(3) Problems Covering Intro to Circuits, Ohm's Law and Resistivity

Directions: For full credit, show all work including the equation, substitution and units.

#1) A 12 V battery is in parallel with (2) bright intensity lamps. The circuit is also setup to have a switch controlling a variable resistor in series with (2) medium intensity lamps. The switch controls the variable resistor and lamps only.

   a) Draw a schematic of the above described circuit and label all parts of the circuit.

   b) When the switch is open, which (if any) lamps will be lit?

   c) When the switch is closed, which (if any) lamps will be lit?

   d) When the switch is closed and the variable resistor set to low resistance, how can you make the
       medium intensity lamps dimmer?

#2) The current through a 10 Ω resistor is 1.2 amps. What is the potential difference across the resistor?

b) If this current occurs over a period of 1.2 x 10^{-2} seconds, how many coulombs of charge were transferred?

c) How many electrons passed through the resistor?

3) What is the resistance of a piece of nichrome wire at 20°C that is 20 m in length and 0.010m^2 in cross sectional area?