Department of Computer and Electronics Engineering Technology

CEET 1140

Lab 4

Title: Parallel Circuits.

Objective: The student will be able to construct and analyze a parallel circuit and use a multimeter to measure voltage, current and resistance in a parallel circuit. The student will also compute the power for each element and veriify Kierchhoff's current law.

Equipment: Power Supply
Digital Multimeter (2)
Proto Board

Parts: 1 47 Ω Resistor, ¼ watt
1 100 Ω Resistor, ¼ watt
1 160 Ω Resistor, ¼ watt

Preparation: Write the title and a short description of this lab in your lab book. Make sure the page is numbered and make an entry in the table of contents for this lab.

Measure the actual resistance of your resistors with an ohmmeter and record them in your lab book. If you are using the same resistors you used in lab 3, you may use the measurements from lab 3 as well.

In your lab book, draw a schematic of a parallel circuit with all three resistors and a 3.5V DC voltage source. Use the measured resistances, not the resistance shown on the color bands.

Compute (a) the equivalent resistance of the three resistors, R_T, (b) the current through the voltage source, (c) the current through each resistor and (d) the power dissipated by each resistor.

Using PSPICE or Multisim, simulate your circuit. Make sure to output the current through each resistor and the voltage source. Print the output of the simulation and affix it to your lab notebook.

Bring your lab notebook and the parts, above, to your lab period.

Set up: Combine the 3 resistors in parallel on your protoboard. Measure the parallel resistance, R_T, and record it in your lab book. Complete

your circuit using the power supply as the 3.5V DC voltage source. Use a voltmeter to adjust the voltage as accurately as possible. (Make sure the voltage knob is turned all the way down before turning on the power.)

Procedure: In this procedure, you will measure and record the currents through the voltage source and each resistor. In any order you choose, turn off the power supply, interject your ammeter into one branch of the circuit, turn the power back on and record the measurement. (Note, the current should not exceed 100mA, so you can use the mA socket instead of the 10A socket to get more precision)

Carefully check the temperature of each resistor. Note in your lab book which resistor is warmest and which is coolest to the touch. Does this agree with your power calculations?

Cleanup: Turn off the power. Configure the multimeter(s) to be voltmeter(s).

Conclusions: In the conclusion section, write a short summary of what you did and what you learned. Make sure your conclusion answers the following questions:

How close was the measured R_T to the R_T you computed? Why might they not be exactly the same?

According to Kirchhoff's current law, the sum of the currents going into a node should equal the sum of the currents leaving the node. Do your measurements confirm this law?

Which resistor dissipates more power? Which dissipates the least? How does this compare with the same resistors in a series circuit?