Electric Circuits

Book Chapter: 16, 17, 18
Book Pages: 498-505, 509-516, 531-544, 556-566
Practice Problems: pp524-526; 4, 22, 30: pp550-552; 6, 14, 34: 578-580; 6, 8, 16, 20
Terms/ Ideas:
Current
EMF vs DOP
Electron Flow
Resistance/ Resistivity
Ohm's Law (V=IR)
Power
Kirchoff's Rules: (govern series and parallel circuit behavior of V, R, I)
Capacitance
Superconductivity
Series/ Parallel

Equations:

$$1amp = \frac{1C}{\sec}$$

$$V = IR$$

$$R = \rho\frac{L}{A}(\text{Re}\,sistivity)$$

$$P = VI$$

$$P = \frac{V^2}{R}$$

$$P = I^2R$$

$$w = VIt$$

$$H = I^2Rt$$

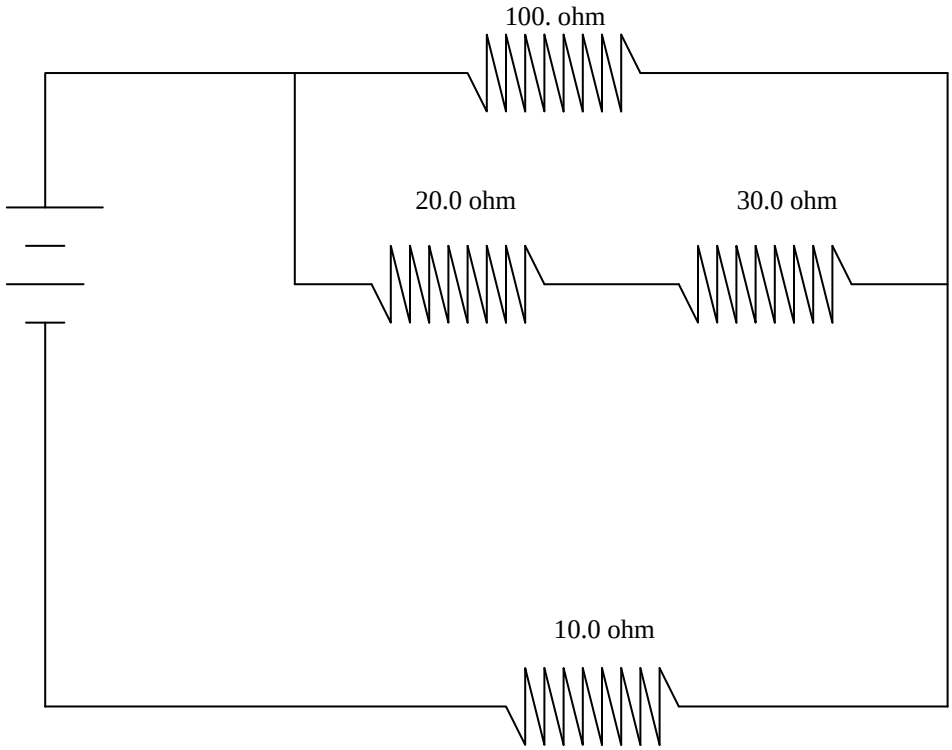
Free Response:

A student is provided with a 12.0 volt battery of negligible internal resistance. Four resistors are also provided, resistance as follows 100.0 ohms, 30.0 ohms, 20.0 ohms and 10.0 ohms. The student also has plenty of wire, of negligible resistance, available to make connections.

1) Using all of the above components, draw a circuit diagram in which each resistor has nonzero current flowing through it, but in which the current through each resistor is as small as possible.

2) Using all of these component, draw a circuit in which the resistors have as much current flowing through them as possible.

The battery and resistors are now connected in the circuit shown below.



3) Determine the following for this circuit.
-the current in the 10 ohm resistor

-the total power consumption of the circuit

-the current through the 100 ohm resistor

4) Assuming that the current remains constant, how long will it take to provide a total of 10.0 kJ of electrical energy to the circuit?