

**CPE 1140**

**Circuits / DC Circuit Fundamentals Lab**

**Fall 2021**

Laboratory Report

Lab# 3

Lab: parallel DC Circuit Analysis

Submitted by: Bruce Liu

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# Part A:

The initial resistors, values, and tolerances are listed below they are within tolerance ranges.

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| --- | --- | --- | --- |
| Resistor labels | Resistor (Ω) | Measured (Ω) | Resistor tolerances (­Ω) |
| R1 | 510 | 521.20 | 484.500 – 535.500 |
| R2 | 1000 | 987.52 | 950.000 - 1050.000 |
| R3 | 2000 | 1965.19 | 1900.00 – 2100.000 |
| R­t­­ | 288.952 | 290.62 | 274.504 – 303.399 |

The measured parallel resistance is in tolerance range. The location of the resistors didn’t matter if they were in parallel the values are approximately the same. As shown below.

|  |  |
| --- | --- |
| Parallel labels | Parallel equivalents measured (Ω) |
| R­­123 | 290.620Ω |
| R­­­321 | 290.630Ω |

Part B:

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| --- |
| E =5.0465 (V) |
| VR1 =5.0458(V) |
| VR2 =5.0072(V) |
| VR3 =5.0429(V) |

There is nearly no difference in source voltage and voltage drop of parallel elements.

Part C:

|  |  |  |
| --- | --- | --- |
| Labels | Multisim simulation values (mA) ()()valuesvaluewas | Lab measured values (mA) |
| IA | 9.804  . | 17.3191 |
| IB | 7.501 | 7.6565 |
| IX | 17.000 | 17.3225 |
| I1 | 9.804 | 9.341 |
| I2 | 5.001 | 5.0986 |
| I3 | 2.501 | 2.5330 |

All the values agree except for I­A­. Somehow it is taking the value of the branch of R1?? I am going to use the experimental values. I also measured I­a­­ and I­x­ in my home lab I cannot replicate the simulated values of I­a.­ In theory­­ I­a ­= I­x­ I assume this night be a software bug.

I­A ­=­ 17.319 mA, I­B­ ­ = 7.656 mA, I­1 ­= 9.341 mA. I­B ­+I­1­ = 16.997 mA. All current passes though node A. The theory says they should be nearly the same and they are the measurements that day were jumpy.  ­­ I­**­**­B ­=­7.656 mA, I­2­ ­ = 5.098 mA, I­3 ­= 2.533 mA. I­2 ­+I­3­ = 7.631 mA. Currents I­2 ­and I­3­ start from node B and should sum to node B. Which are nearly the same.

|  |  |  |
| --- | --- | --- |
| Resistor | Current through R (mA) | Power dissipated (mW) |
| R1: 510 Ω | I1 = 9.803 | P1 = 49.019 |
| R2: 1000 Ω | I2 =5.000 | P2 =25.000 |
| R3: 2000 Ω | I3 =2.500 | P3 =12.500 |

|  |  |
| --- | --- |
| Rt = 288.952 | Ω |
| IA (Rt) = 17.303 | mA |
| IA (Sum) =17.303 | mA |

Part D:

Diagram, schematic

Description automatically generated

Something is wrong about node A.