Lab Assignment 03

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Section : 09

Course : CSE250

Experiment No : 02

Experiment Name: Varification of KCL and KVL

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Name of the Experiment: Varification of KCL and KVL.

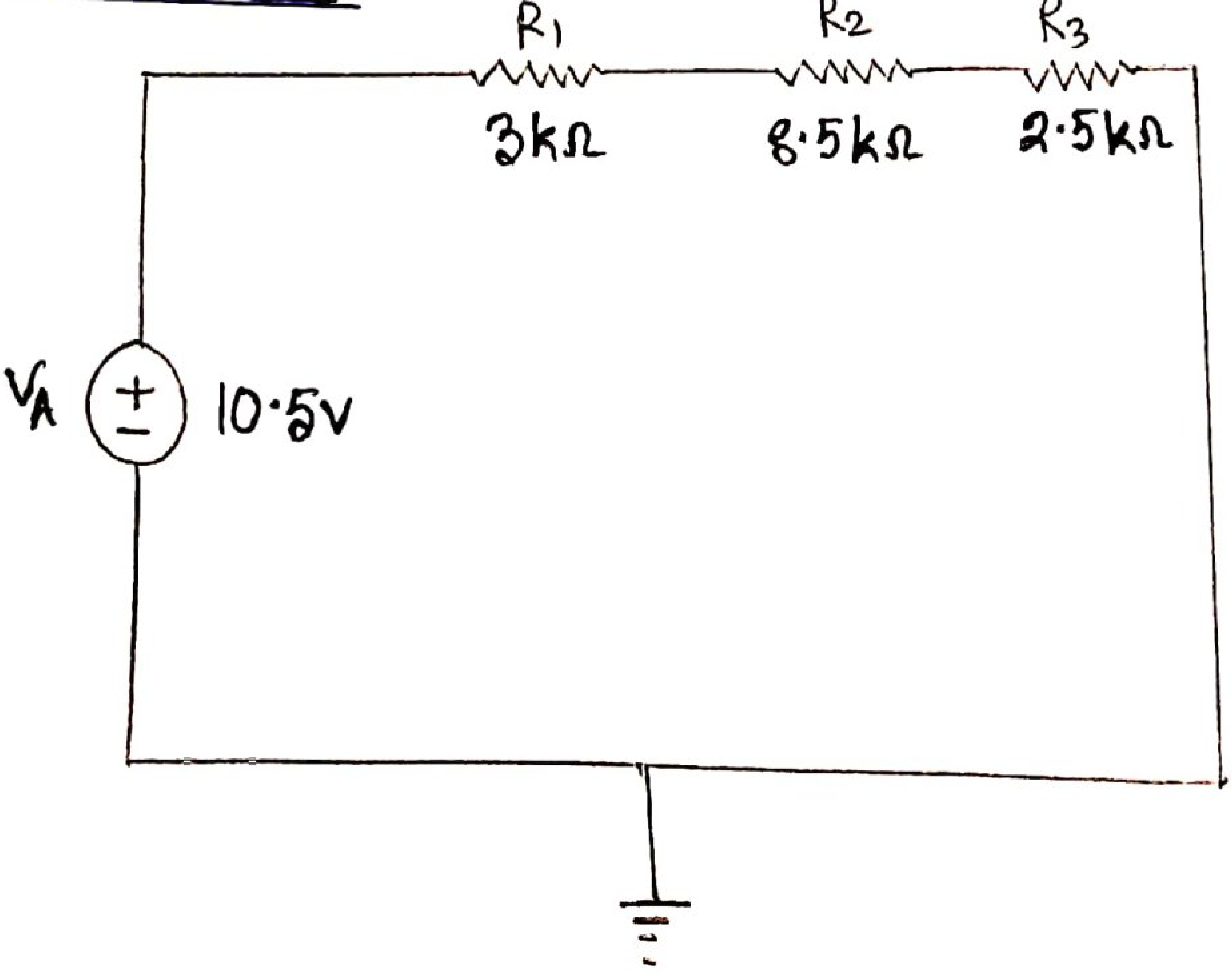
KVL

Objective: This experiment is intended to verify kirchhoff's voltage law (KVL) with the help of series circuits

Apparatus:

- One multimeter
- One DC Ammeter (0 – 1A)
- Three Resistors
- One DC power supply.

Circuit:



Analysis :

Total resistance, $R = (3.0+8.5+2.5)\,k\Omega$

$= 14\,k\Omega$

Current, $I = V/R = 10.5/14\times10^3 = 0.00075\,A$

$V_1 = 0.00075\times3\times10^3 = 2.25\,V$

$V_2 = 0.00075\times8.5\times10^3 = 6.37\,V$

$V_3 = 0.00075\times2.5\times10^3 = 1.88\,V$

$\therefore V_1+V_2+V_3 = (2.25+6.37+1.88)\,V = 10.5\,V$

Table 1 : Verification of KVL.

Observation	R_1	R_2	R_3	V	V_1	V_2	V_3	$V_1+V_2+V_3$
Simulation	3.0	8.5	2.5	10.5	2.25	6.37	1.88	10.5
Theoretical	3.0	8.5	2.5	10.5	2.25	6.37	1.88	10.5

Report :

- To get exact value, voltmeter should be connected with the circuit in parallel.
- ~~Sim~~ As simulation and theoritical's value's are same. So, no discrepanices happen. Again, as ~~the~~ source voltage and calculated voltage are same, so the results has matched with KVL theory.

Discussion :

$V_1+V_2+V_3-V=0$, Out of KVL, we find that aroud any closed circuit; the sum of the algebric voltage enhances which equivalents with the ~~al~~ sum of algebric voltage drops. So, KVL Theory proved.

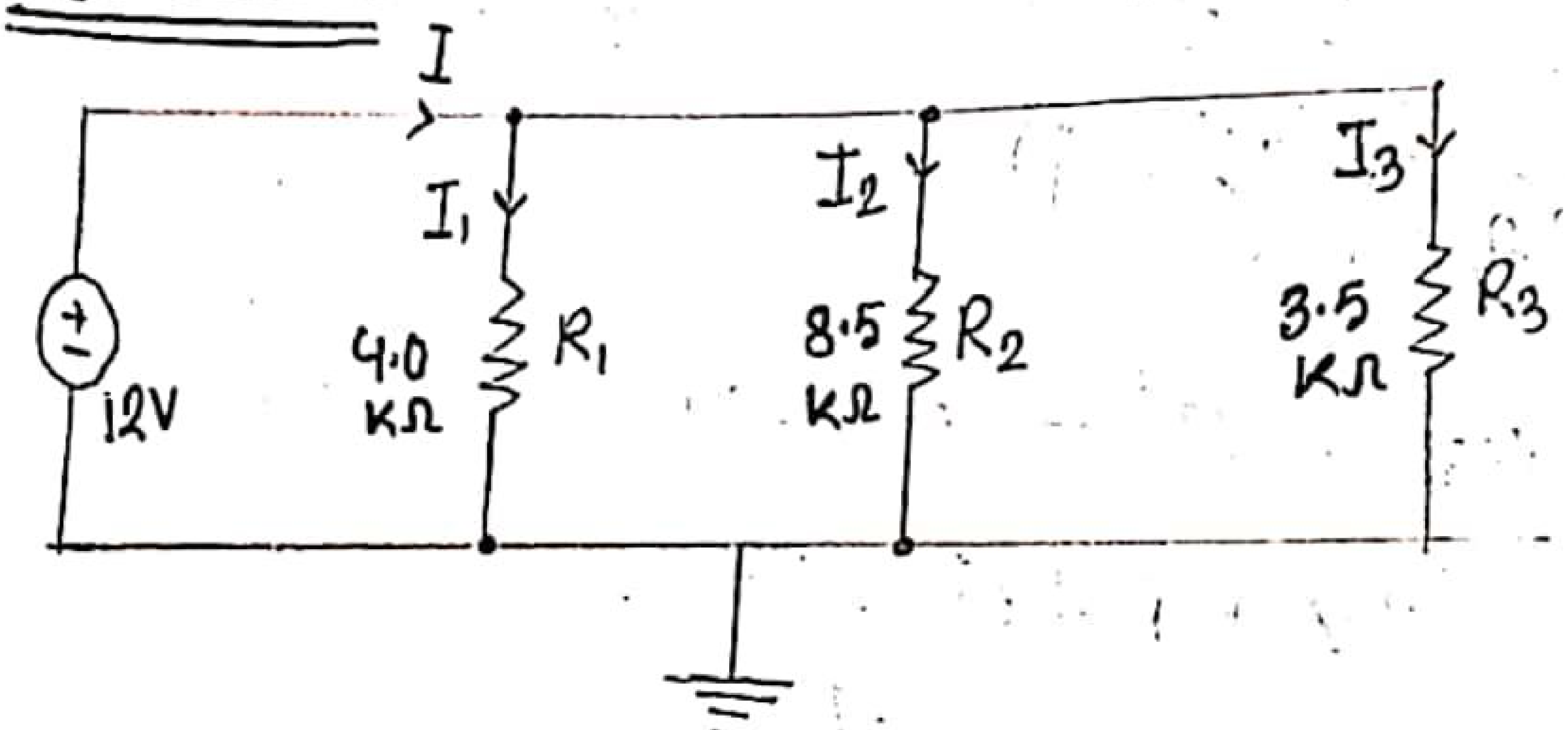
KCL

Objective: This experiment is intended to verify Kirchhoff's current law (KCL) with the help of a simple parallel circuit.

Apparatus:

- One DC Ammeter (0–1A)
- Three Resistors
- One multimeter
- One DC supply.

Circuit:



Analysis:

$$I_1 = V/R_1 = 12/4.0\times10^3 = 3.00\text{ mA}$$

$$I_2 = V/R_2 = 12/8.5\times10^3 = 1.41\text{ mA}$$

$$I_3 = V/R_3 = 12/3.5\times10^3 = 3.43\text{ mA}$$

$$\therefore I = I_1 + I_2 + I_3 = (3+1.41+3.43)\text{ mA} = 7.84\text{ mA}$$

Table 1: verification of KCL:

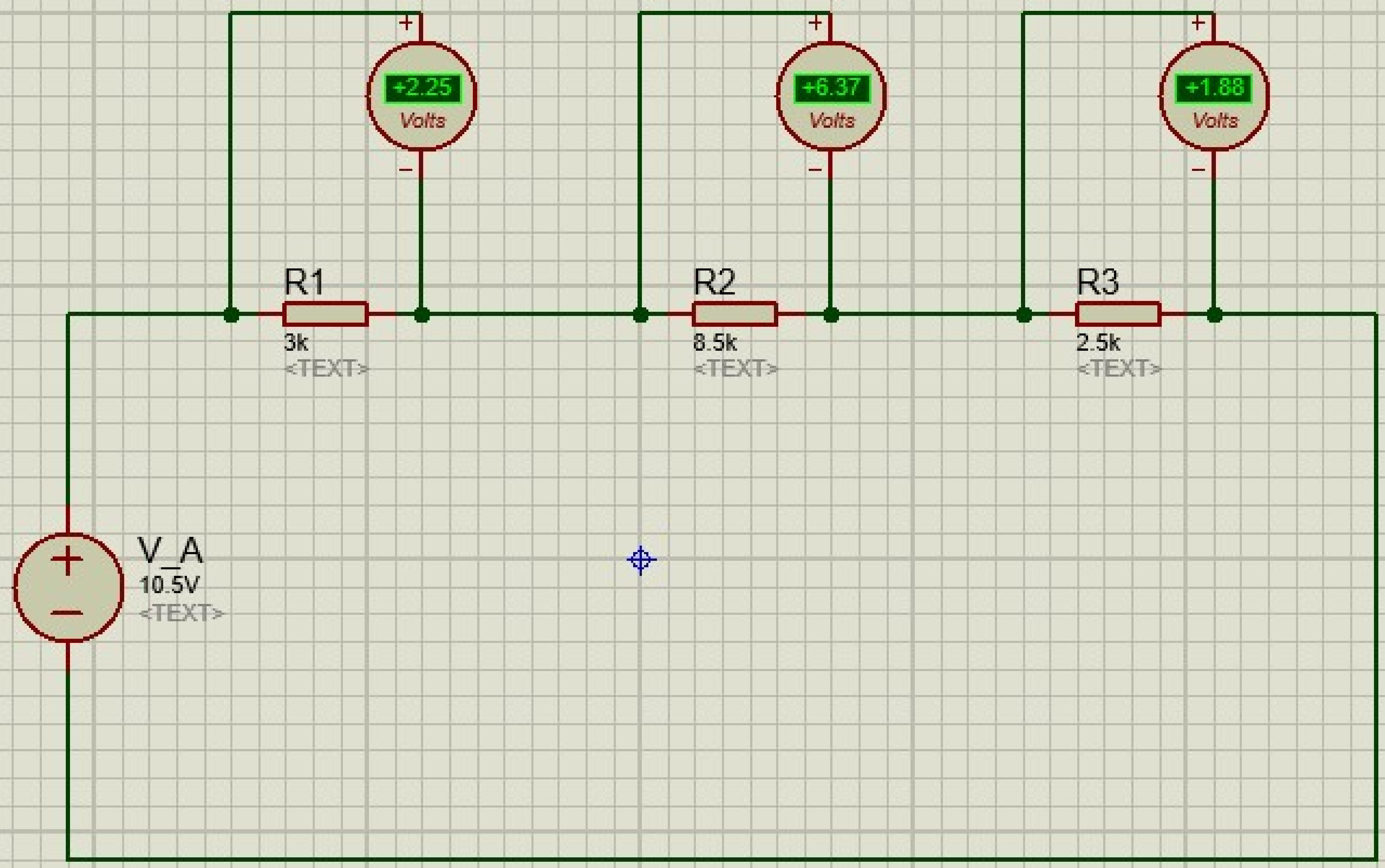
Observation	R_1	R_2	R_3	I	I_1	I_2	I_3	$I_1+I_2+I_3$
Simulation	4	8.5	3.5	7.84	3.0	1.41	3.43	7.84
Theoritical	4	8.5	3.5	7.84	3.0	1.41	3.43	7.84

Report:

- To get the current flows, the ammeter should be connected to ~~the each~~ every resistors and circuits in series.
- As simulation and theoritical values are same. So no discrepancies happen. Again, as source current and calculated current values are same. So, the results has matched with KCL theory.

Discussion:

$I_1 + I_2 + I_3 - I = 0$, out of KCL, we find the sum of algebric of the currents entering to any node equivalents with the sum of current leaving node. So, KCL proved.



R1
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R2
8.5k
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R3
2.5k
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+2.25
Volts
+6.37
Volts
+1.88
Volts
V_A
10.5V
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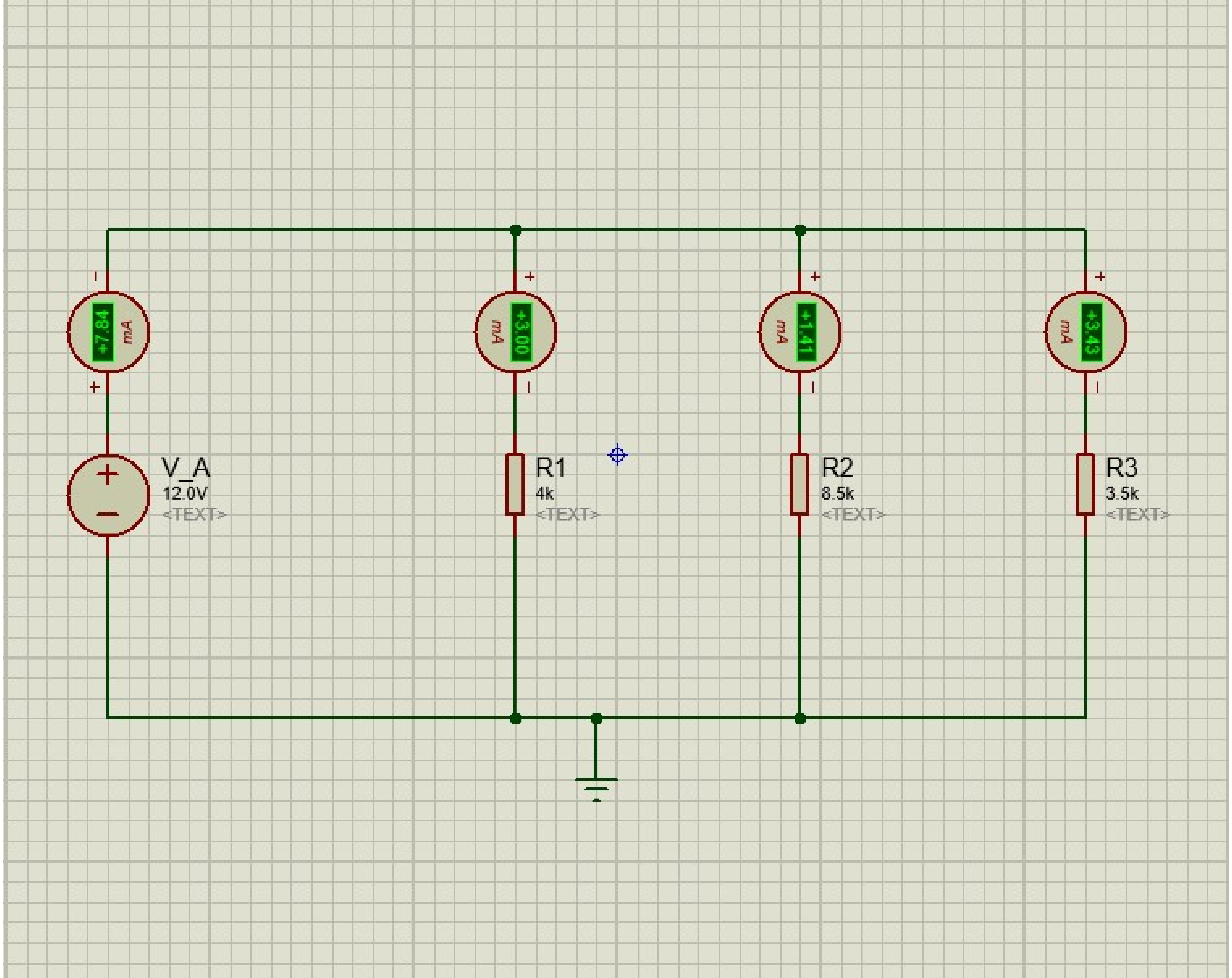

+7.84
mA
+3.00
mA
+1.41
mA
+3.43
mA
V_A
12.0V
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R1
4k
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R2
8.5k
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R3
3.5k
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