Report for Experiment 6

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ABSTRACT:

$I_T = \frac{V_s}{R_T} = \frac{15V}{4.995k\Omega} =$

DATA:

Table 6–1

Component	Listed Value	Measured Value
R_1	1.0 kΩ	0.998kΩ
R_2	1.5 kΩ	1.492kΩ
R_3	2.2 kΩ	2.171kΩ
R_4	330 Ω	0.328kΩ
R_T	4.98kΩ	4.995kΩ

Brn Blk RED 6
Brn Grn RED 6
RED RED RED 6

Table 6–2

	Computed Value	Measured Value
I_T	3.003mA	2.996mA
V_{AB}	3.003V	2.997V
V_{BC}	4.505V	4.510V
V_{CD}	6.607V	6.548V
V_{DE}	0.991V	0.984V

$V_{AB} = I \cdot R_1 =$
$3.003mA \cdot 1k\Omega =$
$3.003V$
$3.003mA \cdot 1.5k\Omega = 4.505V$
$3.003mA \cdot 2.2k\Omega =$
$3.003mA \cdot 330\Omega =$
$0.991V$

Table 6–3

Step Number	Kirchhoff's Voltage Law (Measured Values)
7	15V - 2.997 - 4.510 - 6.548 - 0.984 = -0.039V
8	6.548 + 4.510 - 12.997 - 15 + 0.944 = -0.039V
9	0 - 0 - 0 + 0 = 0

-0.26%

RESULTS AND CONCLUSION:

FURTHER INVESTIGATION RESULTS:

APPLICATION PROBLEM RESULTS:

EVALUATION AND REVIEW QUESTIONS:

1. Why doesn't the starting point for summing the voltages around a closed loop make any difference?

PER KIRCHHOFF'S VOLTAGE LAW, ALL VOLTAGE RISES AND DROPS IS EQUAL TO ZERO

2. Kirchhoff's voltage law applies to any closed path, even one without current. How did the result of step 9 show that this is true?

Without current, the voltages across the circuit dropped to zero.

3. Based on the result you observed in step 9, what voltage would you expect in a 120 V circuit across an open (blown) fuse?

ZERO

4. Use Kirchhoff's voltage law to find V_X in Figure 6–7.

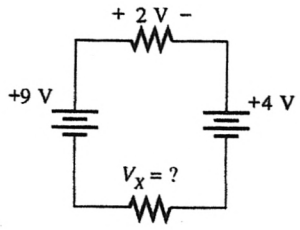

Figure 6–7

$9 - 2 + 4 - V_X = 0$

$V_X = 11V$

5. A 10 Ω resistor is in series with a bulb and a 12 V source.
   (a) If 8 V is across the bulb, what voltage is across the resistor? 4V
   (b) What is the current in the circuit? 0.4A
   (c) What is the resistance of the bulb? 20Ω

$I = \frac{4V}{10\Omega} = 0.4A$

$R_T = \frac{12V}{0.4A} = 30\Omega$

$30\Omega - 10\Omega = 20\Omega$

6. A student wishes to limit the current to an LED (light-emitting diode) to 10.0 mA. The source voltage is +5 V and the diode drops 1.8 V.
   (a) What value resistance is required? 320Ω
   (b) What power is dissipated in the resistor? 32mW

$5 - 1.8V = 3.2V$

$R_R = \frac{3.2V}{10mA} = 320\Omega$

$10mA \cdot 3.2V =$