

UNIT 11 EXERCISES

1) (Questions from *Physics With Health Science Application*, Paul Peter Urone, John Wiley and Sons, Inc., NY, 1986)

The maximum safe current through a normal person is 5.0mA. A repair technician touches the hot wire in an appliance opened for servicing and thereby comes into contact with 120V. Will he receive a harmful shock

(i) if his hands are wet and the resistance of the path through him to the ground is 8000 ohms? Show your work.

(ii) if his skin is dry and he is wearing rubber soled shoes giving a resistance of 500,000 ohms to ground. Show your work.

2) (Questions from *Physics With Health Science Application*, Paul Peter Urone, John Wiley and Sons, Inc., NY, 1986)

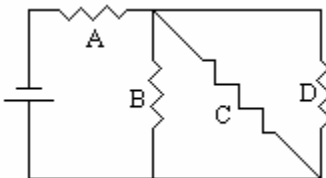
a) Calculate the current through a person standing barefoot on a wet floor who grasps a 220V wire and has a resistance of 4400 ohms to ground. Show your work. Is the current great enough to cause ventricular fibrillation? Explain.

b) What current will flow through a would-be rescuer who grasps the first person by the wrist and has a resistance of 8000 ohms to ground? You may assume the resistance of the part of the original victim between the source of voltage and the would-be rescuer is 500 ohms. What is the likely effect of the second person? Explain.

3) (Questions from *Physics With Health Science Application*, Paul Peter Urone, John Wiley and Sons, Inc., NY, 1986)

A current of 20×10^{-6} A applied directly to the heart (perhaps by accident during surgery) may cause ventricular fibrillation. If the resistance of a human heart is 300 ohms, what is the smallest voltage that poses a danger when the heart is exposed during surgery? Explain.

4) Consider the circuit in the diagram below.



a) The voltage of the battery is 1.5V. The current through resistor B is 0.5A. All the resistors are identical. Find the resistance of each of the resistors.

b) Determine the current through resistors A, C, and D.