EE102

ENDSEM REPORT

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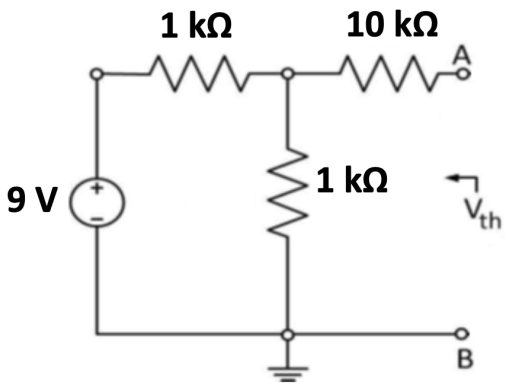
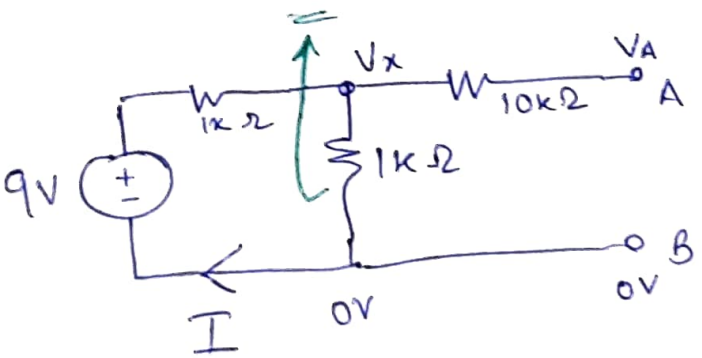
Objective:
Implement the following circuit and verify the *Thevinin's theorem* as seen from terminals A-B.

Deliverable:
Make a written report about the experiment giving details of estimation for V_{Th} and R_{Th}. Upload the same on a link created on MS-Teams portal for End-sem exam report before the deadline communicated to you.



Theoretical Calculations

- Thevenin's Voltage: that would the voltage developed between open terminal A & B. Since its open, the voltage is same as developed across ~~this~~ this 1K resistor. (Since no current flows through 10kΩ resistor, $V_x - V_A = (0)(10k\Omega)$ $\Rightarrow V_x = V_A$)



$\Rightarrow 9V = ((1k + 1k)\Omega) \cdot I$

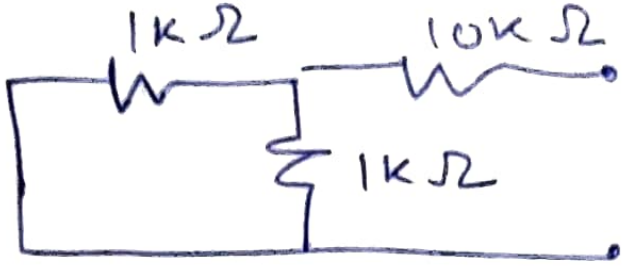
$I = \frac{9}{2}\ mA$

$\Rightarrow V_x = 1k\Omega \times \frac{9}{2}\ mA = 4.5V$

Thus thevenin Voltage $\boxed{V_{TH} = 4.5\,V}$

- Thevenin's Resistance

→ Short circuiting Independent Current and voltage sources



The two 1kΩ are in parallel & their combination is in series with 10kΩ.

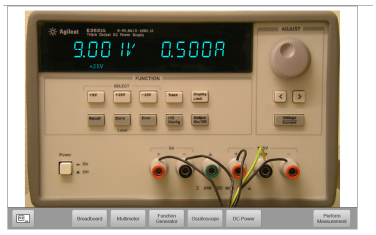
$$R_{TH} = \left(\frac{1K \cdot 1K}{1K + 1K} + 10K\right)\Omega$$

$$\boxed{R_{TH} = 10.5K\Omega}$$

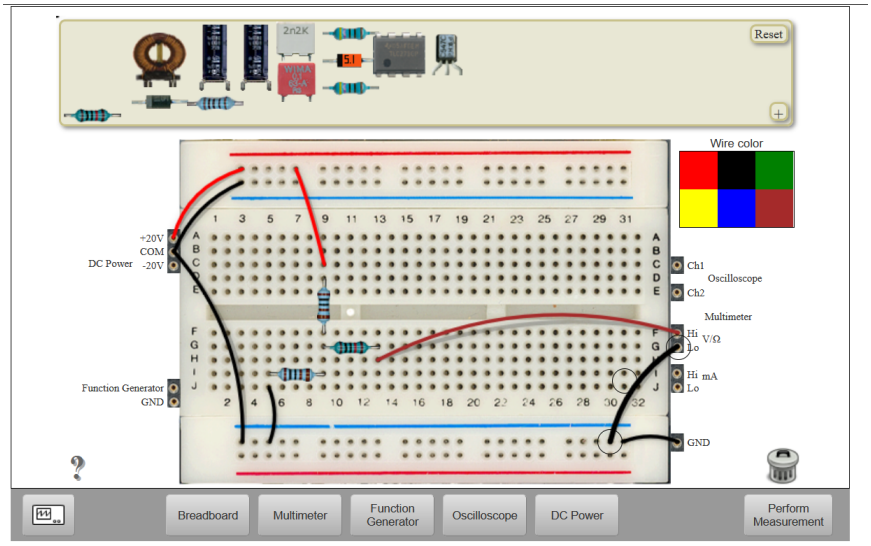
Observations from Experiment

V_{oc} (in V)	I_{sc} (in μA)	$V_{TH} = V_{oc}$ (in V)	$R_{TH} = V_{oc}/I_{sc}$ (in kΩ)
4.459	407.3	4.459	10.95

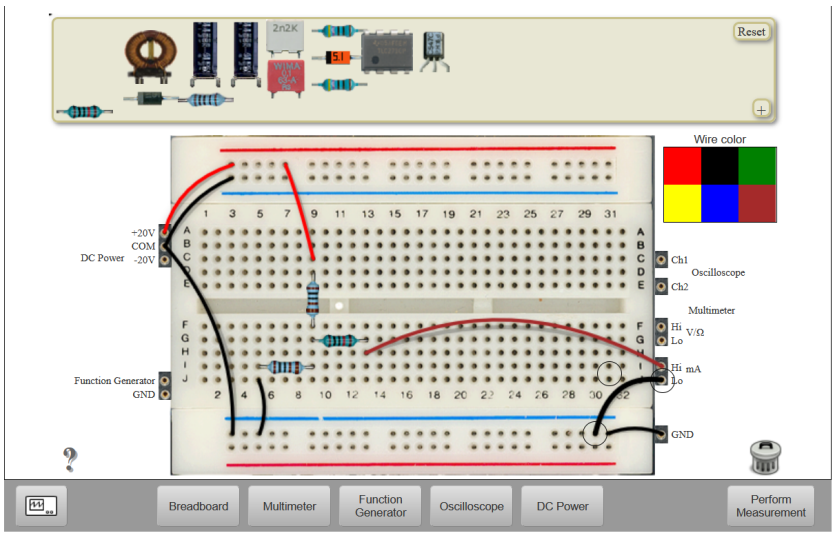
Screenshots:



Measuring voltage



Measuring Current



Results

Theoretical values ⇒ $V_{TH} = 4.5V$, $R_{TH} = 10.5\,k\Omega$

Experimental values ⇒ $V_{TH} = 4.459V$, $R_{TH} = 10.95\,k\Omega$

Thus the values are quite close, and the slight difference might be due to the unaccounted resistance of wires, ~~current~~ DC source's internal resistance or the multimeter's resistance.