Name: Student Number:

Physics Pre-reading – Current, Capacitance and Circuits

Please read chapters 30.1, 30.2, 30.3 microscopic model of current. We'll cover most of this in class, so just skim it to get the basic ideas. Read 30.5 to learn about resistors and Ohm's Law. Read 29.5, 29.6, 29.7 to learn about capacitors. Read 31.1, 31.2 to brush up on circuits. All chapters are from Knight 3rd edition. The following questions will focus on some basic concepts you'll need for the weeks lectures.
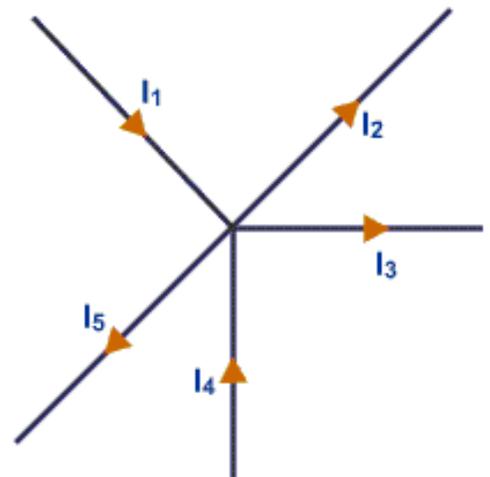
Question 1

Two resistors are made of the same material, and have the same cross-sectional area, but one is longer than the other. Tell me which has the higher resistance. Tell me in words why, not some equation.

Question 2

And ideal wire carries current. What is the change in potential as we move from one end of the wire to the other? How is this different than a real wire?

Question 3

If I_1 = 3 A, I_2 = 2 A, I_3 = 4 A, I_4 = -1 A, what is I_5? Pay attention to the arrows, which define the direction of the current, and the sign of the current, which tells you what direction it goes in relation to the arrow.
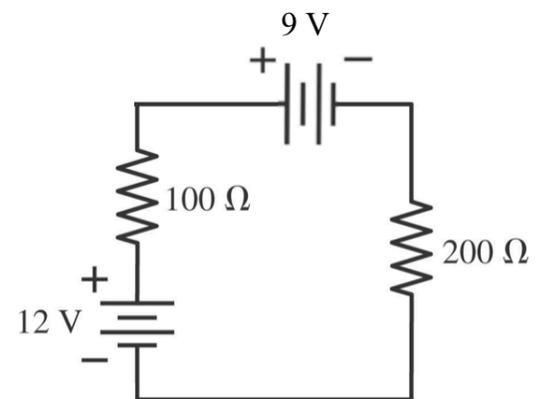
Question 4

A parallel plate capacitor has an electric field of 2 N/C in between its plates. If the plates are 3 cm apart, what is the potential difference from one plate to the other? If the plates are moved to 4 cm apart, does the capacitance increase, decrease or stay the same?

Question 5

Kirchhoff's loop law to determine the current flowing in the circuit below. Be sure to label the direction fo the current on the diagram. Determine the voltage drop across the 200 Ω resistor.

Question 6

Find the equivalent resistance and equivalent capacitance of the two configurations. I fairly sure you know resistor combinations from high school, but if you need help, check out chapters 31.4 and 31.6.