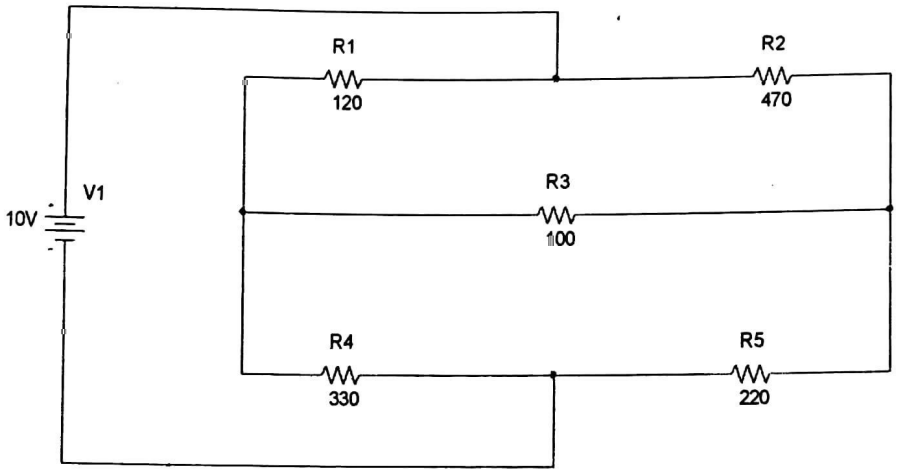
Ex. No.:3 **Date:** 8/8/2019

Verification of Thevenin's Theorem

Aim: To verify the Thevenin's Theorem of a given network by theoretical and experimental values.

Circuit Diagram



Apparatus/Tool required:

Sl. No.	Components Name	Range	Quantity
1	Resister	120Ω, 330Ω, 470Ω, 220Ω, 100Ω	Each 1 No.
2	Ammeter	0-50mA (DC)	1 No.
3	Voltmeter	0-10V (DC)	1 No.
4	RPS	0-32 V (DC)	1 No.
5	Connecting Wires	-	Few
6	Bread Board	-	1 No.

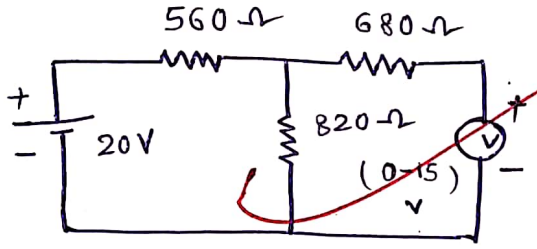
Theory

Statement: Thevenin's Theorem

In a linear bilateral network with output terminals A and B can be replaced by a single voltage source in series with equivalent resistance.

Hardware Circuit:

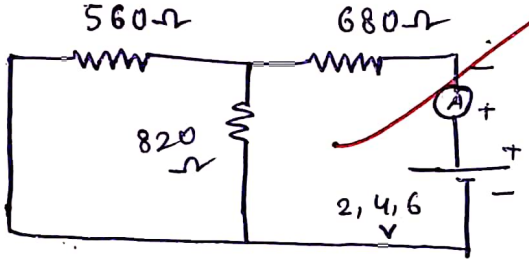
To Find V_{TH}:



Reading:

Applied Voltage (Volts)	V_{TH} (Volts)
10 V	5.25 V

To Find R_{TH}:

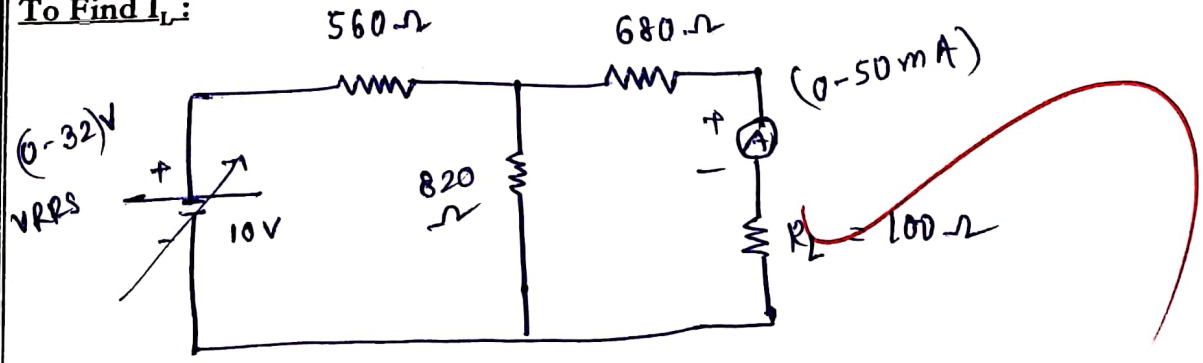


Reading:

Applied Voltage	Voltmeter Reading	Ammeter Reading	R_{TH} = V/I ohms
2 V		1.9 mA	1.05KΩ
4 V		3.8 mA	1.05KΩ
6 V		5.6 mA	1.07KΩ

Average of R_{TH} = 1.05 K Ohms.

To Find I_L:

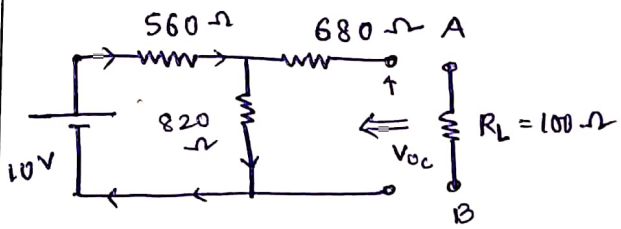


Reading:

Applied Voltage (Volts)	Ammeter Reading (Amps)
10 V	5.25 mA

Manual Calculations:

To Find V_{TH}:



$$i = \frac{V}{R_T} = \frac{10}{560+820}$$

$$= 7.2\ mA$$

$$i = 7.2 \times 10^{-3}\ A$$

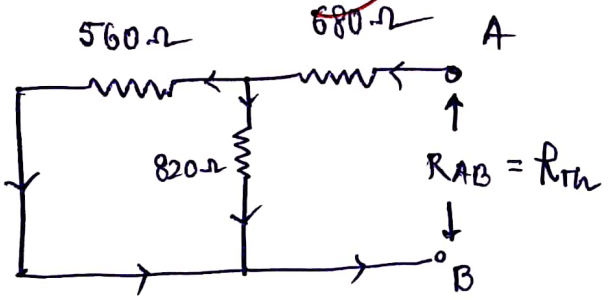
$V_{OC} = V_{Th} = V_{AB}$

$V_{Th} = V_{OC} = V_{AB} = i_{820\Omega} \times R$

$= 7.2 \times 10^{-3}\ V \times 820$

$$V_{Th} = 5.9\ V$$

To Find R_{TH}:

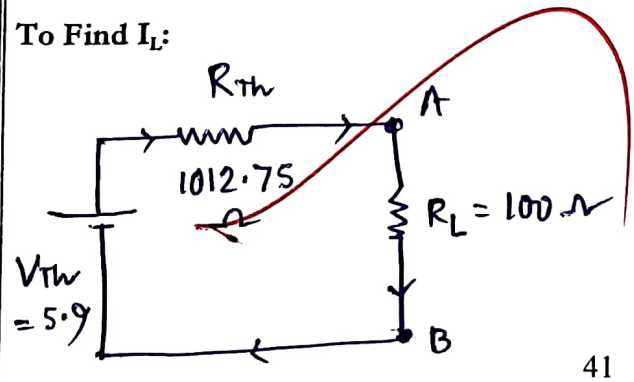


$R_{Th} = R_{AB} = (560 \| 820) + 680\ \Omega$

$$= \frac{560 \times 820}{560+820} + 680\ \Omega$$

$$R_{Th} = 1012.75\ \Omega$$

To Find I_L:



$$i_L = \frac{V_{Th}}{R_{Th} + R_L}$$

$$= \frac{5.9}{1012.75 + 100}\ mA$$

$$i_L = 5.3\ mA$$

Procedure:

Results: The Thevenin's Theorem has been verified for the given network both by theoretically & experimentally & the following results are tabulated as under:—

Result: ~~Thevenin~~

Thevenin's Theorem

parameters	Manual Calculations [Theoretical values]	Practical Output [Experimental values]
V_{Th}	5.9 V	5.25 V
R_{Th}	1012.75 Ω	1050 Ω
i_L	5.3 mA	5.25 mA

Inference:

Verified

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