Northern University Of Bangladesh

Experiment No-4: verification of Thevenin's theorem

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Code : CSE 1259

Result and Discussion:

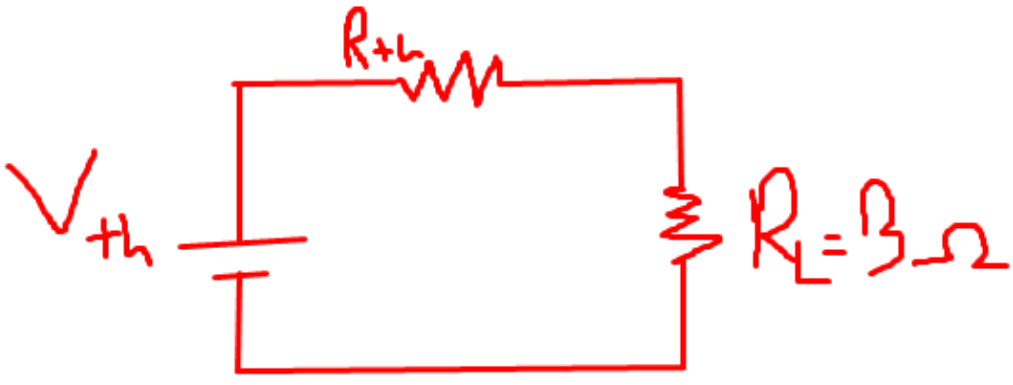
Thevenin's theorem : Thevenin's theorem states that it is possible to simplify any linear circuit, irrespective of how complex it is, to an equivalent circuit with a single voltage source and a series resistance. There are three steps to solve thevenins's theorem

1) Find the Thevenin Resistance by removing all voltage sources and load.
2) Find the Thevenin Voltage by reconnecting the voltage sources.
3) Use the Thevenin Resistance and Voltage to find the total current flowing through the load.

Lets consider this circuit

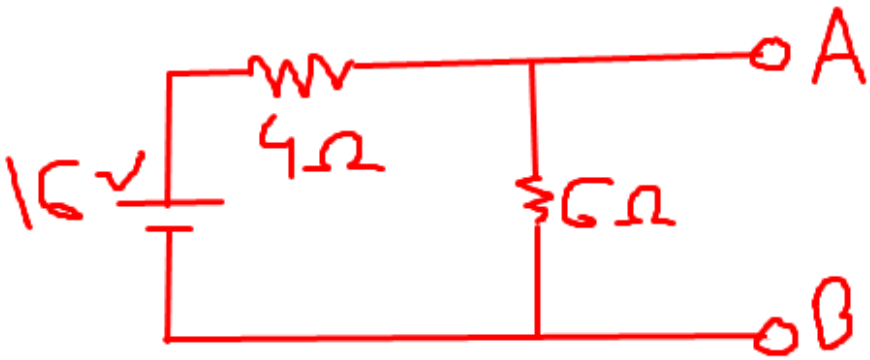
Lets solve this circuit using thevnin's theorem

At first lets draw a thevnin's equivalent circuit



Here V_{th} is thevnin's voltage , R_{th} is thevnin's resistance and R_L is load resistance .

According to thevnin's theorem we need to remove R_L form main circuit and calculate V_{th} and R_{th} .



Calculating V_{th} :

V_{th} will be the voltage through the resistance 6Ω

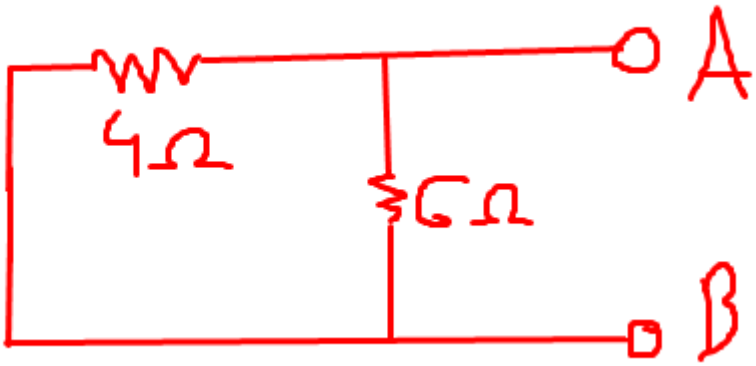
So, $I = V / R = 16\ V / (4\ \Omega + 6\ \Omega)$

$= 1.6\ A$

$V_{6\Omega} = I \times R = 1.6\ A \times 6\ \Omega = 9.6\ V$

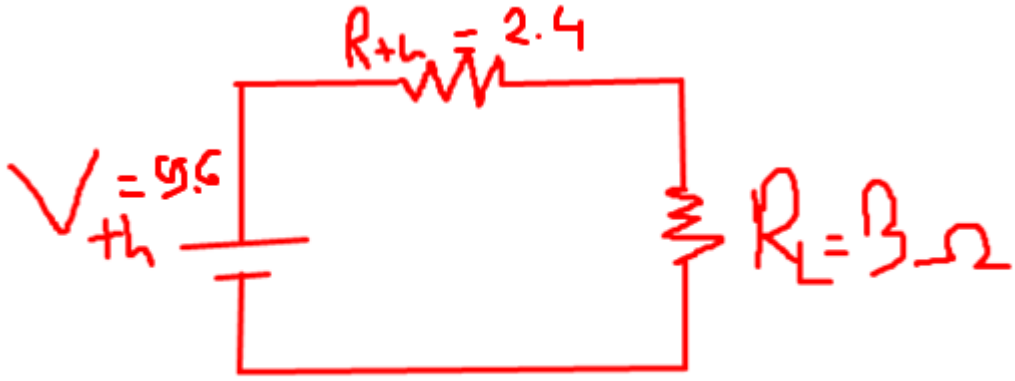
Calculating R_{th} :

To calculate according to thevnin's theorem we need to remove voltage from the circuit.



$Rth = 4\ \Omega \,||\, 6\ \Omega = 2.4\ \Omega$

So ultimately the circuit will be

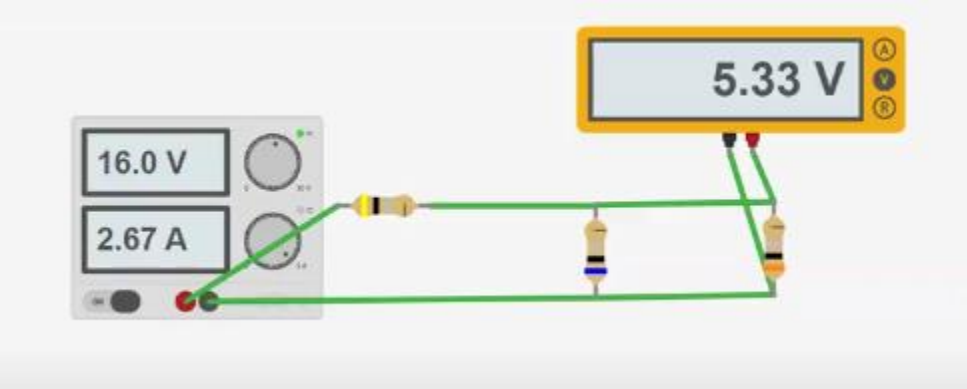


Now we need to calculate the voltage through R_L = 3 Ω resistor

So , I = V / (R_{th} + R_L) = 9.6 v / (2.4 Ω + 3 Ω)

= 1.78 A

V_{RL} = I x R_L = 1.78 x 3 = 5.33 V



Here R_L also 5.33 V. So it can be said that thevnin's theorem is verified .