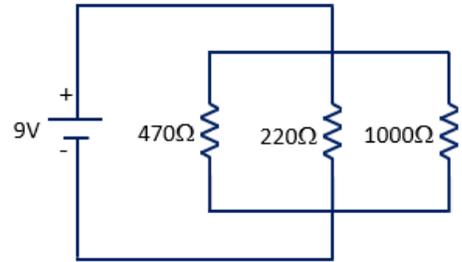
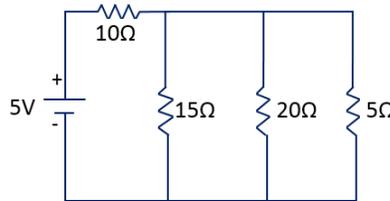


**NOTE:** Use engineering format for problems 1 through 5 and non-engineering format for problems 6 and 7. This is an individual assignment.

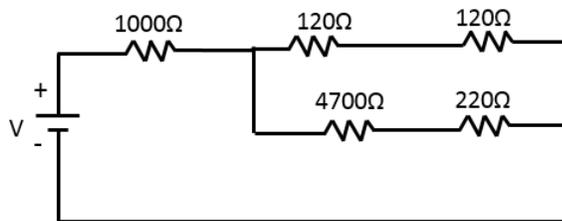
1. Consider the circuit given. Find/answer the following:
  - a. Before working the problem, predict which resistor will have the highest current passing through it. Explain your answer.
  - b. The current leaving the power source.  $I=69\text{mA}$
  - c. The power dissipated by the overall circuit.  $P=0.62\text{W}$
  - d. The voltage drop across each resistor.  
 $\Delta V_{470\Omega}=9\text{V}$ ,  $\Delta V_{220\Omega}=9\text{V}$ ,  $\Delta V_{1000\Omega}=9\text{V}$
  - e. The current through each resistor.  
 $I_{470\Omega}=19\text{mA}$ ,  $I_{220\Omega}=41\text{mA}$ ,  $I_{1000\Omega}=9\text{mA}$



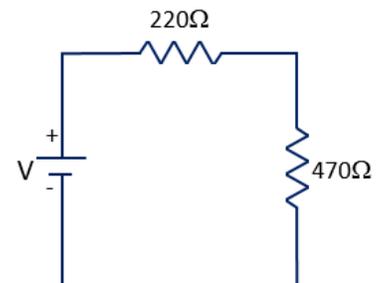
2. Consider the given circuit. Find
  - a. The current leaving the power source.  $I=0.38\text{A}$
  - b. The voltage drop across each resistor.  $\Delta V_{10\Omega}=3.8\text{V}$ ,  $\Delta V_{15\Omega}=1.2\text{V}$ ,  $\Delta V_{20\Omega}=1.2\text{V}$ ,  $\Delta V_{5\Omega}=1.2\text{V}$
  - c. The current through each resistor.  $I_{10\Omega}=0.38\text{A}$ ,  $I_{15\Omega}=0.08\text{A}$ ,  $I_{20\Omega}=0.06\text{A}$ ,  $I_{5\Omega}=0.24\text{A}$
  - d. The power dissipated by the 20Ω resistor.  $P_{20\Omega}=0.072\text{W}$
  - e. Check your answers for b. Do they satisfy Kirchoff's Voltage Law? If so, explain how. If not, you should check your work to ensure you did it correctly.
  - f. Check your answers for c. Do they satisfy Kirchoff's Current Law? If so, explain how. If not, you should check your work to ensure you did it correctly.



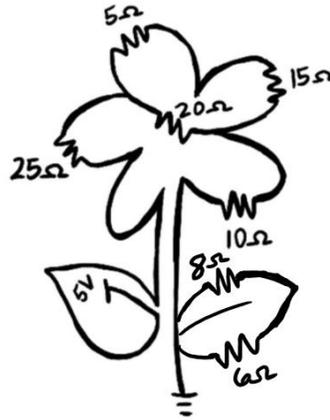
3. If the power across the 1000Ω resistor is 7.2W, the find
  - a. The current through the 220Ω resistor.  $I_{220\Omega}=0.00395\text{A}$
  - b. The voltage drop across the 220Ω resistor.  $\Delta V_{220\Omega}=0.869\text{V}$



4. When power is connected to the circuit below,  $3.21 \times 10^{18}$  electrons will flow from the negative end of the power source in 2 minutes. Find
  - a. The current passing through the 470Ω resistor.  $I_{470\Omega}=0.004\text{A}$
  - b. The voltage drop across the 470Ω resistor.  $\Delta V_{470\Omega}=2.021\text{V}$
  - c. The voltage supplied by the power source.  $V_{\text{source}}=2.958\text{V}$



5. Redraw the given circuit with clean straight lines, and then find
  - a. Equivalent Resistance  $R_{eq}=45\Omega$
  - b. Current leaving the power source  $I=0.11A$



6. Build an LED circuit with a green LED and another LED circuit with a red LED (resistor and LED connected to a pin declared as a digital output) on your breadboard. Write a sketch that can read input from your switch and control LEDs as follows:
  - a. If the switch is clicked (pressed and released), have the red LED blink on for 300ms and off for 100ms 10 times. The green LED should be off while the red LED is blinking.
  - b. Else, have the green LED stay on.

Provide a screen shot of your program. In the sketch, be sure to comment on what each line is doing. Have your sketch ready to show your professor at the next class.

*HINT: Remember that you can use for loops to make LEDs blink repeatedly for a set number of times!*

**Note:** Have your Arduino/Blinking LED circuit out on your table with the program running so that your instructor or class assistant can quickly check your work. Do not turn your homework in at the front; have it ready so that the instructor / assistant can grade your blinking LED activity.

7. Please reference the SolidWorks installation instructions on the meta moodle page for the ENGR 120 course. Have SolidWorks installed on your laptop for class 7 (next class). **Please note it can take a long time for SolidWorks to install. Do not wait until right before class to do the installation. Allot at least 2 hours for installation.** Include with your homework the following three statements along with your signature to indicate that you agree to comply with the guidelines of the SolidWorks license. (if you already completed this in HW 5, you do not have to redo this problem).
  - I understand that this is an ACADEMIC LICENSE of the SOLIDWORKS software program and is provided by Louisiana Tech University for currently-enrolled students. I WILL ONLY USE THIS PROGRAM FOR ACADEMIC PURPOSES.
  - I agree that I AM INSTALLING THIS PROGRAM ON A COMPUTER THAT I OWN. I will not install this program for professional activities or commercial use.
  - I agree that I WILL ONLY USE THIS PROGRAM AS A CURRENTLY-ENROLLED STUDENT in Tech's College of Engineering & Science. I will not forward or share this information with anyone, including other students.
8. Please try to have your battery packs finished by class 8; you can visit the HelpDesk to complete the soldering or use the soldering equipment during any free time in class.