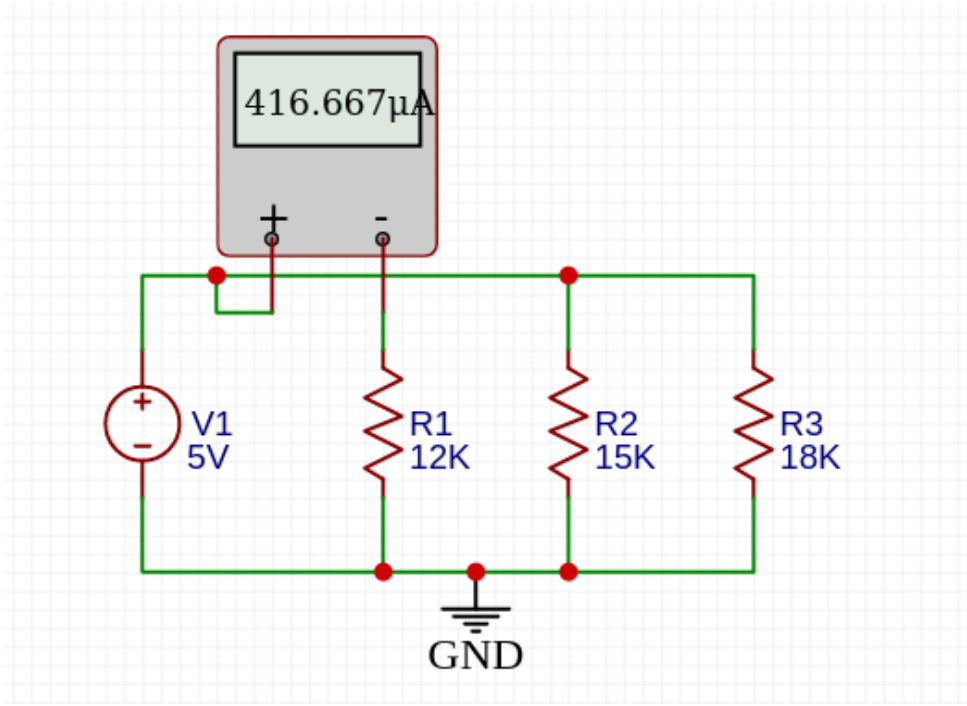
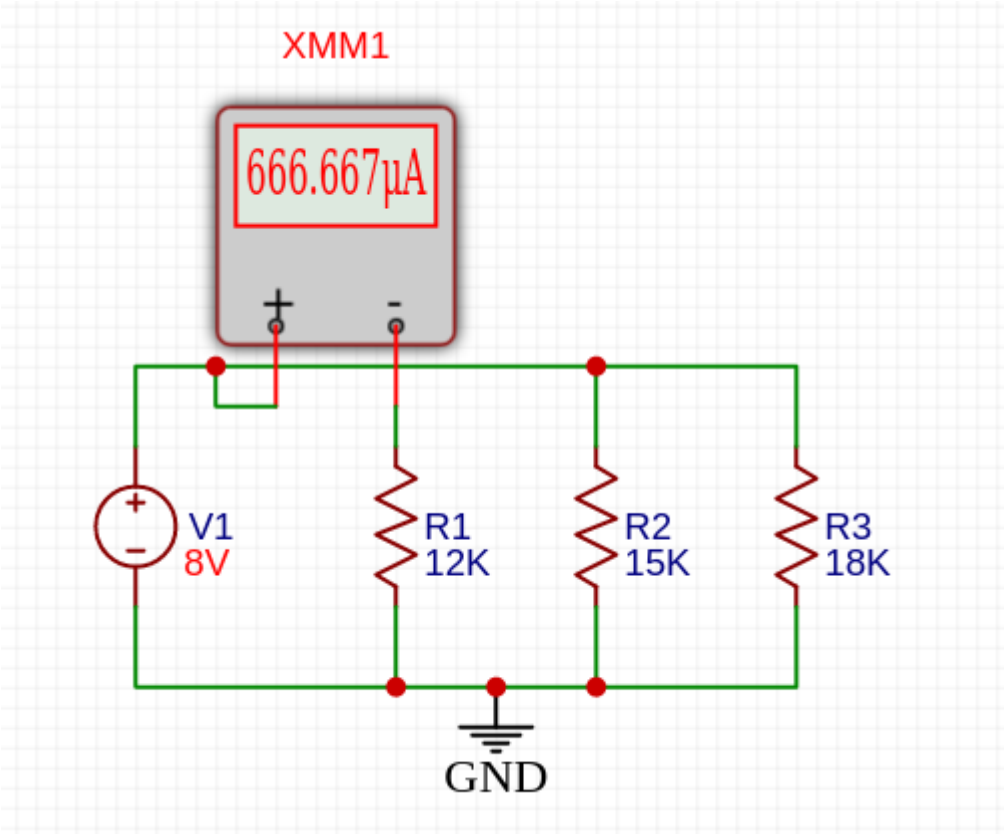
Section 1

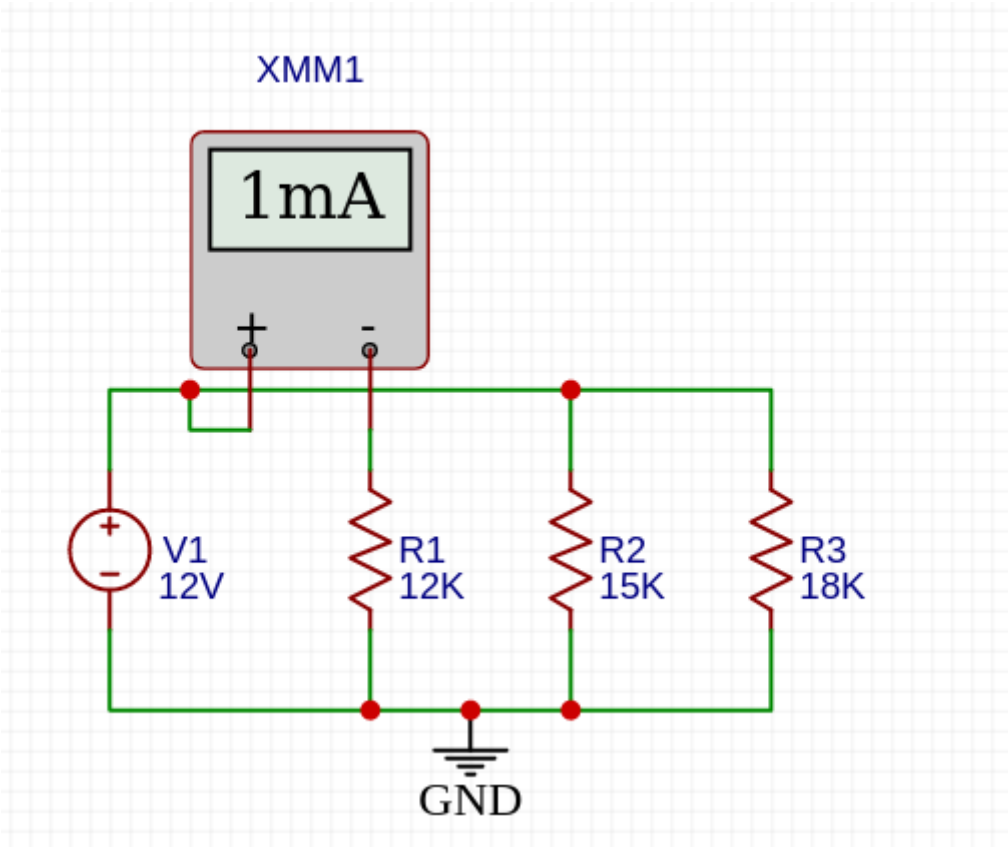
Table 1



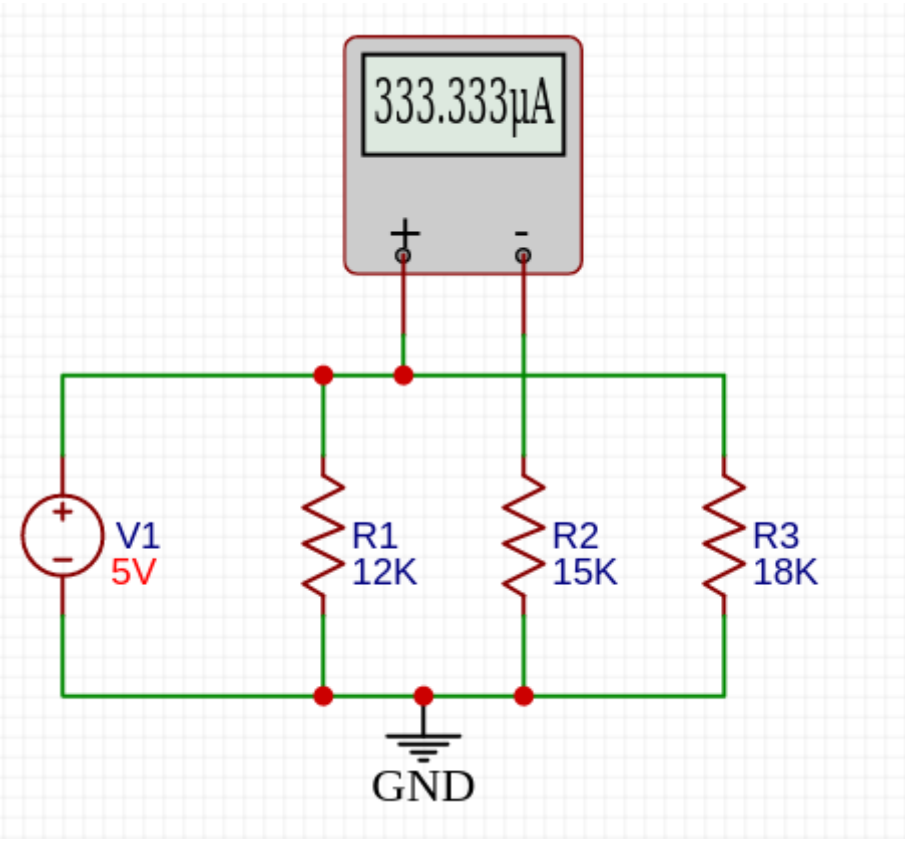
I_1[A] 5V



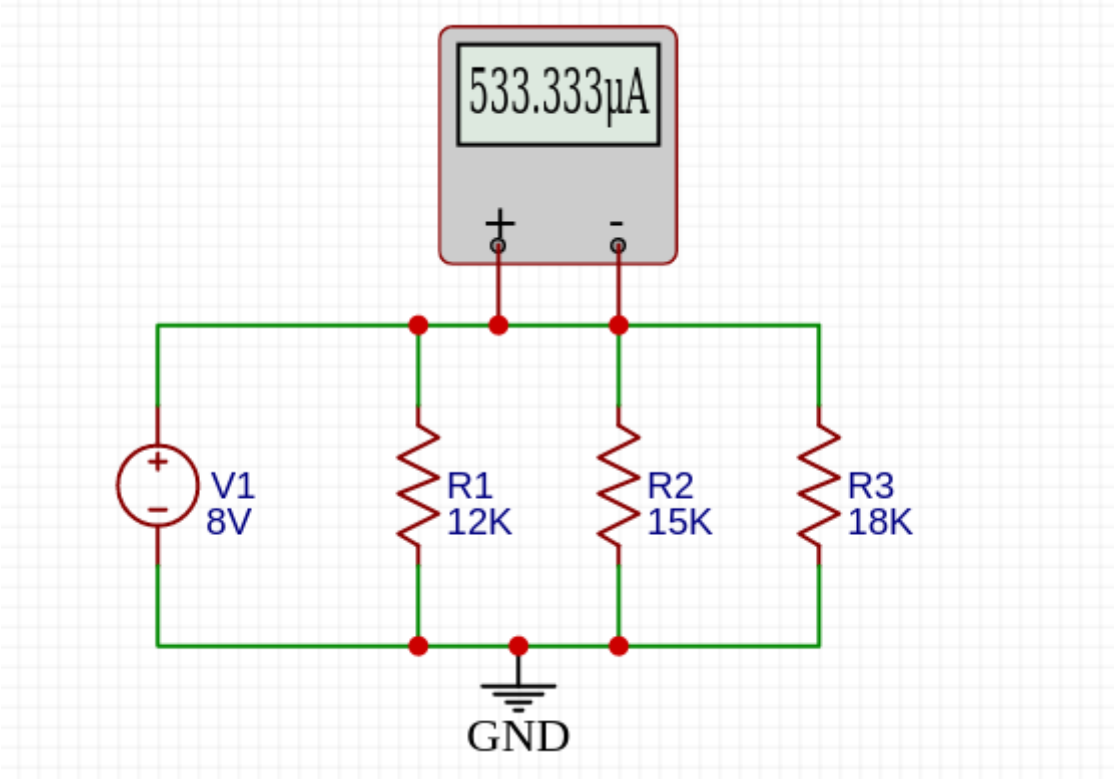
I_1[A] 8V



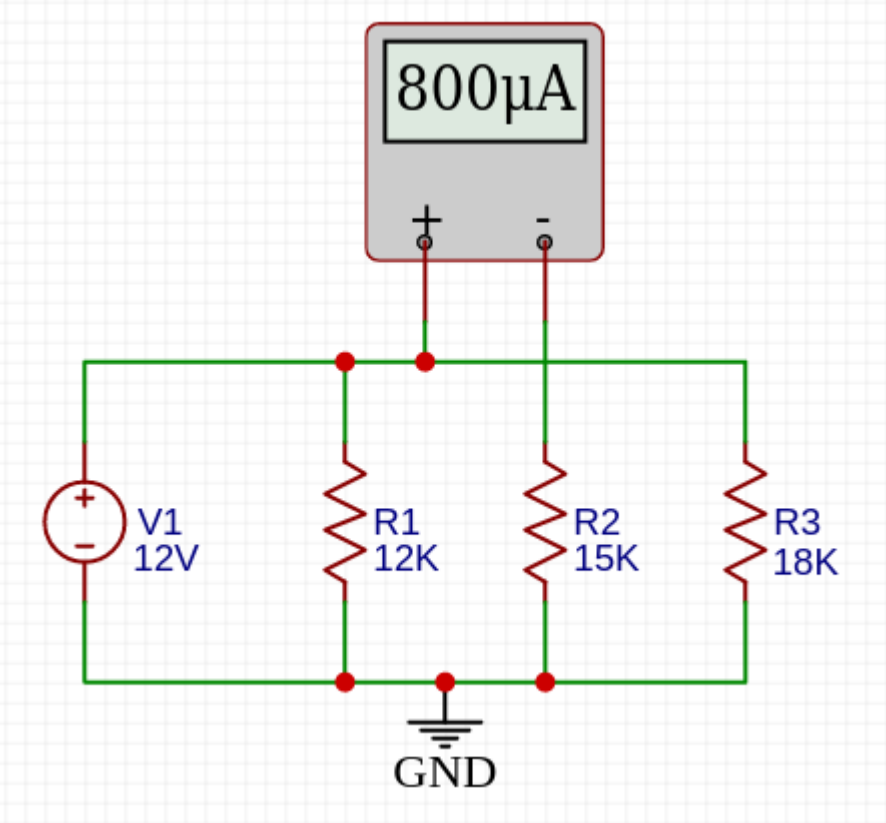
I_1[A] 12V



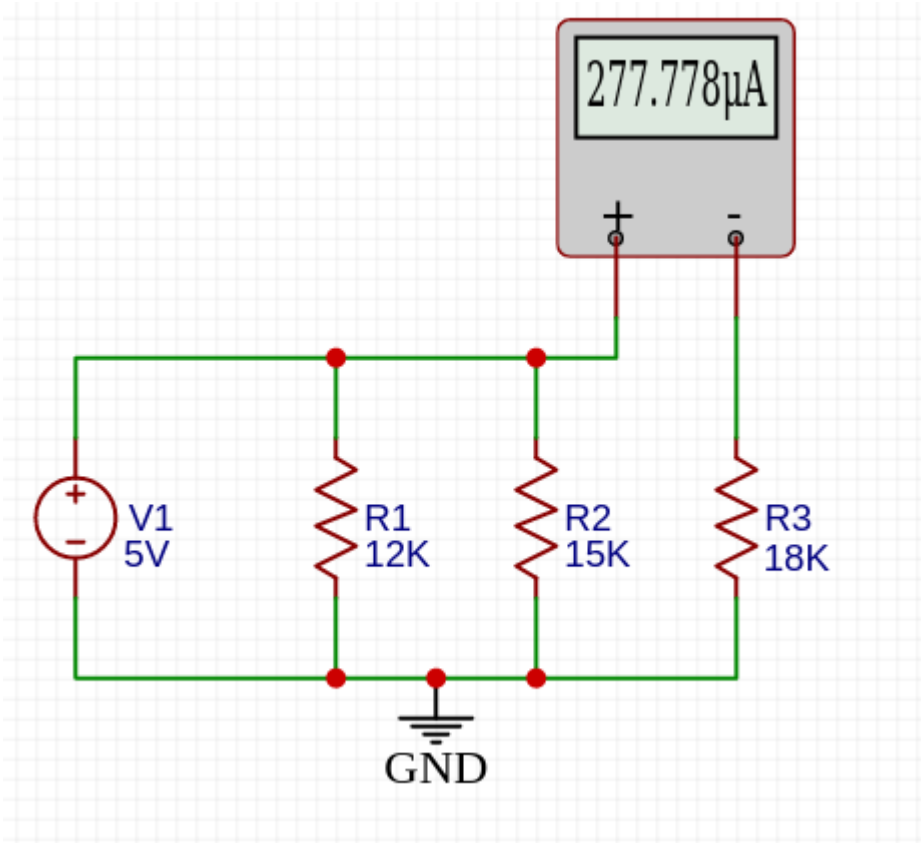
I_2[A] 5V



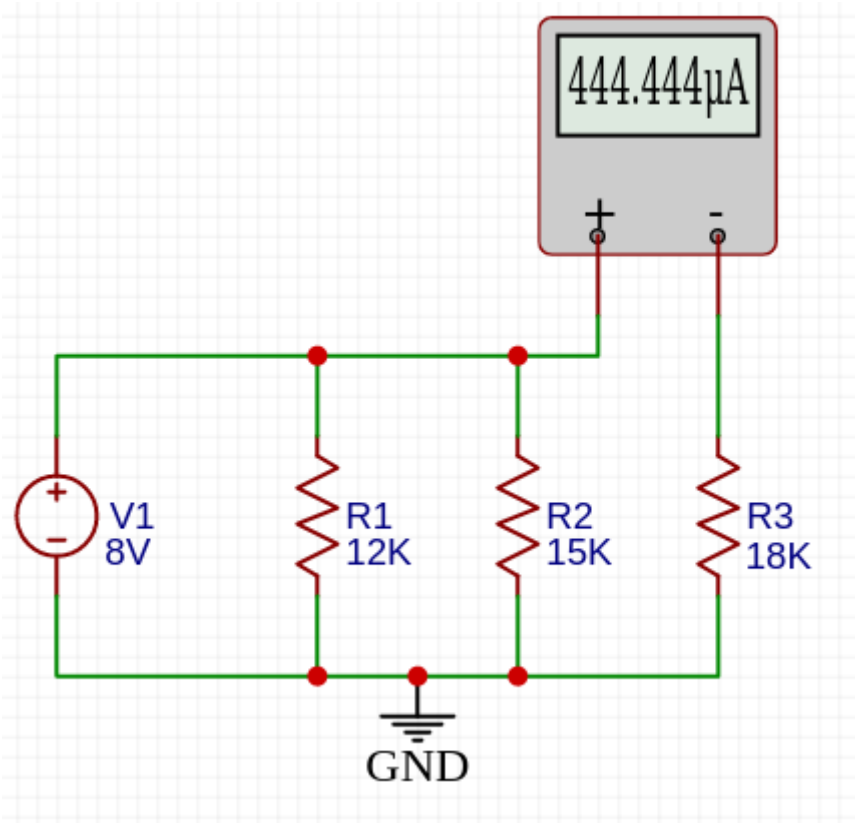
I_2[A] 8V



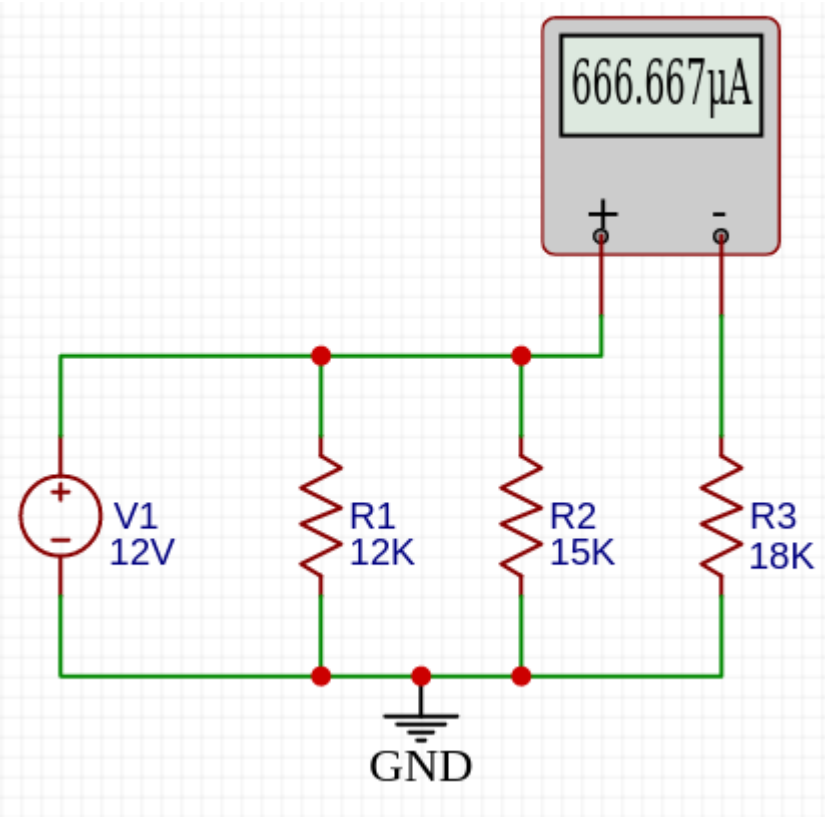
I_2[A] 12V


277.778µA
+
-
V1
5V
R1
12K
R2
15K
R3
18K
GND

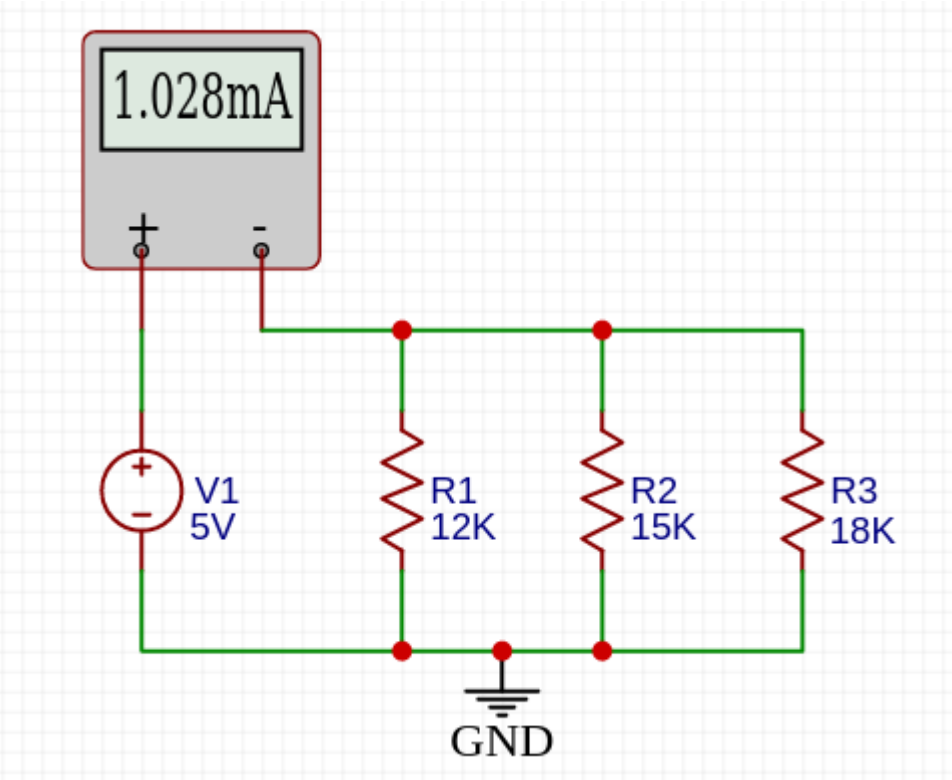
I_3[A] 5V


444.444µA
+
-
V1
8V
R1
12K
R2
15K
R3
18K
GND

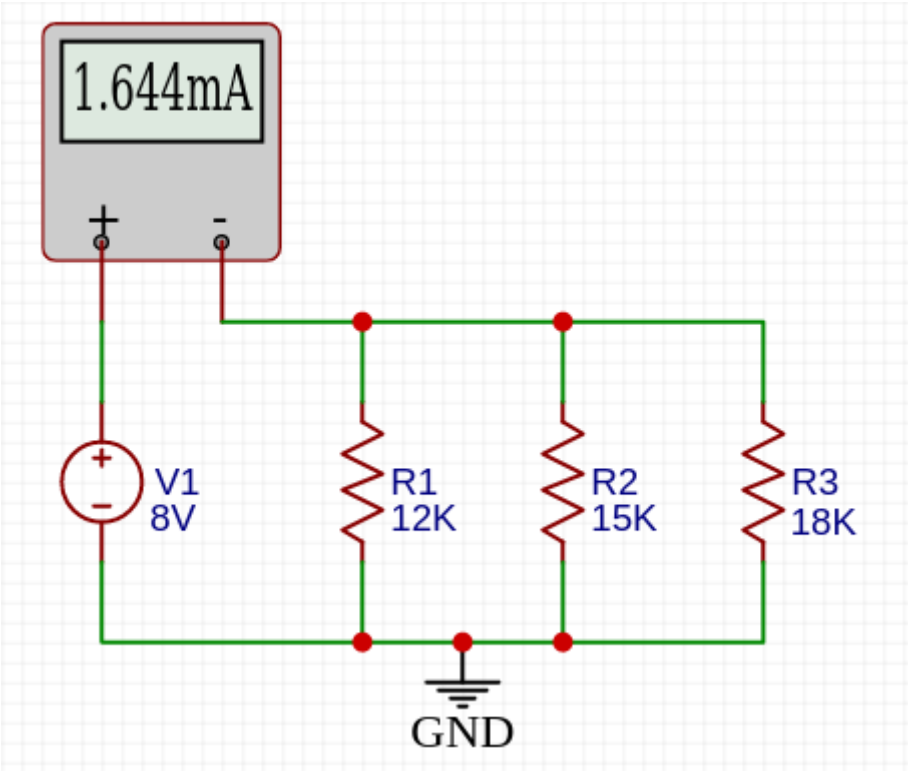
I_3[A] 8V



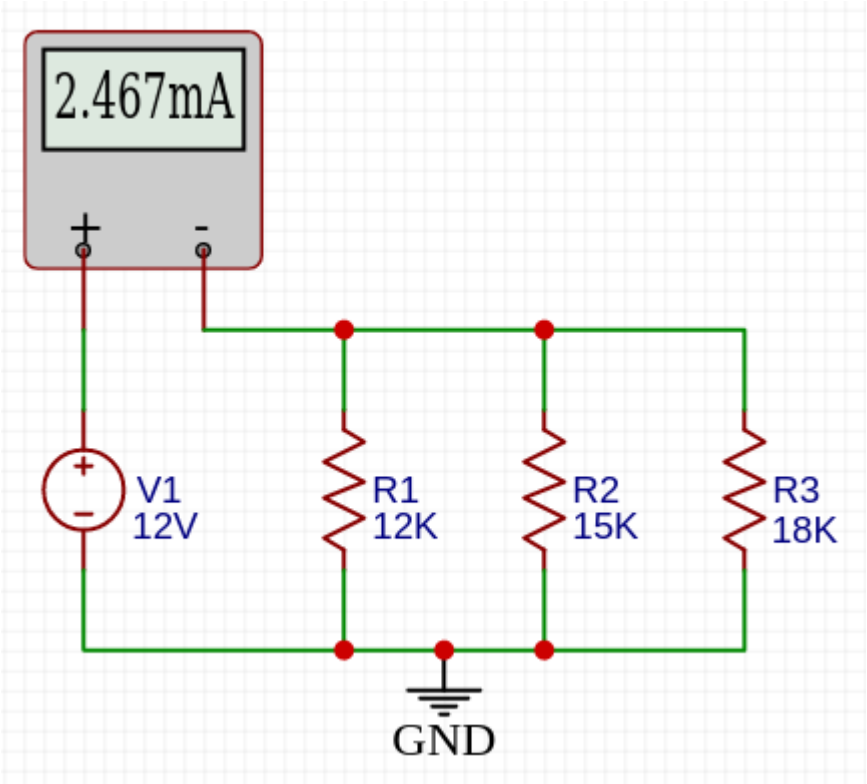
I_3[A] 12V



I_k[A] 5v

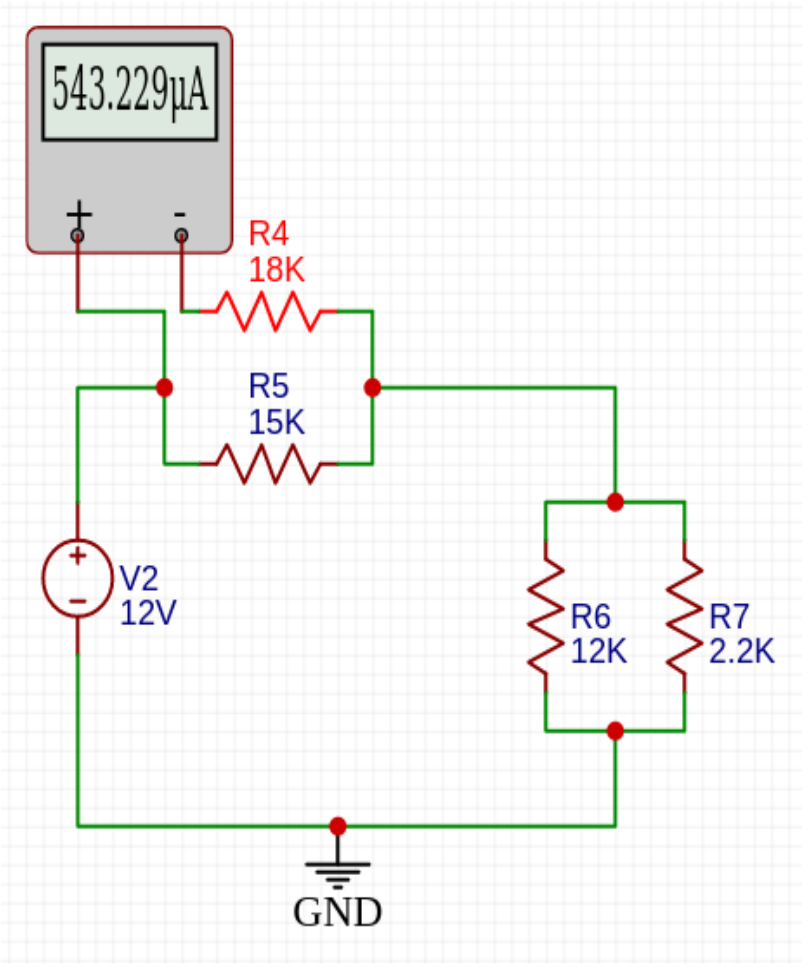


$I_k[A]$ 8v

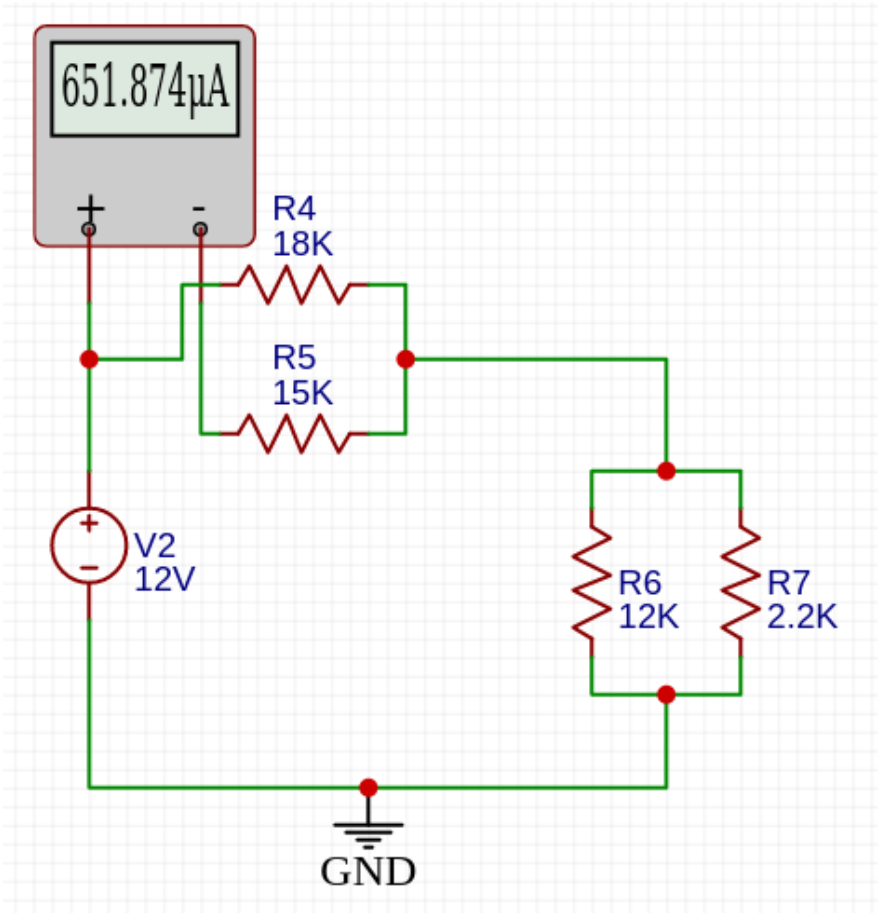


$I_k[A]$ 12v

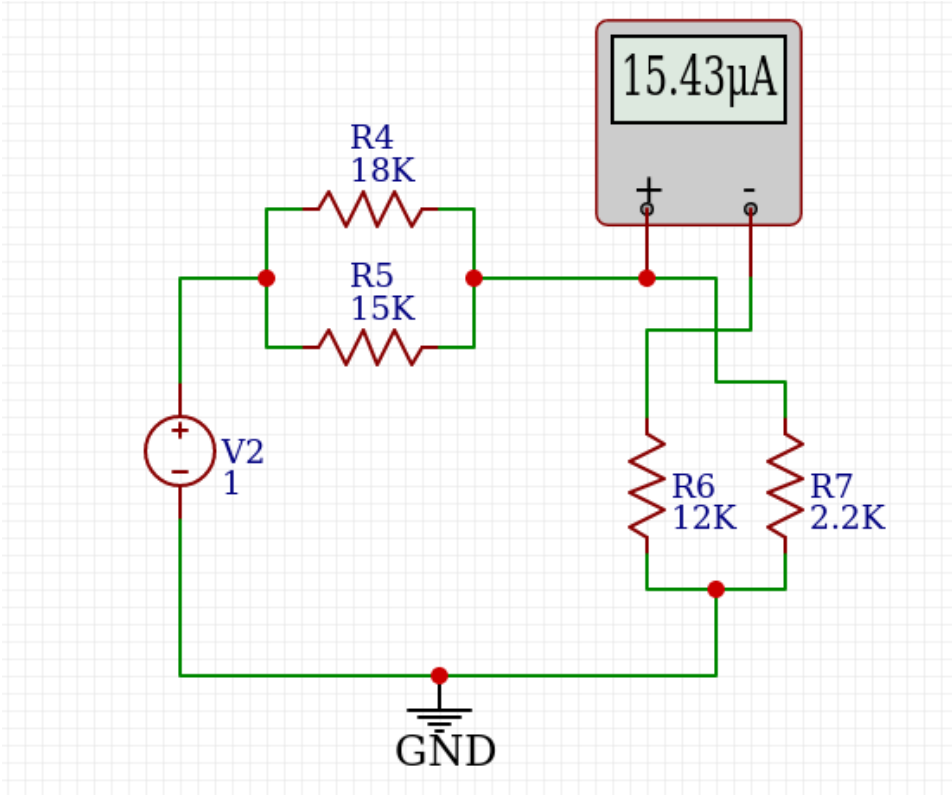
Table 2



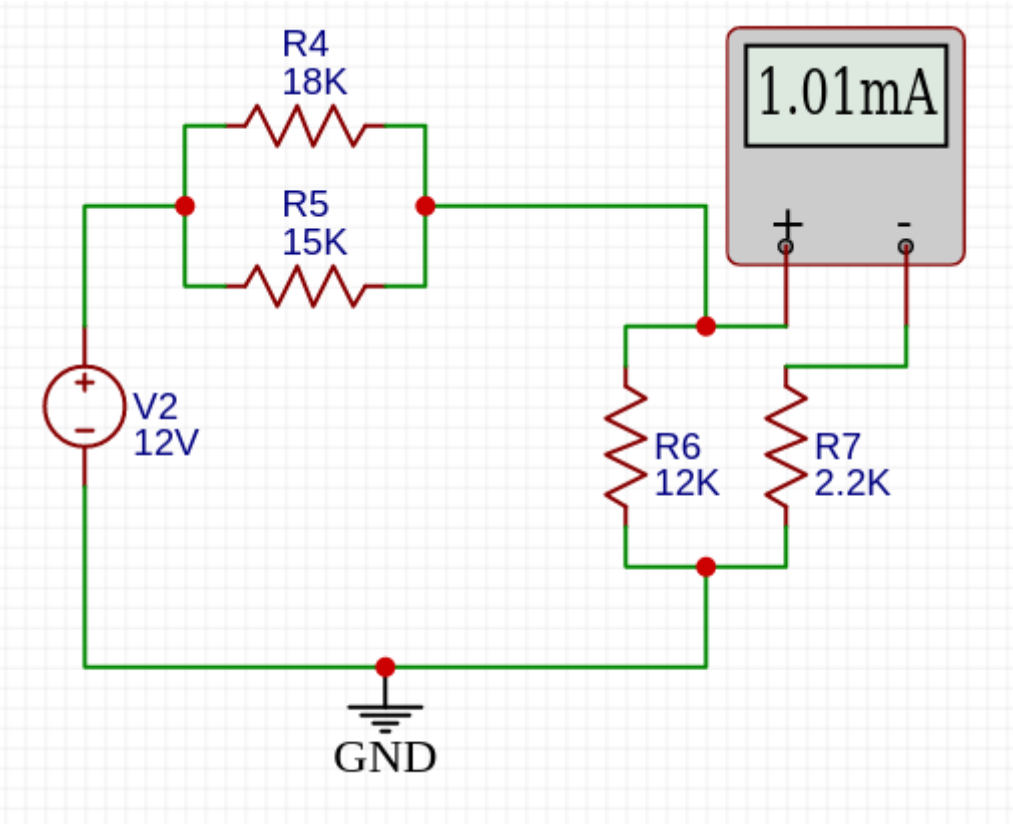
$I_{R1}[A]$


651.874µA
+
-
R4
18K
R5
15K
V2
12V
R6
12K
R7
2.2K
GND

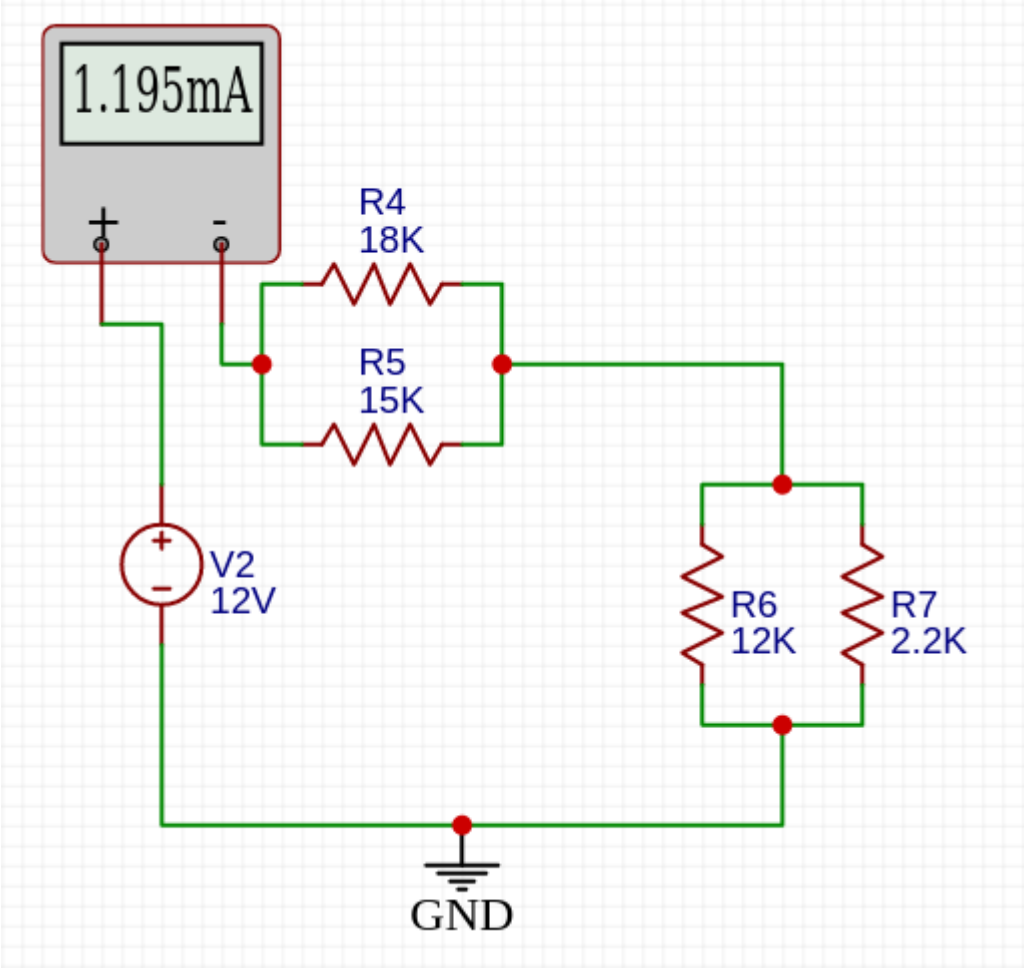
$I_{R2}[A]$


15.43µA
+
-
R4
18K
R5
15K
V2
1
R6
12K
R7
2.2K
GND

$I_{R3}[A]$


R4
18K
R5
15K
1.01mA
+
-
V2
12V
R6
12K
R7
2.2K
GND

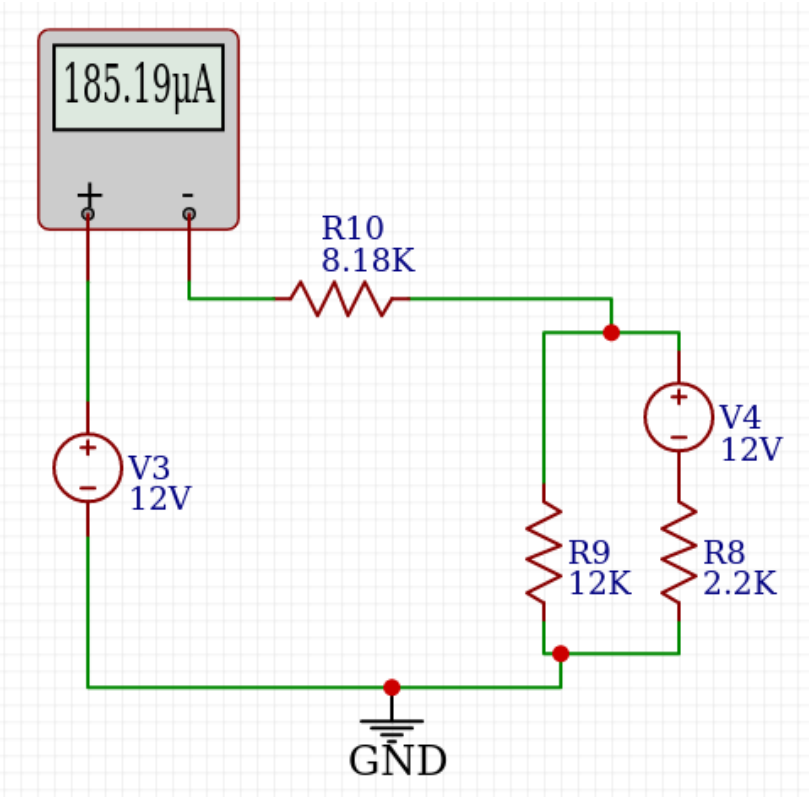
$I_{R4}[A]$


1.195mA
+
-
R4
18K
R5
15K
V2
12V
R6
12K
R7
2.2K
GND

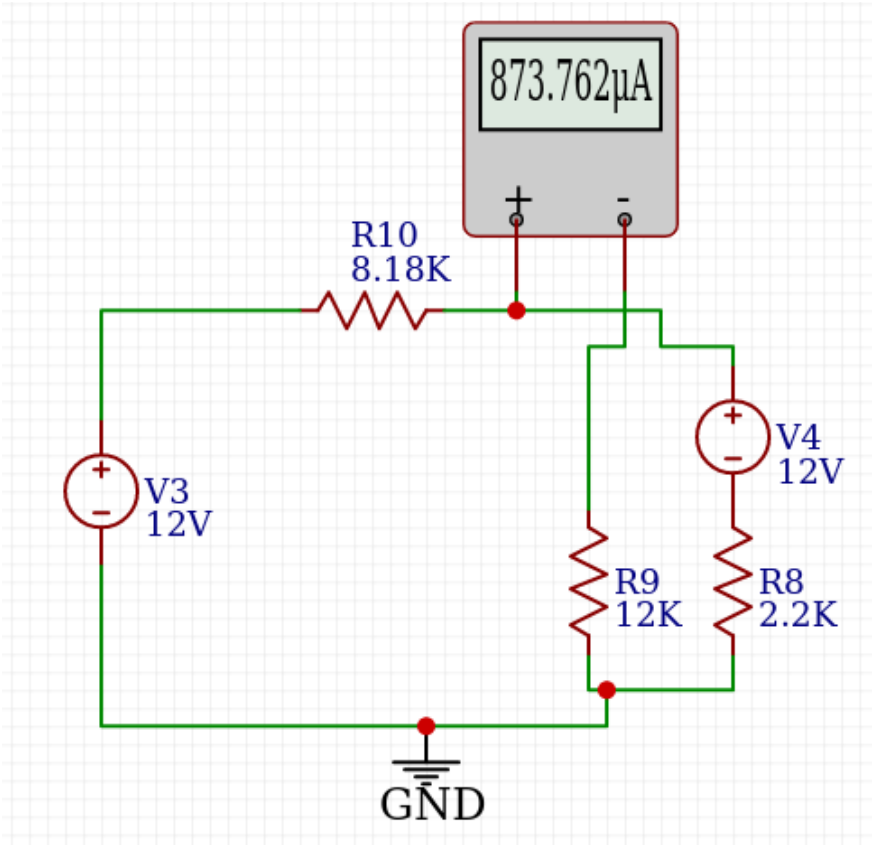
$I_k[A]$

Section 2

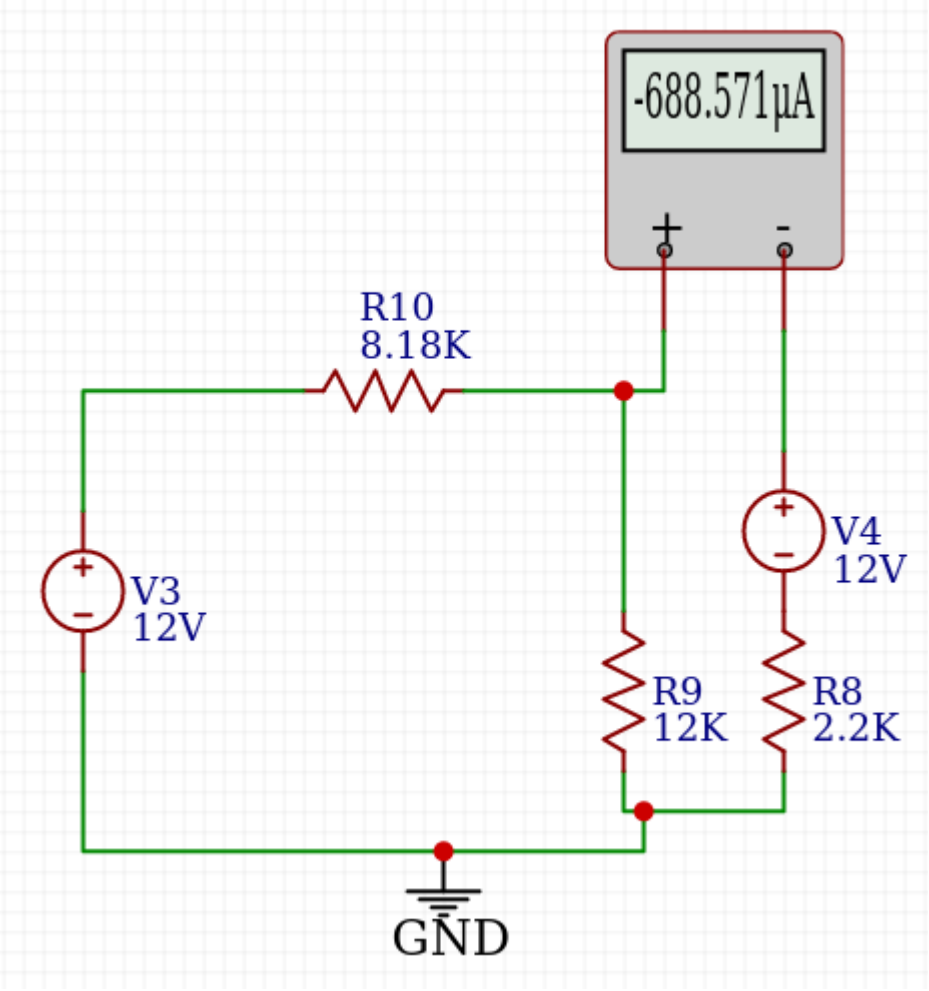
Table 3 (2.1)



$I_{R1,2eqv}[A]$

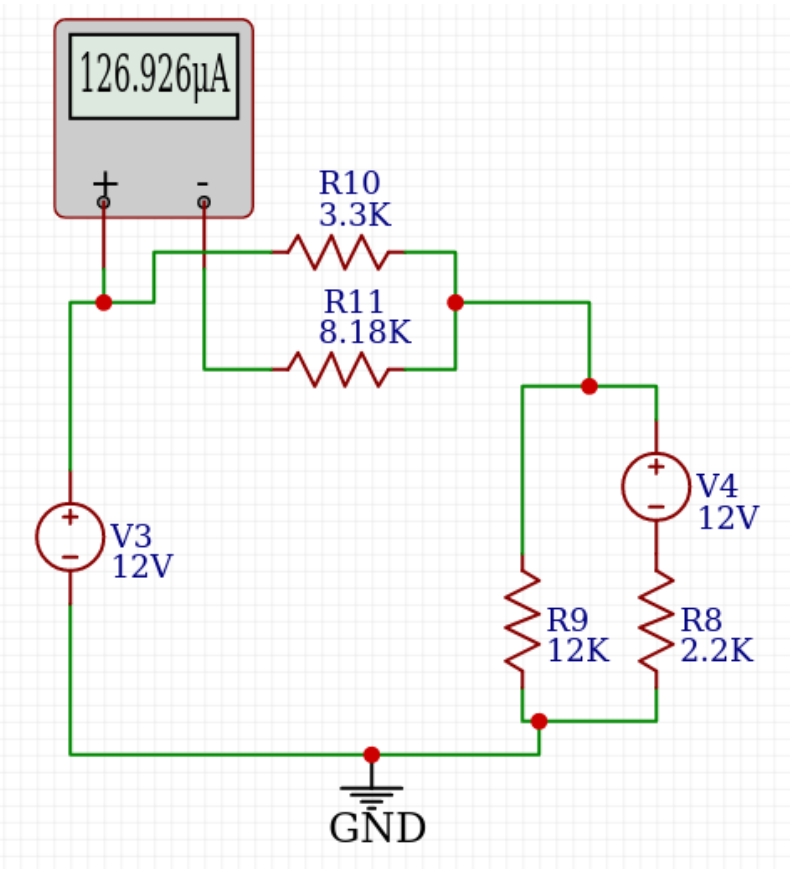


$I_{R3}[A]$

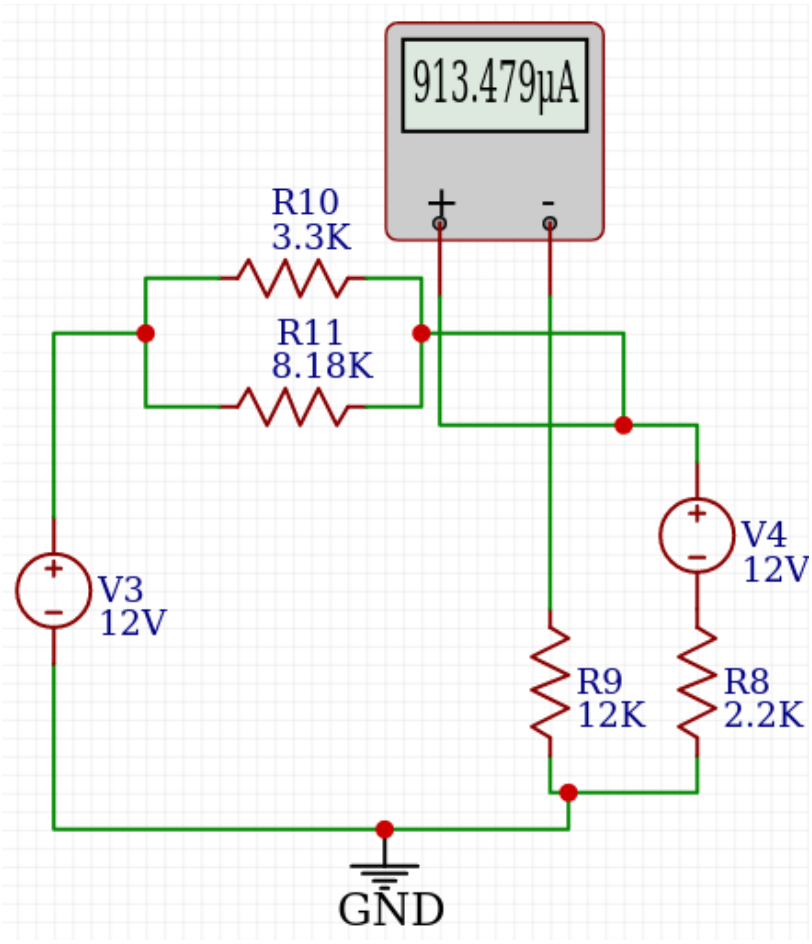


$I_{R4}[A]$

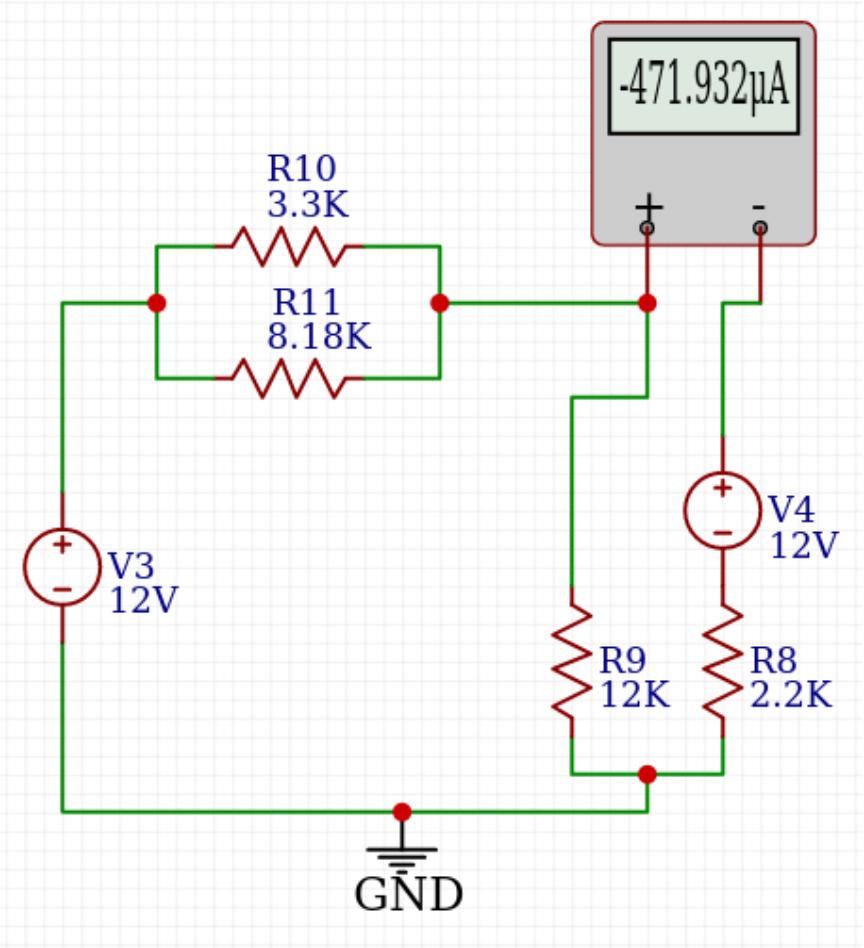
Table 4 (2.2)



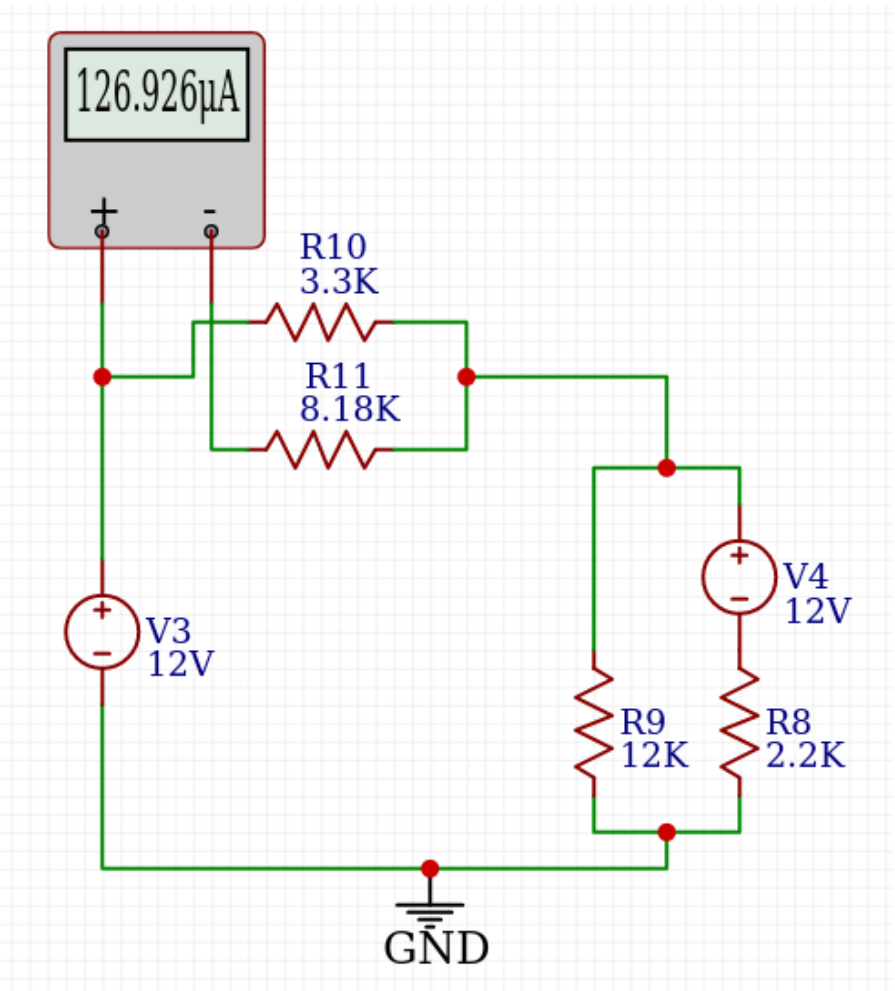
$I_{R1,2eqv}[A]$



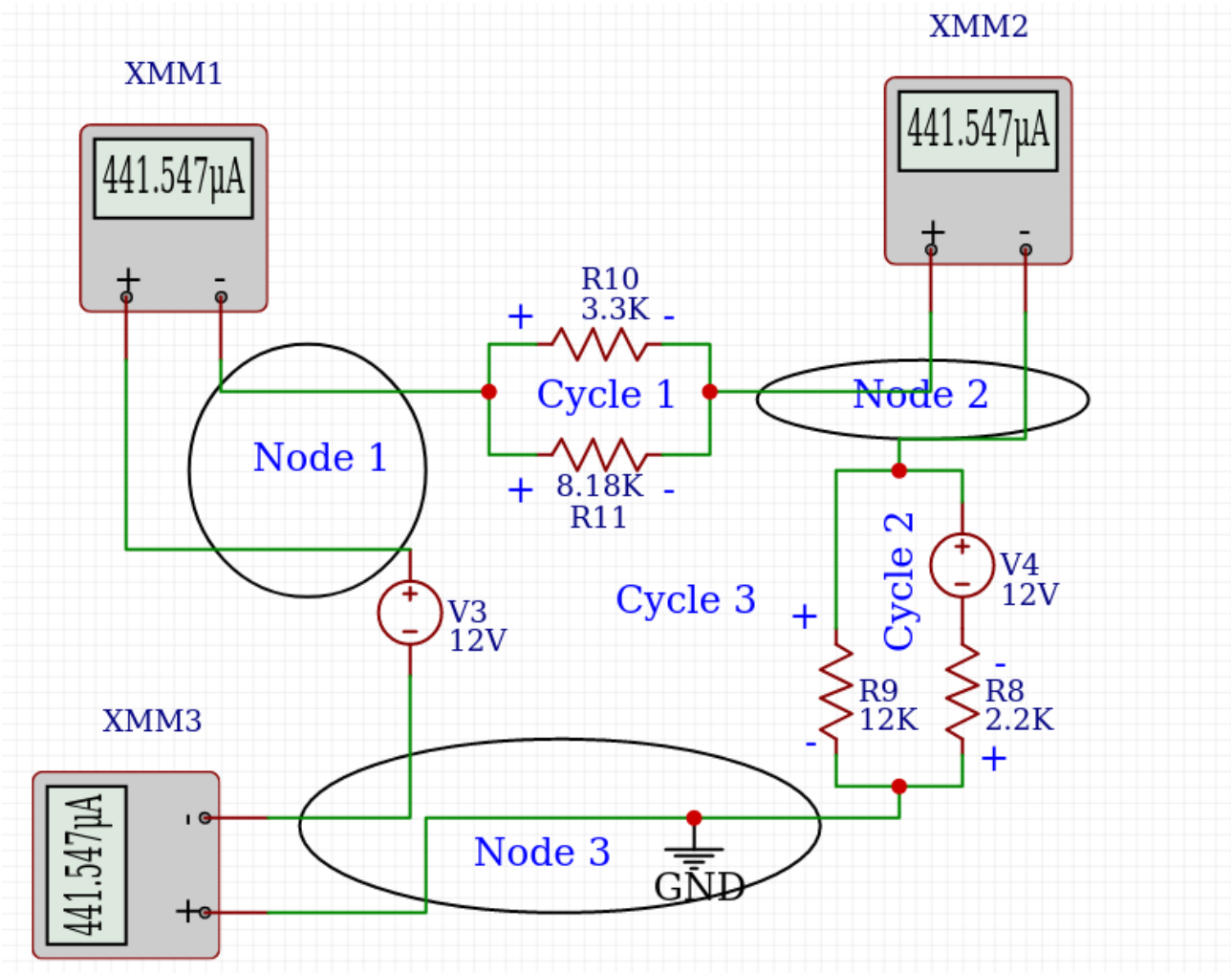
$I_{R3}[A]$


-471.932µA
+
-
R10
3.3K
R11
8.18K
V3
12V
V4
12V
R9
12K
R8
2.2K
GND

$I_{R4}[A]$

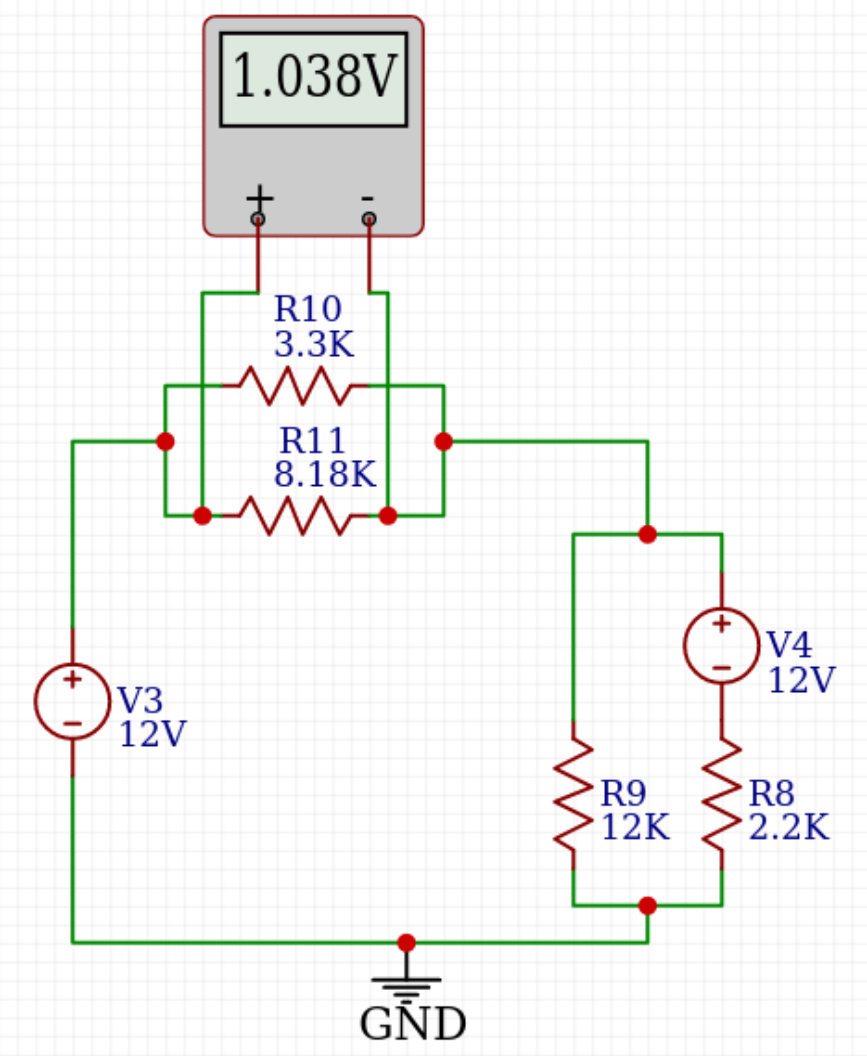

126.926µA
+
-
R10
3.3K
R11
8.18K
V3
12V
V4
12V
R9
12K
R8
2.2K
GND

$I_{R5}[A]$

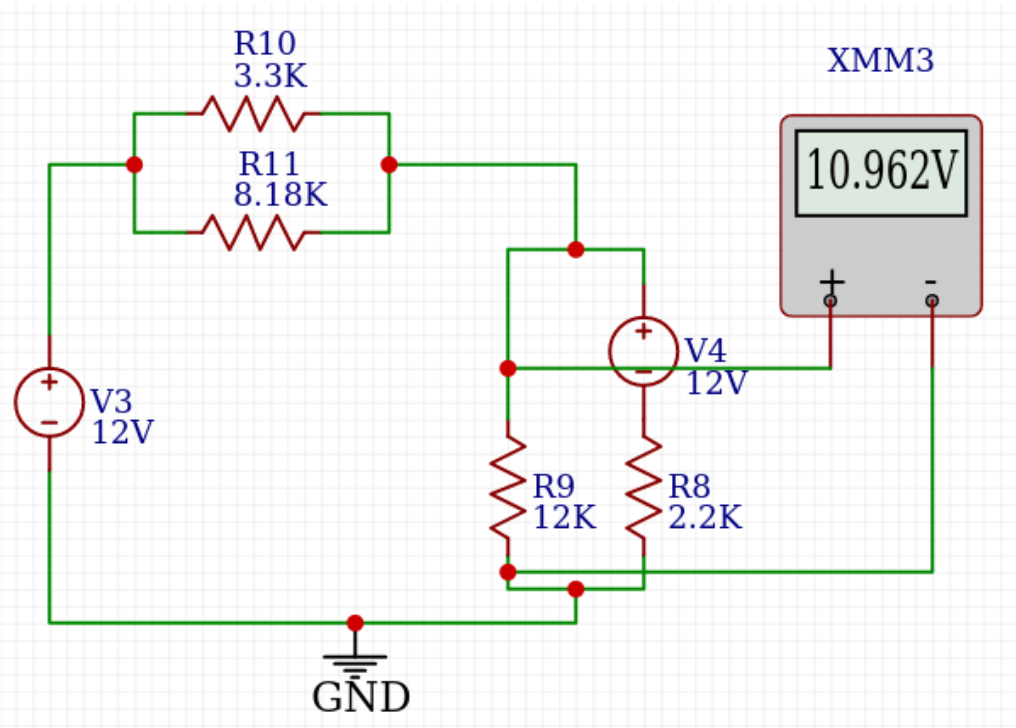


$I_{N1}[A]$ $I_{N2}[A]$ $I_{N3}[A]$

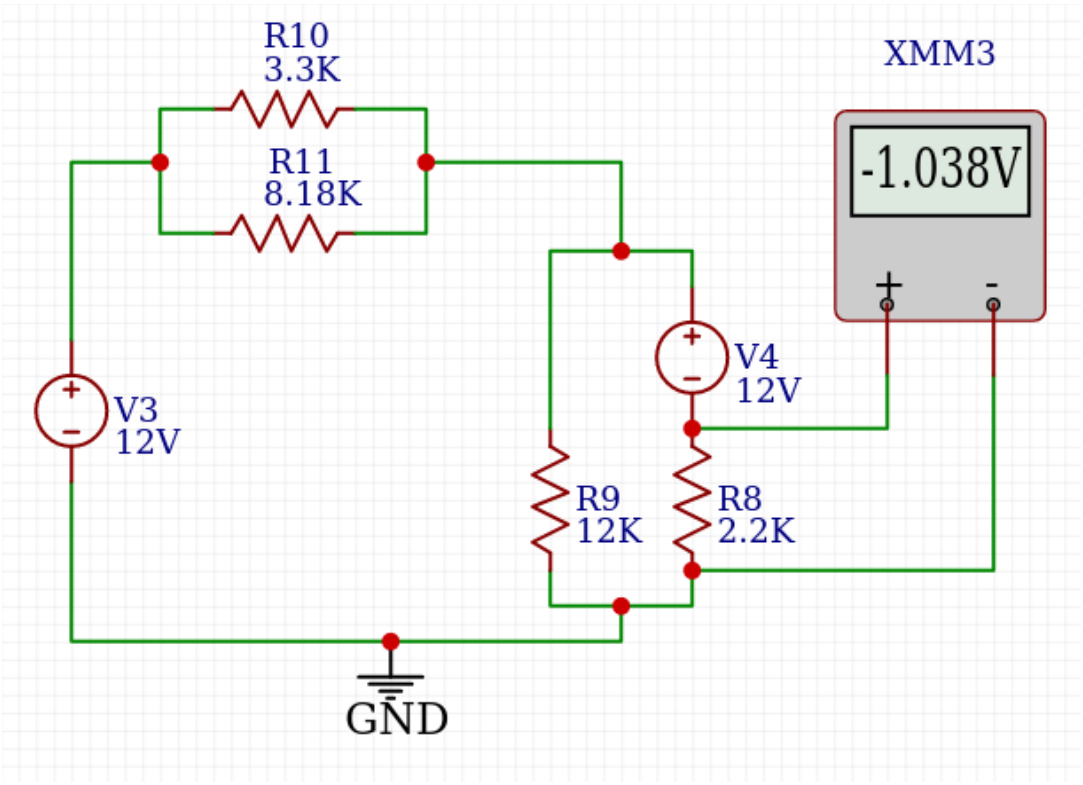
Table 6



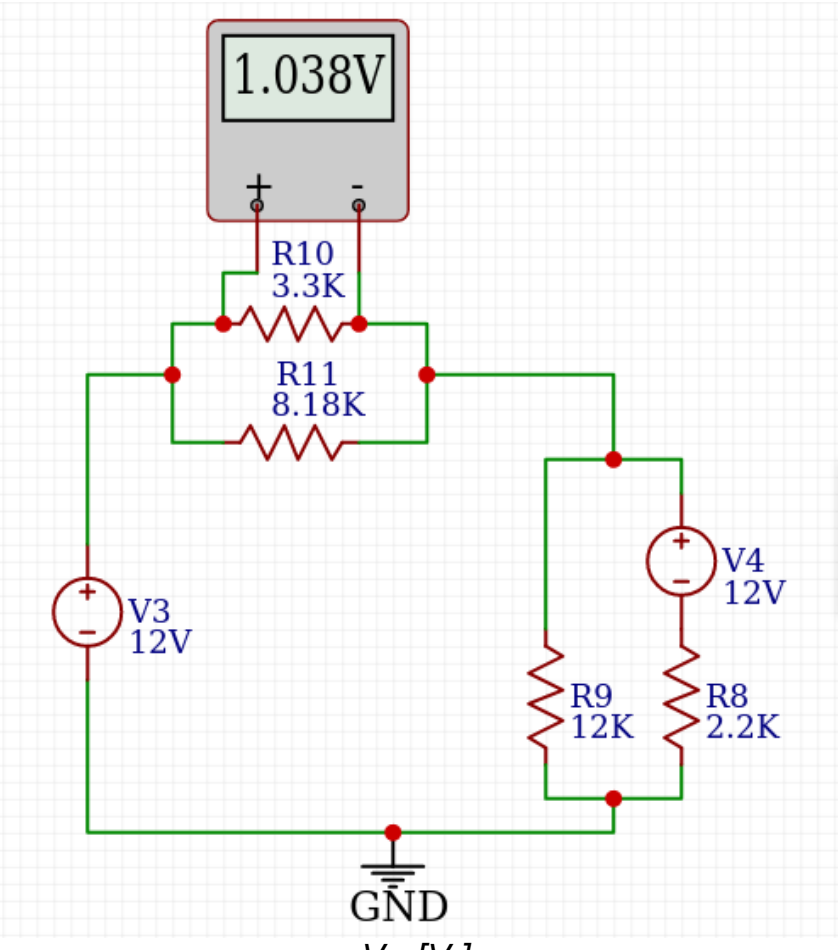
$V_{R1,2eqv}[V]$



$V_{R3}[V]$

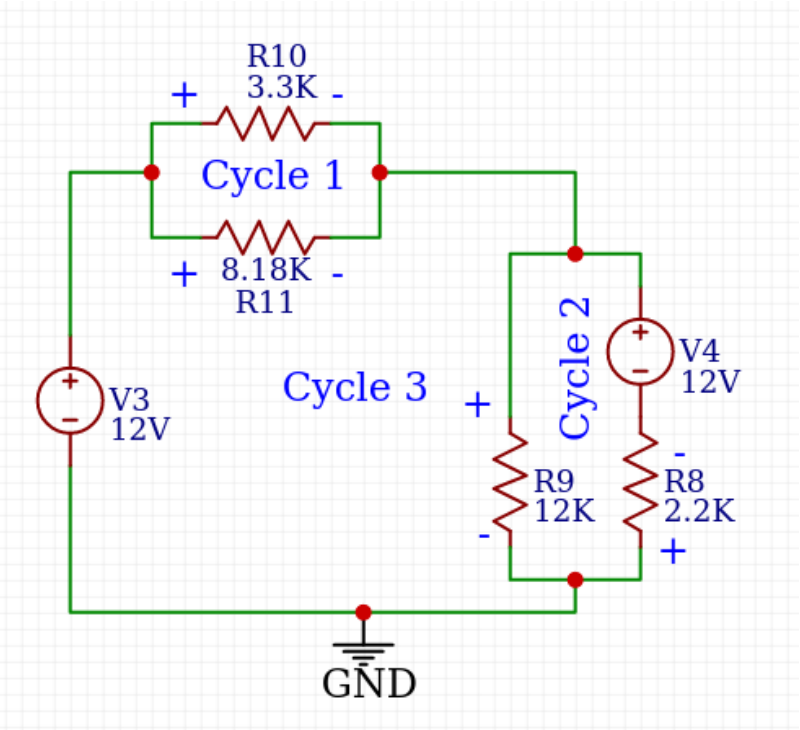

R10
3.3K
R11
8.18K
XMM3
-1.038V
V4
12V
V3
12V
R9
12K
R8
2.2K
GND

$V_{R4}[V]$


1.038V
R10
3.3K
R11
8.18K
V4
12V
V3
12V
R9
12K
R8
2.2K
GND

$V_{R5}[V]$

Table 7



Last Built Circuit

Circuits

Figure 3

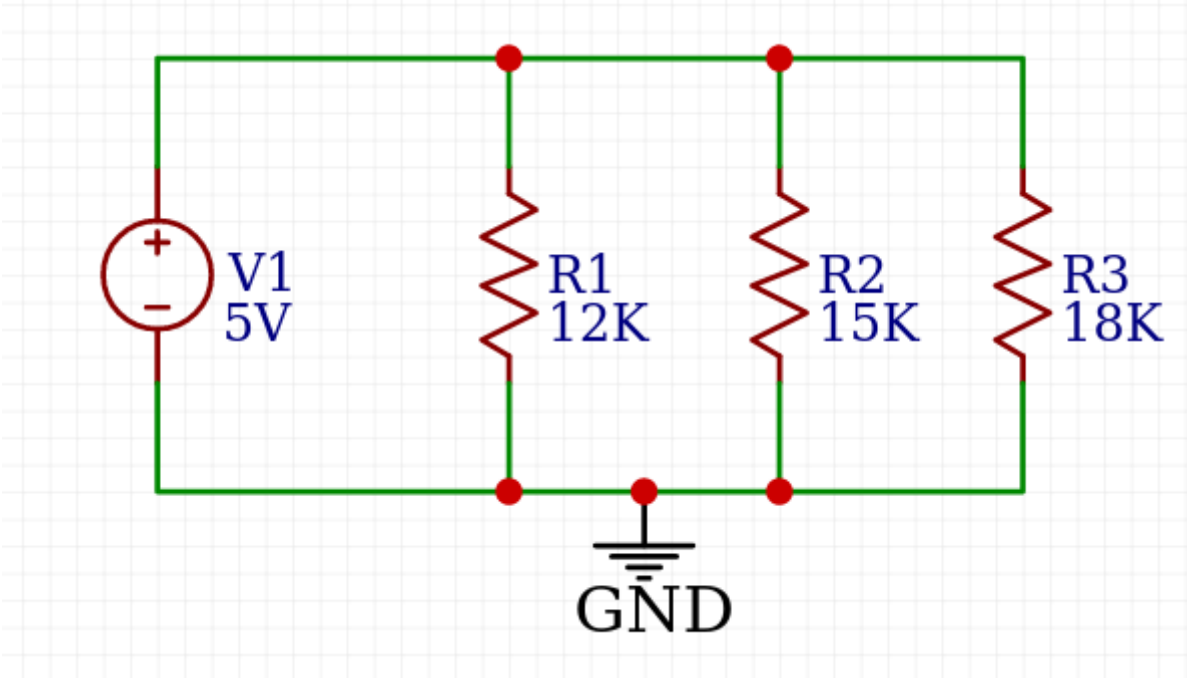
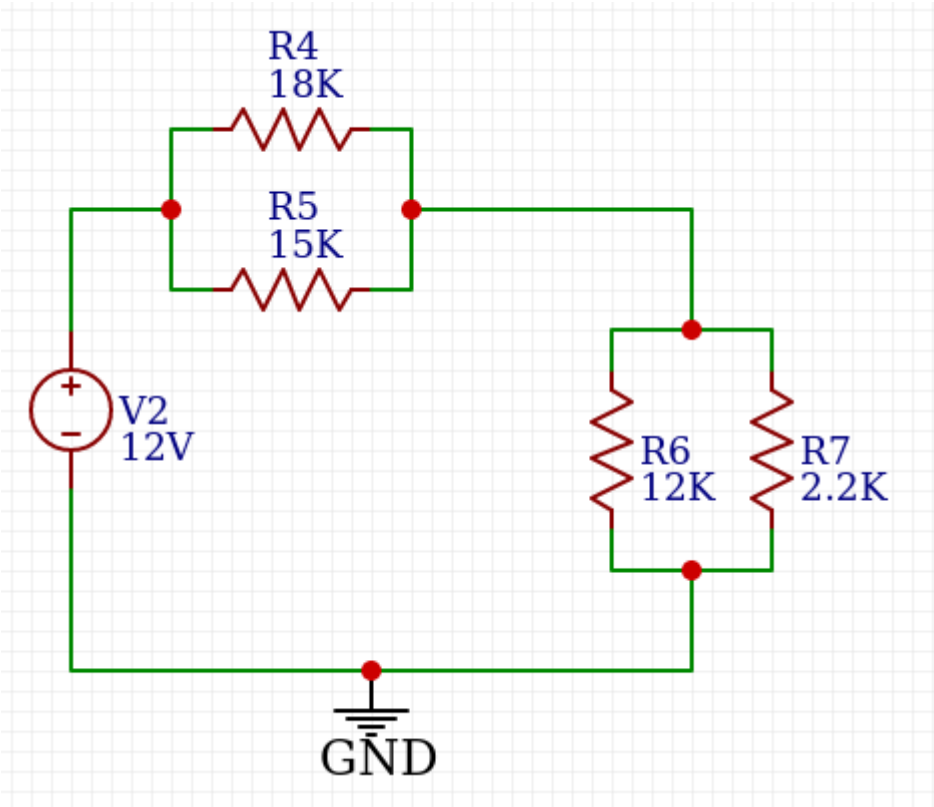
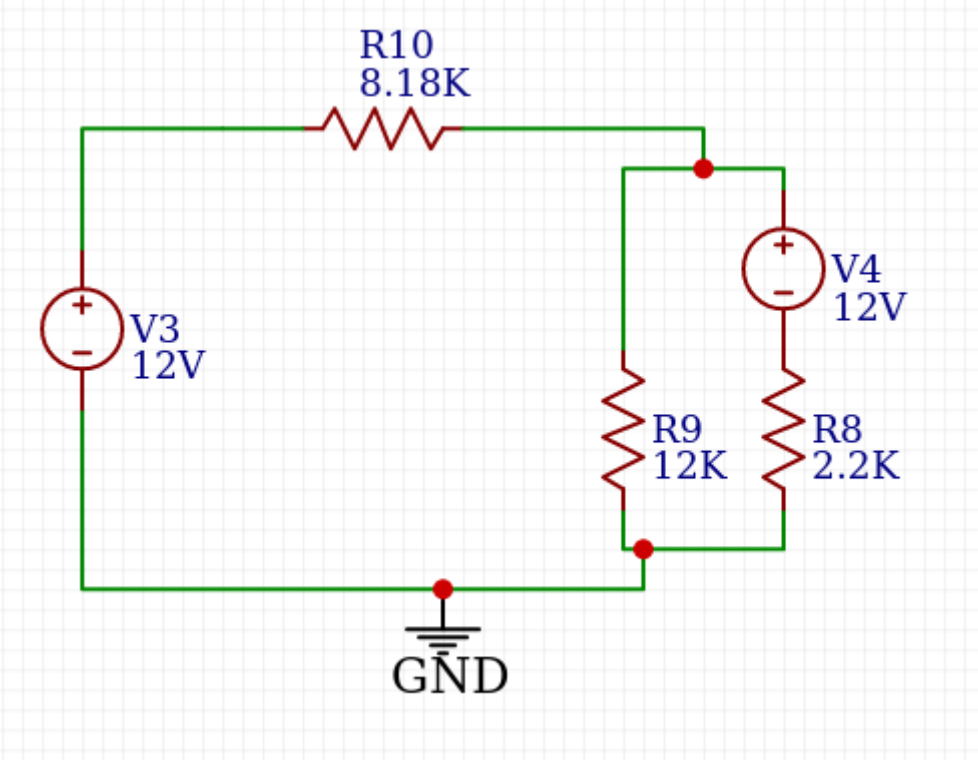


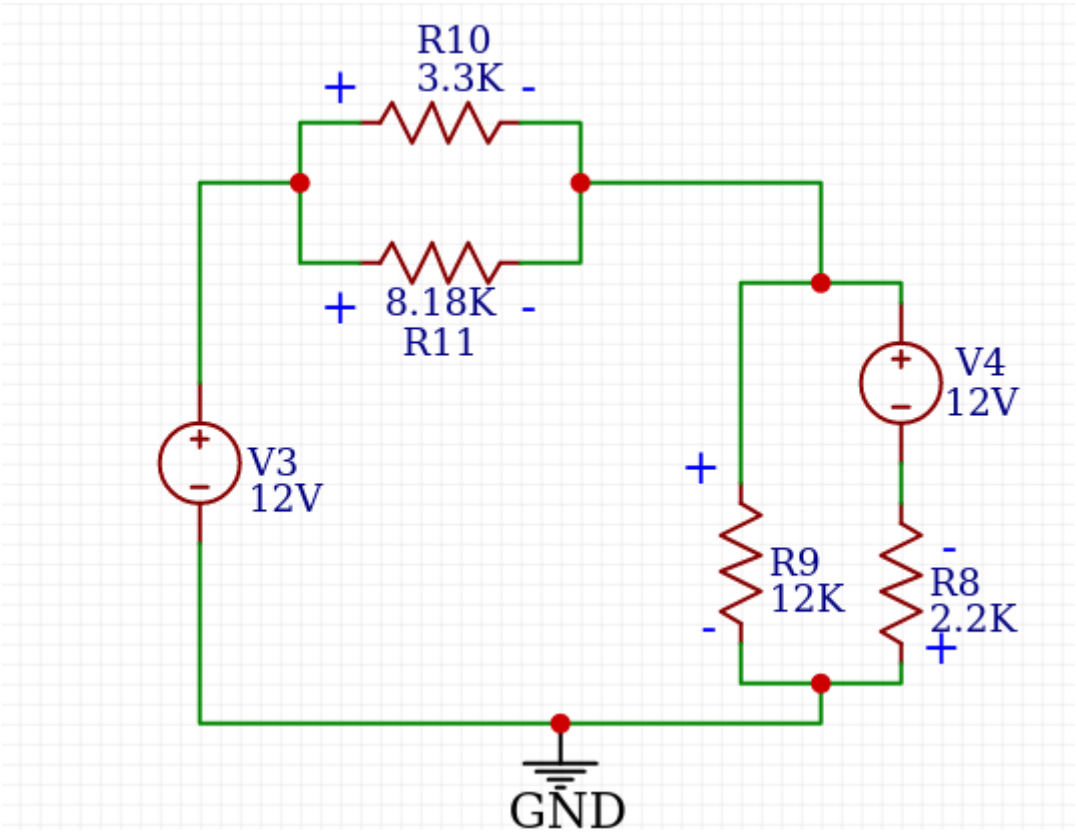
Figure 4



Section 2.1



Section 2.2



Tables

V_{k1}	$I_1[A]$	$I_2[A]$	$I_3[A]$	$I_1 + I_2 + I_3[A]$	$I_k[A]$ (Measured)	$I_k[A]$ (Calculated)	Relative Error [%]
$5V$	416.67 µA	333.3 µA	277.778 µA	1027,748 µA		1.028mA	
$8V$	666.67 µA	533.3 µA	444.4 µA	1644,37 µA		1.644mA	
$12V$	1mA	800µA	666.67 µA	2466,67 µA		2.467mA	
Table 1							

$I_{R1}[A]$	$I_{R2}[A]$	$I_{R1} + I_{R2}[A]$	$I_{R3}[A]$	$I_{R4}[A]$	$I_{R3} + I_{R4}[A]$	$I_k[A]$
543.229 µA	651.874 µA	1195,10 µA	15.43 µA	1.01mA	1025,43 µA	1.195mA
Table 2						

$I_{C1}[A]$	$I_{C2}[A]$	$I_{R1,2eqv}[A]$	$I_{R3}[A]$	$I_{R4}[A]$
*	*	185.168 µA	873.762 µA	-688.571 µA
Table 3				

* What is cycle current ? I think it’s a mistake.

$I_{N1}[A]$	$I_{N2}[A]$	$I_{N3}[A]$	$I_{R1,2eqv}[A]$	$I_{R3}[A]$	$I_{R4}[A]$	$I_{R5}[A]$
441.547 µA	441.547 µA	441.547 µA	126.926 µA	913.479 µA	-471.932	126.926 µA
Table 4						

Node 1	441uA = 314uA + 126uA
Node 2	441uA = - 471uA + 913uA
Node 3	-471uA = -471uA
Node 4	-471uA +913uA = 441uA
Table 5	

$V_{R1,2eqv}[V]$	$V_{R3}[V]$	$V_{R4}[V]$	$V_{R5}[V]$
1.038 V	10.962 V	-1.038 V	1.038 V
Table 6			

Cycle 1	+ 1.038 - 1.038 = 0
Cycle 2	- 10.962 + 12 -1.038 = 0
Cycle 3	- 12 + 1.038 + 10.962 = 0
Table 7	

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