Physics 2140 Homework #8

4 problems

Due by October 29

▷ **1.**

A cylindrical wire of length 1 m and radius 5 mm is made of copper, which has a resistivity of $\rho = 17 \times 10^{-9}\,\Omega \cdot \text{m}$. One end of the wire is 5 V higher than the other.

(a) Find the resistance of the wire.

(b) Find the current through the wire.

(c) Find the power dissipated by the wire.

▷ **2.**

A human being can be electrocuted if a current as small as 50 mA passes near the heart. An electrician working with sweaty hands makes good contact with the two conductors he is holding, one in each hand. If his resistance is 2000 Ω, what might the fatal voltage be?

▷ **3.**

A 40-watt incandescent light bulb is so called because when connected to a 120 V power supply, it emits 40 watts of power, not all of it as light.

(a) Find the resistance of a 40 W bulb and a 60 W bulb.

(b) Find the current through each, if they are connected separately to a 120 V power supply.

(c) How would the power output of a 40 W light bulb change if it were used in a country where 220 V is the norm? Would it be brighter or dimmer?

▷ **4.**

The figure shows an 8 V battery connected in series with a 2 Ω resistor and two 1 Ω resistors.

(a) Find the current through the circuit.

(b) Find the drop in potential ΔV across the 2Ω resistor.

(c) Find the potential difference between the points marked A and B.