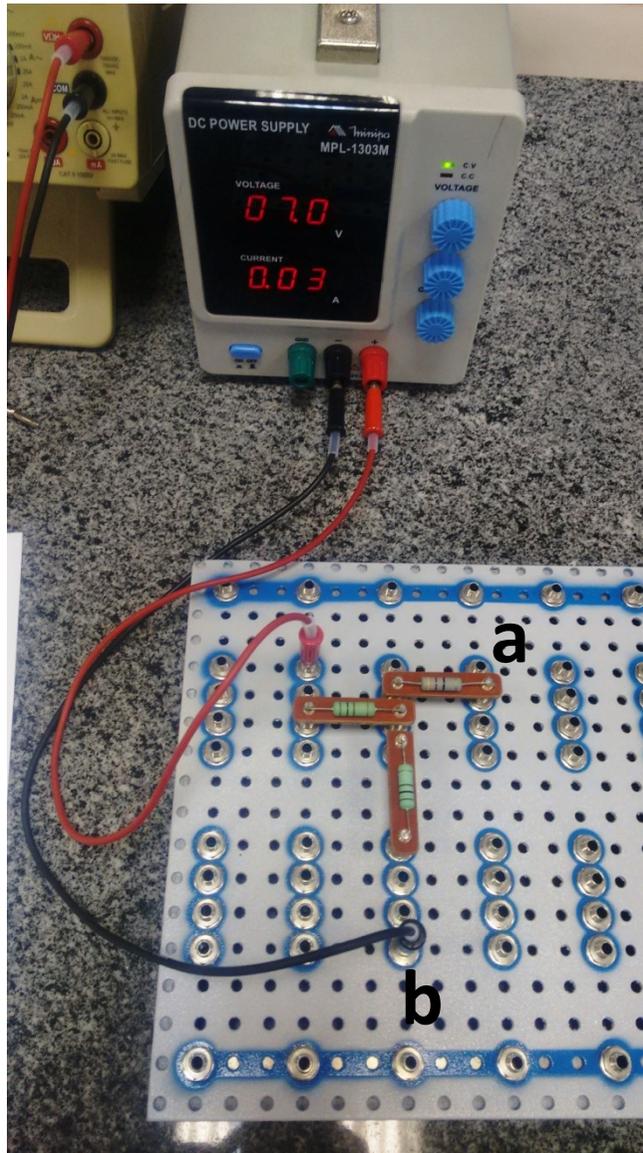
(b)

-Faça trans. de fontes:

$$R_N = R_{Th}$$

$$I_N = V_{Th}/R_{Th}$$

# Procedimentos



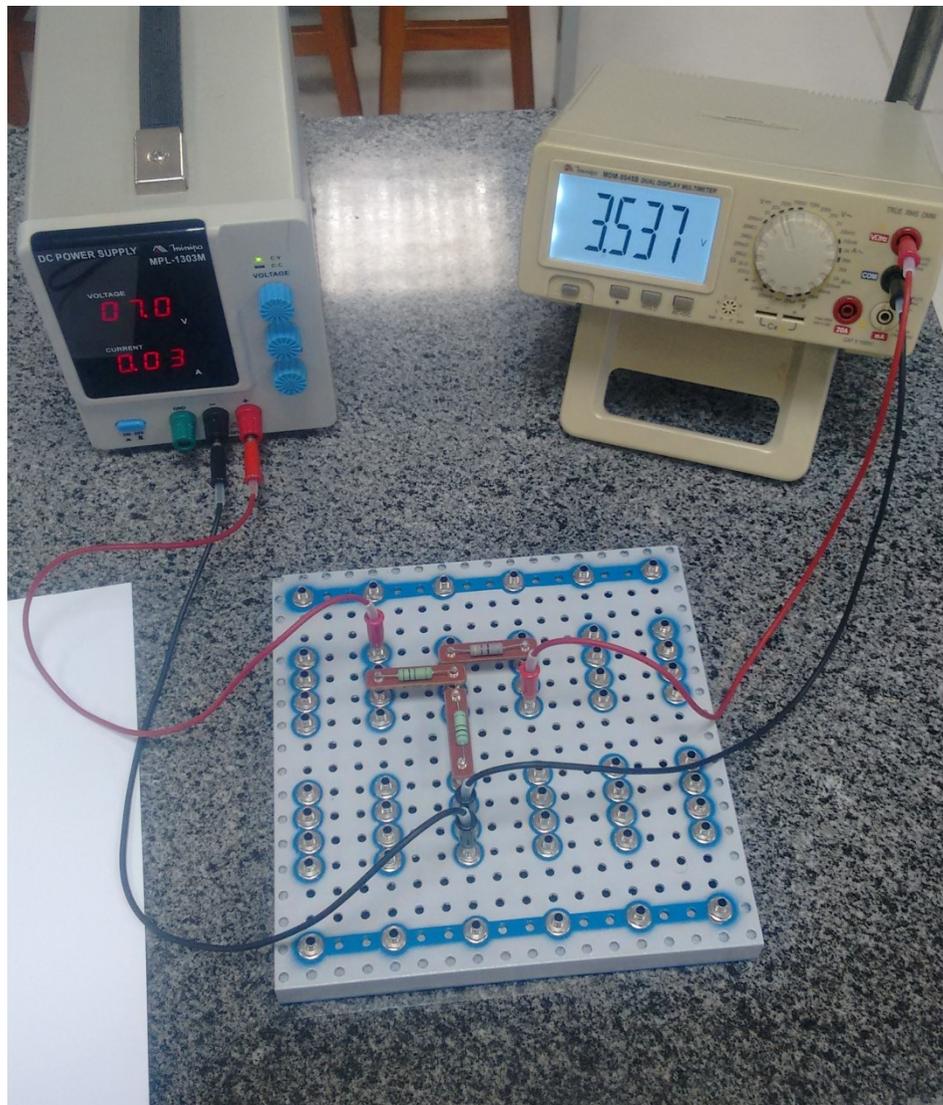
$$R1 = 99,8 \Omega$$

$$R2 = 47,3 \Omega$$

$$R3 = 99,7 \Omega$$

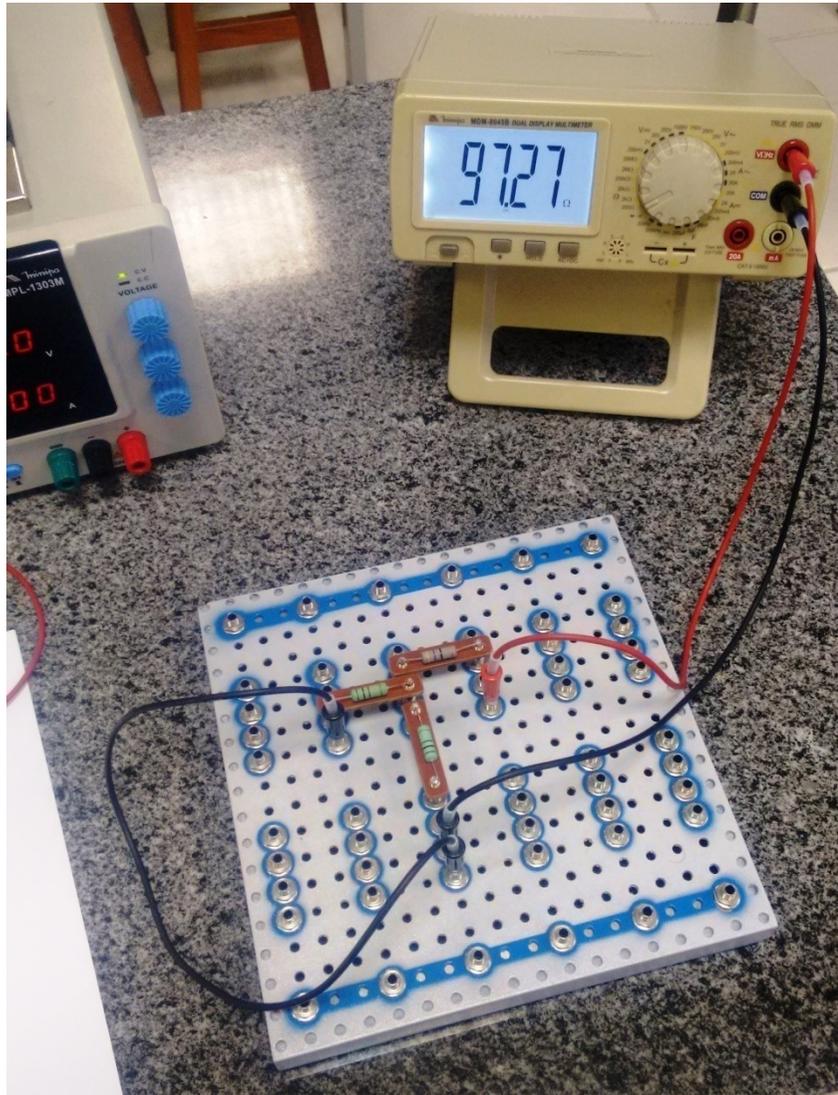
$$\text{Item 3: } V_{\text{fonte}} = 7,08 \text{ V}$$

# Procedimentos



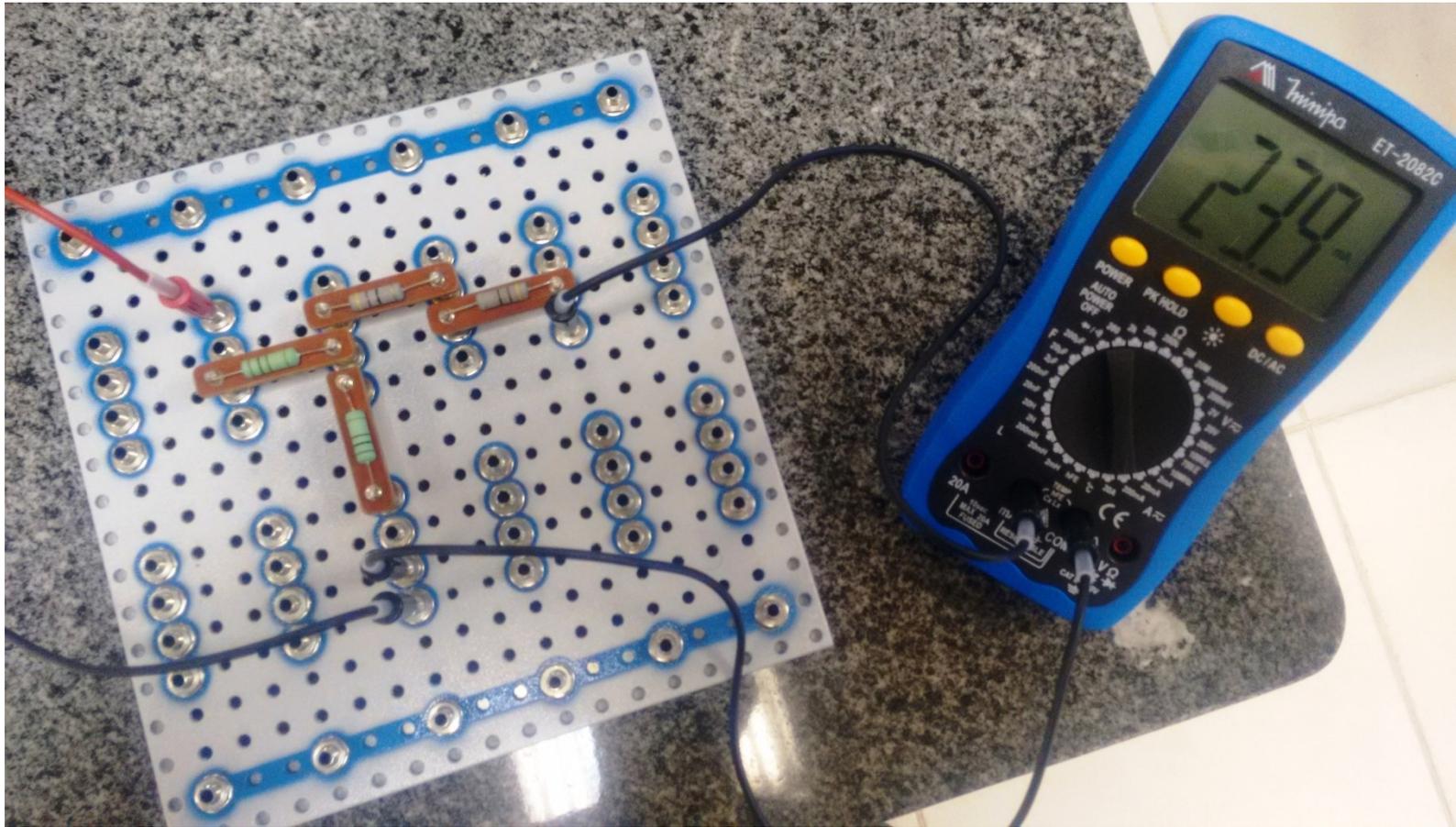
Item 4:  $V_{Th} = 3,54 \text{ V}$

# Procedimentos



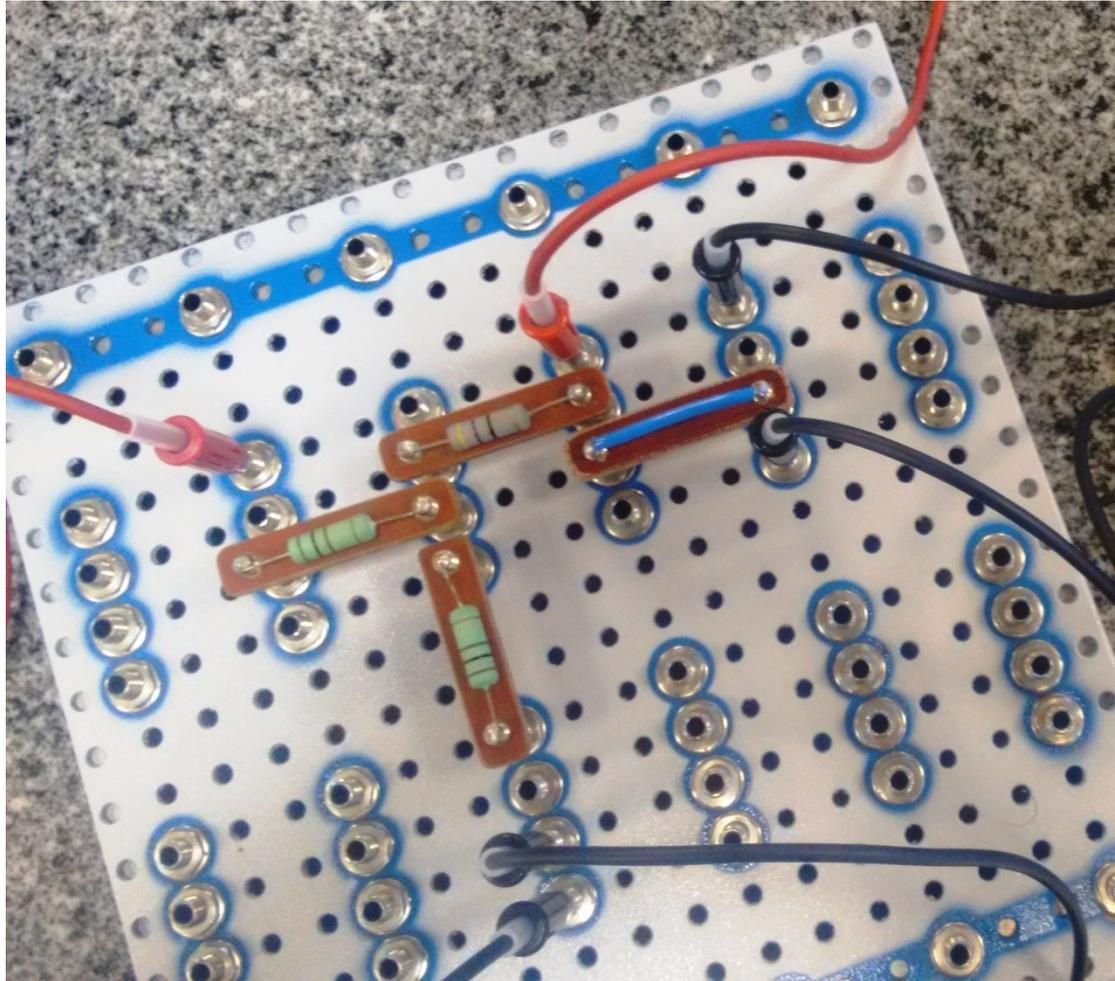
Item 5:  $R_{Th} = 97,3 \Omega$

# Procedimentos



Item 8:  $R_c = 47 \Omega$       $i_c = 23,9 \text{ mA}$       $V_c = 1,13 \text{ V}$

# Procedimentos



Item 8:  $R_c = 0$

$i_c = 35,3 \text{ mA}$

$V_c = 0$

# Trabalho

- Mesmo relatório que é feito em sala de aula;
- Enviar para o monitor (Tomas) em word ou pdf.