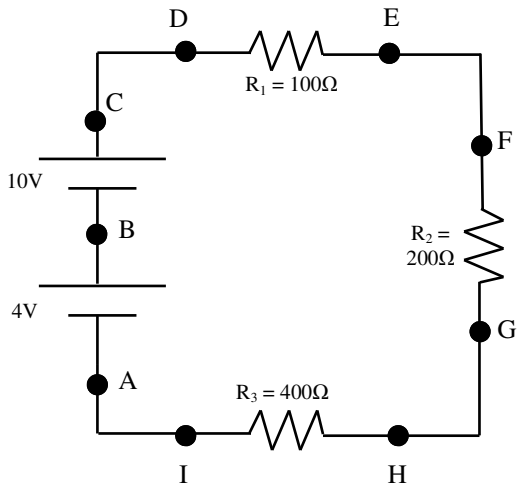
Due Thurs., Jan 5

2011-12 PreAP Circuits 6

1. After working the circuit at the right (*meaning do all your work on the diagram first*), answer the following.



   A. * Calculate the current flowing thru the circuit?

   B. If one of the resistors is replaced by a wire, how will the current change (increase, decrease, stay the same)?

   C. If a third battery is added to the circuit, how will the current change?

   D. How much current is flowing thru the 100Ω resistor?

   E. * How much voltage is used by the 100Ω resistor?

   F. * How much power is used by the 100Ω resistor?

   G. Calculate how much voltage is left at point E.

   H. * On the diagram, calculate the voltage used by the other two resistors.

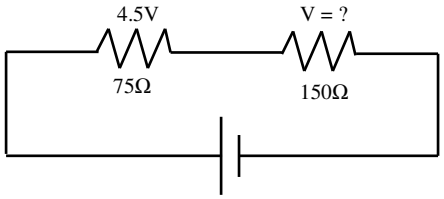
   I. How does the voltage drop across R_1 compare with R_2?

   J. How does the resistance of R_1 compare with R_2?

   K. How does the voltage drop across R_2 compare with R_3?

   L. How does the resistance of R_2 compare with R_3?

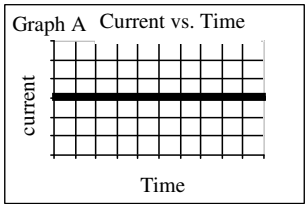
   M. Using the V_{total} and I_{total}, calculate P_{total} for the whole circuit.

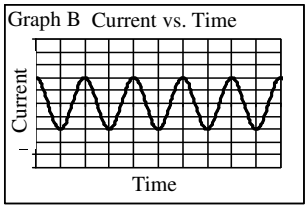


2. Now, using what you learned from parts I-L above (and the lab),
   A. How much voltage is used by the 150Ω?
   B. What is the voltage of the battery?
   C. * How much current is flowing (in mA)?

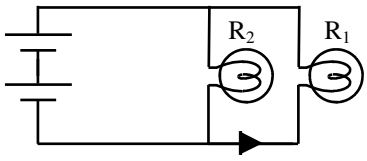
3. AC or DC Current?

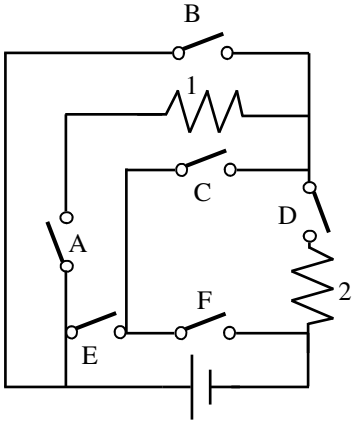
   A. ____ * Current that changes polarity.
   B. ____ Current that is constant.
   C. ____ What comes from a battery.
   D. ____ What comes from the power outlet.
   E. ____ Graph A at the right.
   F. ____ Graph B.





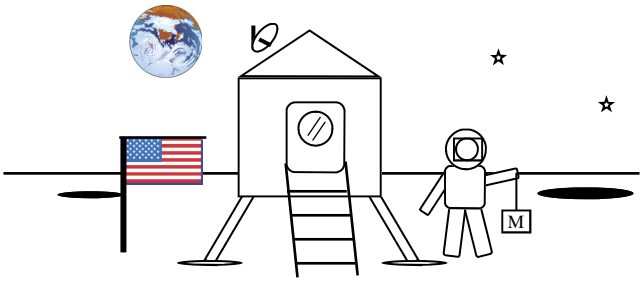
4. In the circuit at the right, R_1 isn't working. Without doing anything to the light bulbs, what is one change that would make R_1 turn on?





5. In the diagram at the right you will need to decide which switches to close to allow different situations. Start at the + side of the battery (the big side). This is like maze games—follow the path, but be sure you don't make a short-circuit. Which resistor or resistors allows:
   A) * only resistor 1 to have current in it?
   B) only resistor 2 to have current thru it?
   C) to by-pass both resistors?
   D) for electricity to go thru both resistors?

(*Review Question on back*)



6. Slim Jim is also an astronaut. The acceleration due to gravity on the moon is 1.63 m/s^2. Jim is lifting a 18 kg object from the ground with a rope.
   A. * What is the weight of the object on the moon?

   B. Draw a force body diagram (FBD) for the mass (below the picture).

   C. If Jim can pull upward with a force of 450N, calculate the acceleration of the mass.

   D. If the radius of the moon is 1.74×10^6 m, calculate the mass of the moon. (*You have the force of gravity due to the moon and the mass of object 1.*)

1A: 0.02 A (which is 20 mA)
1E: V = IR = .02(100) = 2V
1F: P = VI or = I^2R = 0.04W
1H: V2 = 4V V3 = 8V
2C: You have the voltage and resistance of one resistor, calculate the current. And since it is a series circuit, isn't that the total?
3A: AC
5A: Switches: A, C, and D. You can't have D on or R2 comes on. You can't have E on or it will bypass R1 completely with a short circuit.
6A: Come on: Fw = mg this g just isn't 9.8 m/s^2.