Battery-Resistor Circuit SIM Homework

1) In this problem, we will use the Battery-Resistor Circuit Simulation (which you can access online at http://www.colorado.edu/physics/phys1010/) to help us better understand what conditions make the filament brighter.

a) What process is happening within the filament that makes the filament become hot? Your answer should include a discussion of the energy exchanges and energy forms that are important as the electrons pass through the circuit.

b) For case A from problem 1 above, if you replace the 10 ohm bulb with a bulb that has a resistance of 5 ohms,

i) the temperature of the filament will:

○ decrease ○ increase ○ stay the same

the brightness of the bulb will:

○ decrease ○ increase ○ stay the same

the current through the bulb will:

○ decrease ○ increase ○ stay the same

the amount of electrostatic potential energy that each electron releases as it travels through the circuit will:

○ decrease ○ increase ○ stay the same same

ii) the power that goes into heating the light bulb and producing light will be ... the power that went into heating the bulb when the resistance was 10 ohms?

○ one quarter of ○ one half of ○ the same as ○ two times ○ four times

iii) Use the simulation to represent this type of decrease in resistance. Describe any changes you observe in the electrons flowing through the filament and their interaction within the filament and explain how these changes in electron flow affect the power or (energy per second) that goes into heating the filament. Again your answer should include a discussion of the energy exchanges occurring in the filament.