EE 202 Lab Report 1

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**Question 2**

1. The resistance between adjacent protoboard holes in a five-row hole varied from 0.08-0.11 ohms.
2. The resistance from one end to the other of a long protoboard column was 0.180 ohms on the left hand side and 0.167 ohms on the right hand side.
3. The resistance between Seth’s hands was 0.450 mega-ohms and 0.453 mega-ohms for Javier.
4. The actual resistance for the two 47 k-ohm resistors were 47.08 and 47.142. For the 33 k-ohm it was 32.917. For the 22 k-ohm it was 21.532 and 21.657.

**Question 3**

The two-point-probe measurement was 0.070 ohms and the four-point-probe was 0.030 ohms.

**Question 4**

Refer to the figure below to see the voltage drops (they correspond to the circuit diagram, all are absolute values)

|  |  |  |
| --- | --- | --- |
| 2.008V (22 k-ohm) |  | 2.986V(47 k-ohm) |
|  | 0.987V(33 k-ohm) |  |
| 2.986V(47 k-ohm) |  | 2.017V(22 k-ohm) |

When doing the math, it is clear that Kirchoff’s Voltage Law is satisfied in loops 1 and 2 (with some error).

Loop 1: 5 – 2.008 – 2.9866 = 0.006V

Loop 2: 2.008 + .987 – 2.986 = 0.009V

The small voltage can be accounted for by the fact that we took measurements in a lab where there is a small degree of error, these values are both approximately zero.

**Question 5**

Kirchoff’s current law states that the same amount of current enters and exits a node. Additionally, V=iR, V/R = i.

Ia = (2.008V/22k-ohm) + (0.987V/33k-ohm) – (2.986V/47k-ohm)

Ia = 0.0913 - 0.0299 - 0.0635 = -.0021 mA

Ib = (2.986V/47k-ohm) + (.987V/33k-ohm) – (2.107V/22k-ohm)

Ib = 0.0635 + 0.0299 - 0.0958 = -.0024 mA

Both of these values are approximately zero and satisfy the laws at nodes A and B.

**Question 6**

The actual value of the 10-ohm resistor is 10.057 ohms. When connected to a 1V source, the currents at the settings were

|  |  |
| --- | --- |
| 1A | 0.09203 A |
| 100mA | 63.105mA |
| 10mA | OVLD (overload) |

This is reasonable due to the fact that the shunt resistance varies depending on the scale of the multimeter. Since the shunt resistance is in parallel, this will affect the total resistance of the system, and will therefore affect the recorded observed value of current when using the multimeter as a DC ammeter.