

1.

Is I_2 greater than, less than, or equal to I_1 ? Explain.

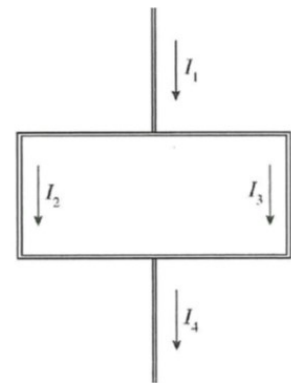


2.

All wires in this figure are made of the same material and have the same diameter. Rank in order, from largest to smallest, the currents I_1 to I_4 .

Order:

Explanation:



3.

Metal 1 and metal 2 are each formed into 1-mm-diameter wires. The electric field needed to cause a 1 A current in metal 1 is larger than the electric field needed to cause a 1 A current in metal 2. Which metal has the larger conductivity? Explain.

4.

If a metal is heated, does its conductivity increase, decrease, or stay the same? Explain.

5.

Wire 1 and wire 2 are made from the same metal. Wire 2 has a larger diameter than wire 1. The electric field strengths E_1 and E_2 in the wires are equal.

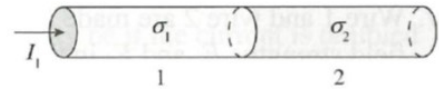
a. Compare the values of the two current densities. Is J_1 greater than, less than, or equal to J_2 ? Explain.

b. Compare the values of the currents I_1 and I_2 .

c. Compare the values of the electron drift speeds $(v_d)_1$ and $(v_d)_2$.

6.

A wire consists of two equal-diameter segments. Their conductivities differ, with $\sigma_2 > \sigma_1$. The current in segment 1 is I_1 .



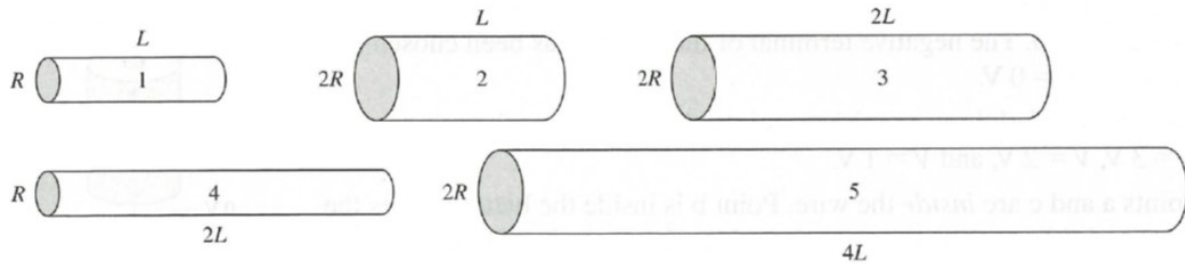
a. Compare the values of the currents in the two segments. Is I_2 greater than, less than, or equal to I_1 ? Explain.

b. Compare the strengths of the current densities J_1 and J_2 .

c. Compare the strengths of the electric fields E_1 and E_2 in the two segments.

7.

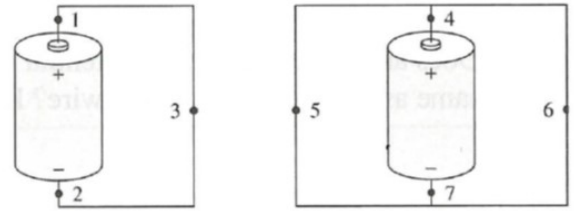
The wires below are all made of the same material. Rank in order, from largest to smallest, the resistances R_1 to R_5 of these wires.



Order:

Explanation:

8. The two circuits use identical batteries and wires of equal diameters. Rank in order, from largest to smallest, the currents I_1 to I_7 at points 1 to 7.



Order:

Explanation:

9. For resistors R_1 to R_2 :

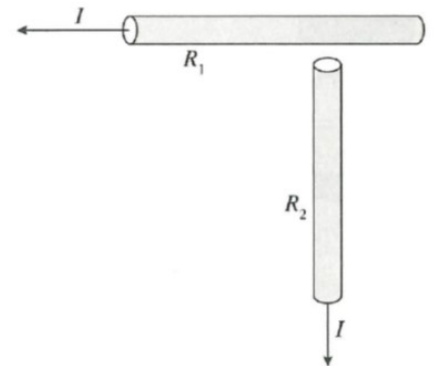
a. Which end (left, right, top, or bottom) is more positive?

R_1 : _____ R_2 : _____

b. In which direction (such as left to right or top to bottom) does the potential decrease?

R_1 : _____

R_2 : _____



10. Wire 1 and wire 2 are made from the same metal. Wire 1 has twice the diameter and half the electric field of wire 2. What is the ratio I_1/I_2 ?
