Ex. No.:1 **Date:** 19.9.19

Verification of NETWORK THEOREMS

(Thevenin's Theorem)

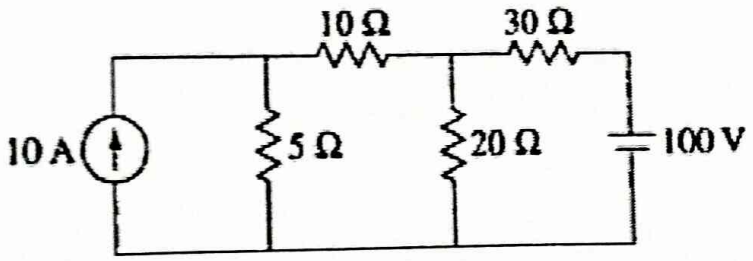
Aim: To verify Thevenin's Theorm of given network by theoritical and simulation values

Apparatus/Tool required:

ORCAD / Capture CIS --> **Analog Library – R,**
Source Library – Vdc, Idc &
Ground (GND) – 0 (zero)

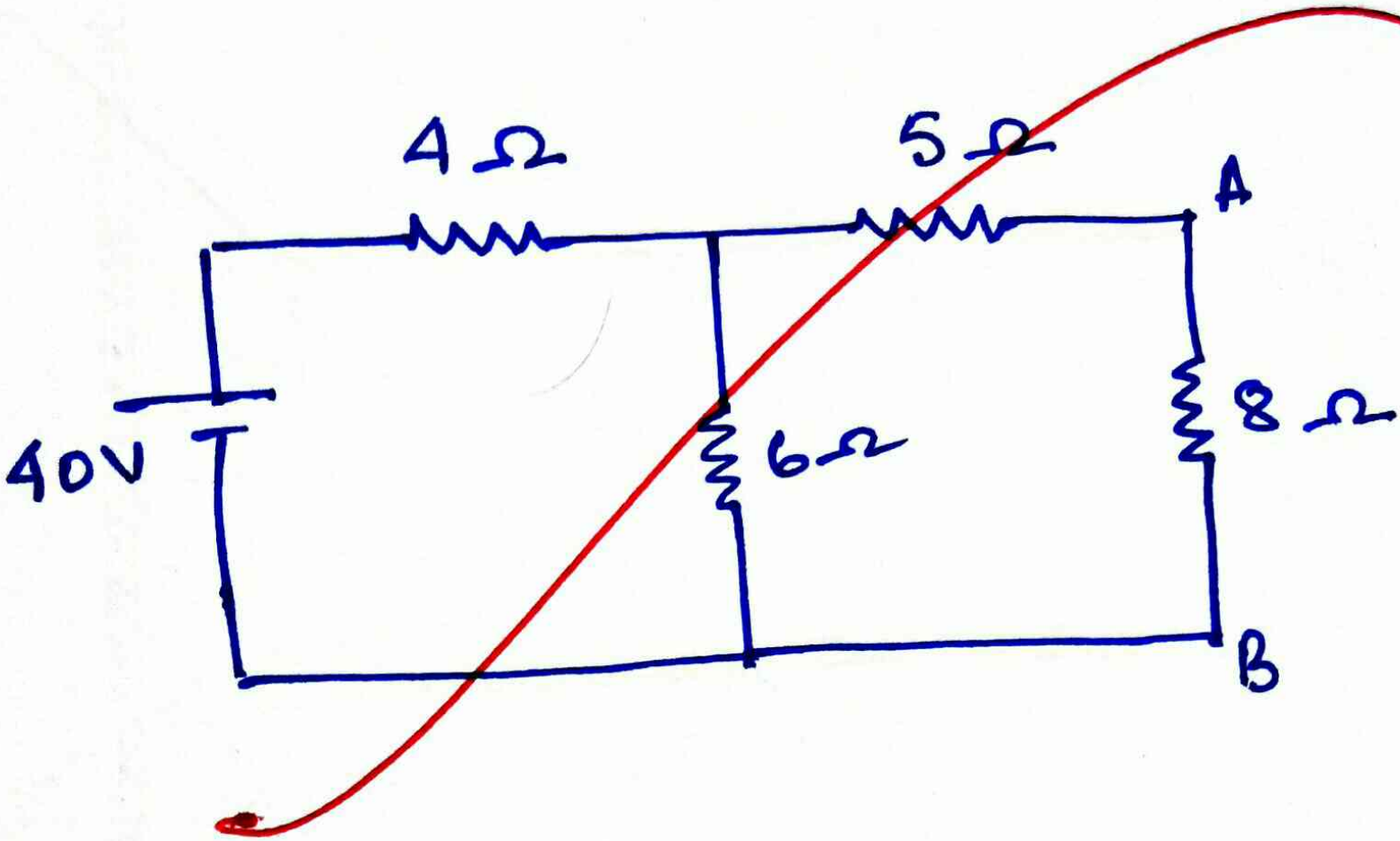
Simulation Settings: **Analysis Type - Bias Point**

Circuit Diagram



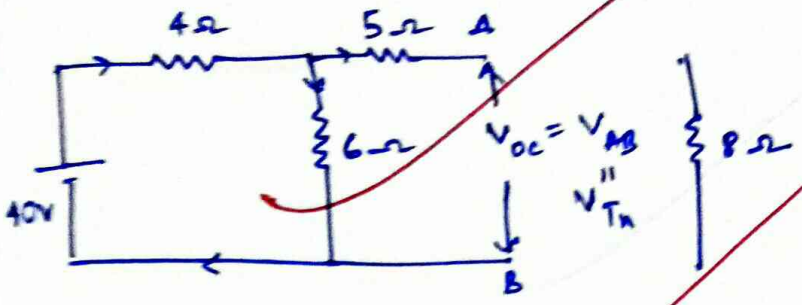
Statement: Thevenin's Theorem

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


4 Ω
5 Ω
A
40V
6 Ω
8 Ω
B

Manual Calculations:

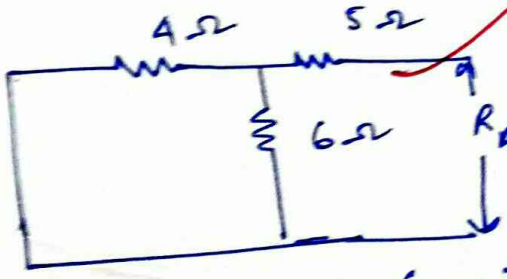
To Find V_{th}:



$$I = \frac{V}{R_T} = \frac{40}{4+6} = 4\,A$$

$$V_{Th} = V_{AB} = V_{OC} = IR = 4 \times 6 = 24\,V$$

To Find R_{th}:



$$R_{Th} = R_{AB} = (4 \| 6) + 5$$

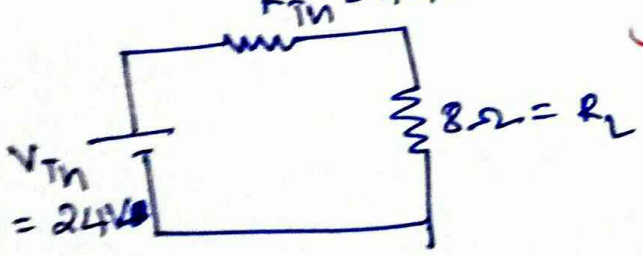
$$= \left(\frac{4 \times 6}{4+6}\right) + 5$$

$$= \frac{24}{10} + 5$$

$$= 2.4 + 5 = 7.4\,\Omega$$

To Find I_L:

Equivalent Circuit



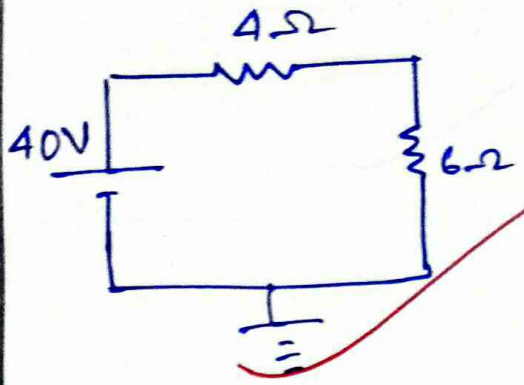
$$I_L = \frac{V_{Th}}{(R_{Th} + R_L)}$$

$$= \frac{24}{7.4+8}$$

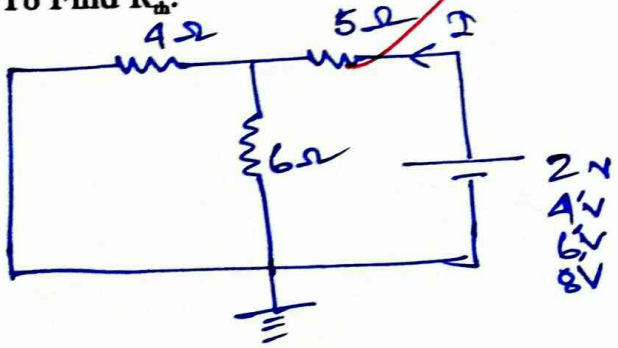
$$= \frac{24}{15.4} = 1.55A$$

Simulation Circuit:

To Find V_{th}:



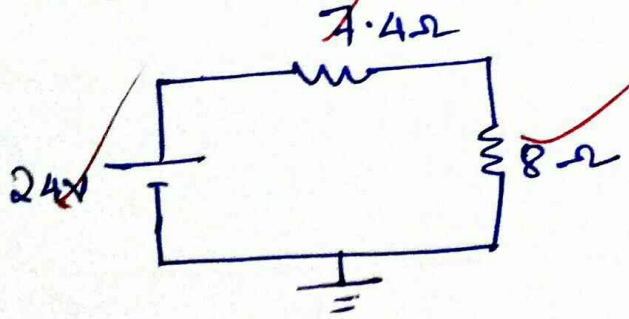
To Find R_{th}:



$V_{(V)}$	$I_{(mA)}$	$R = V/I$
2	270.3	7.39 Ω
4	540.5	7.40Ω
6	810.8	7.40 Ω

$R_{avg} = 7.40\,\Omega$

To Find I_L:



Result:

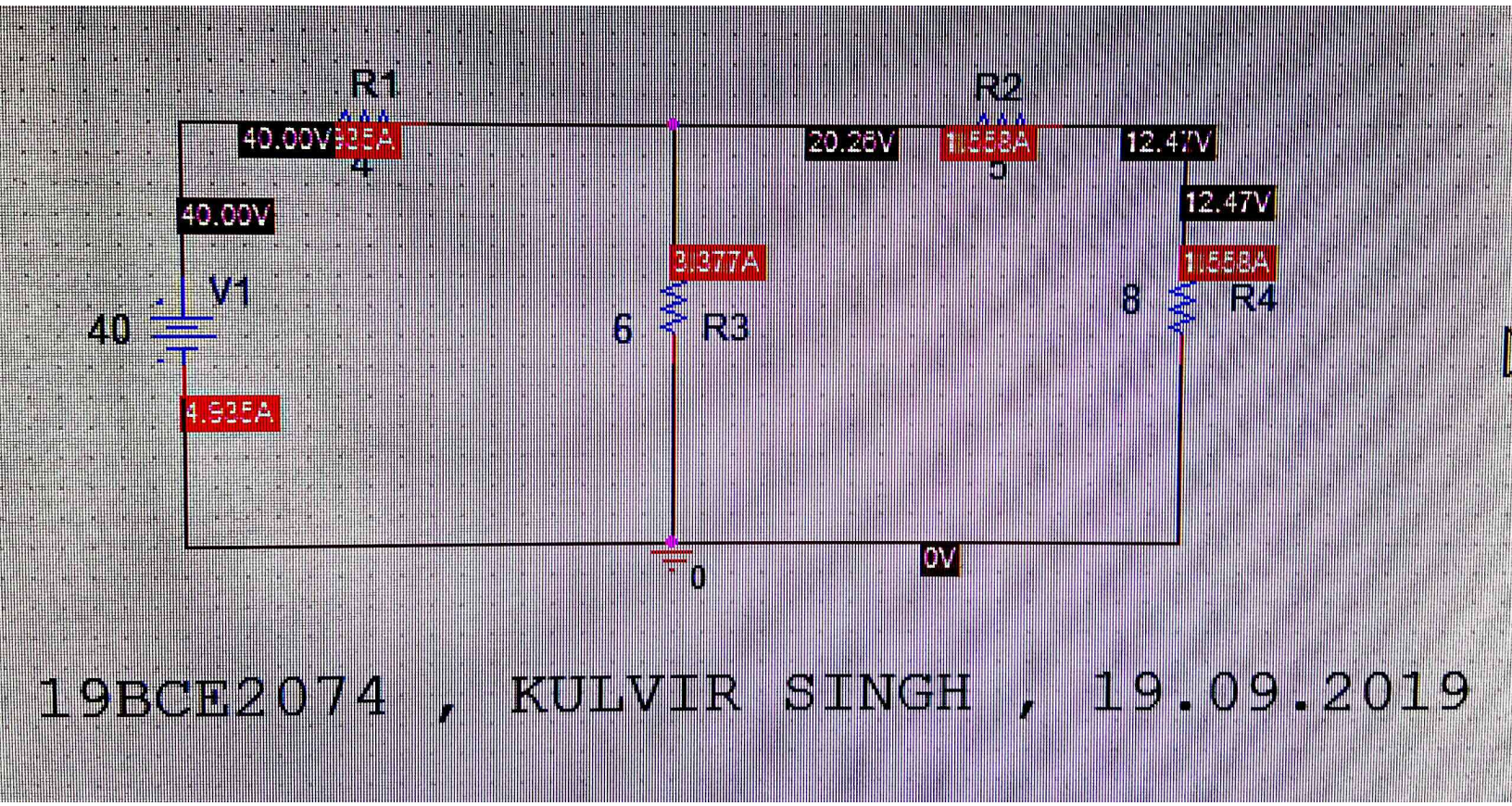
Manual Calculations

Thevenin's Theorem

	Theoritical Values	Simulated Result Simulation Values
V_{TH}	24 V	24 V
R_{TH}	7.4 Ω	7.4 Ω
I_L	1.55A	1.55A

Inference: The Thevenin's Thorem has been verified by theoritical values and simulation values.

Reg. No: 19BCE2074 **Name:** KULVIR SINGH **Date:** 19.9.19



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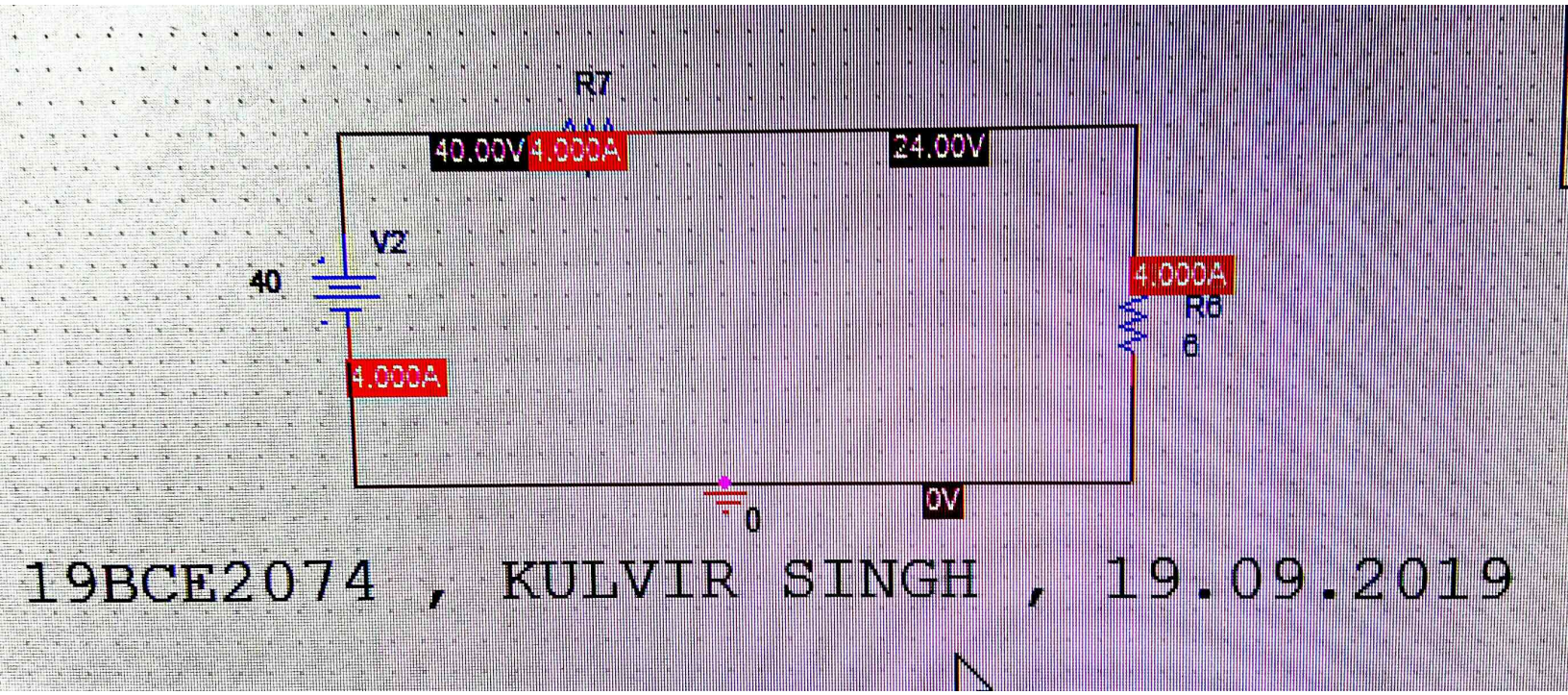

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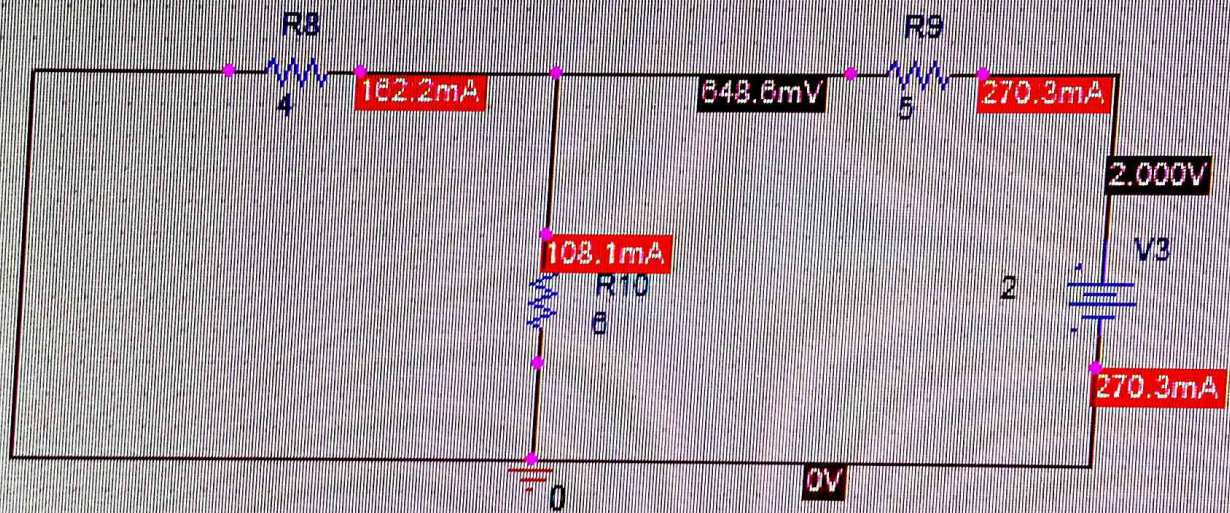

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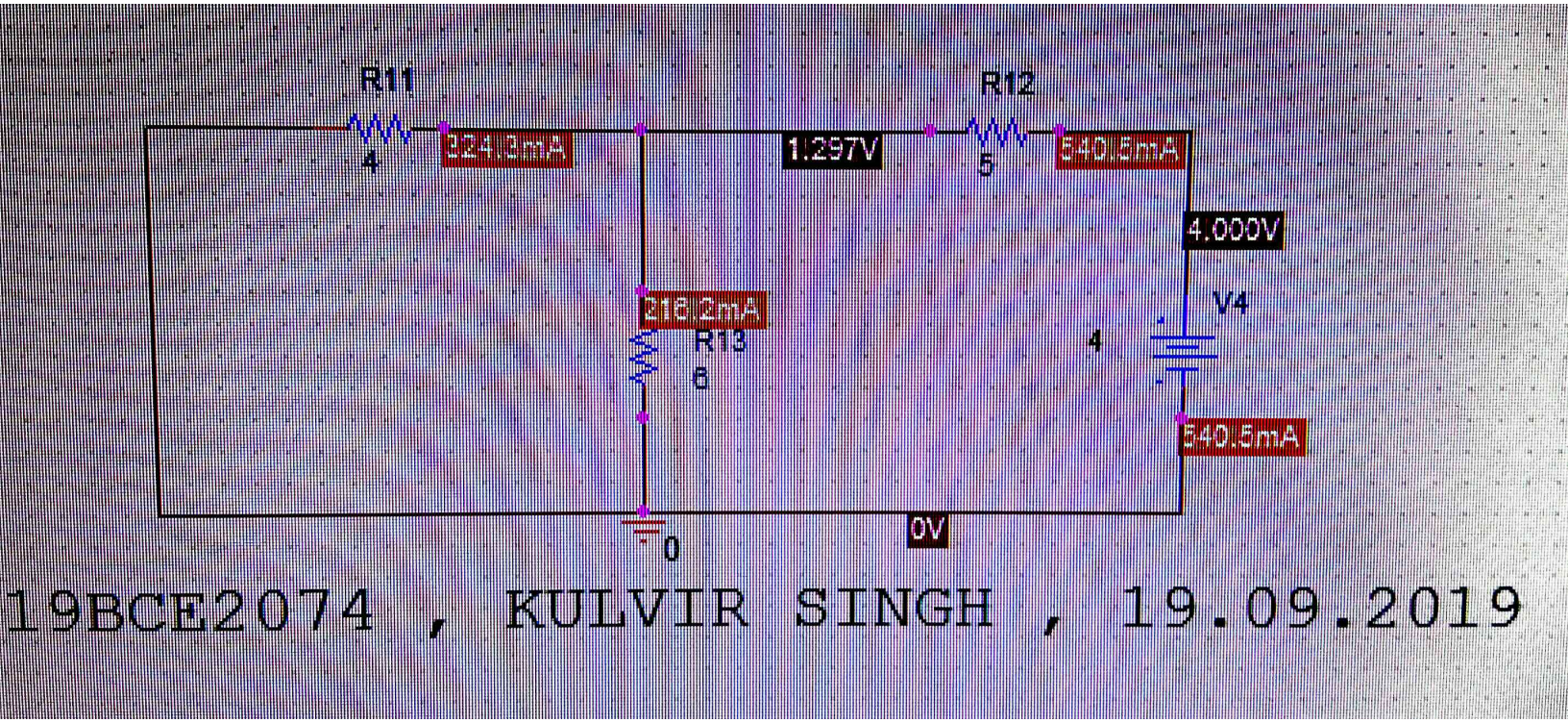

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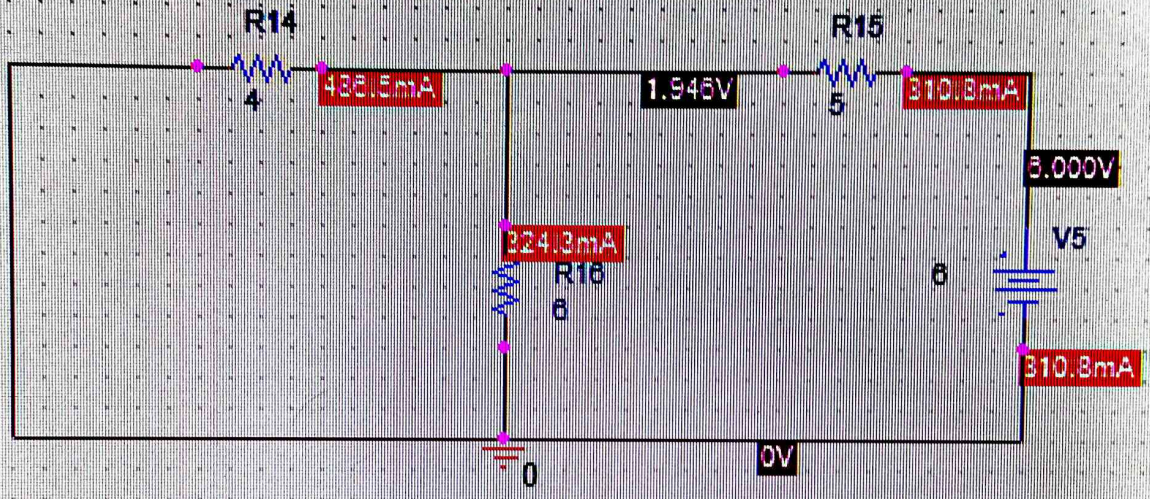

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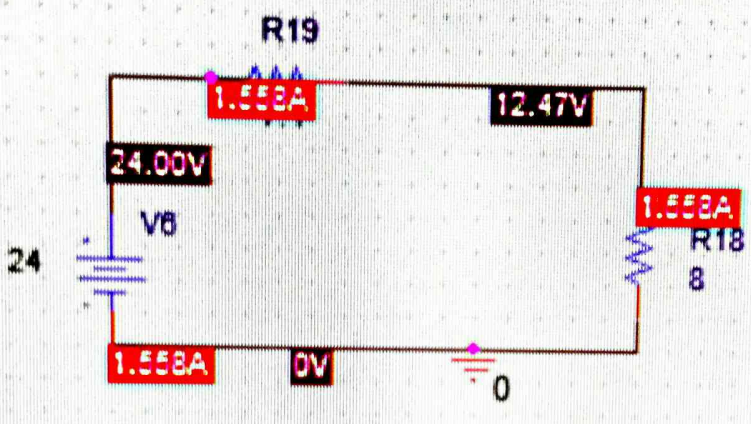

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