WebAssign
CH19-HW02-FALL2010 (Homework)

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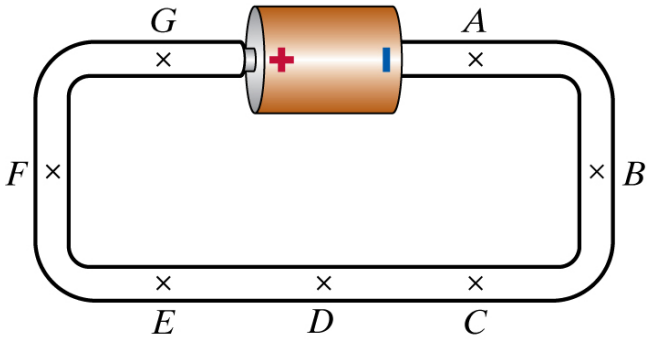
PHYS 272-FALL 2012, Fall 2012
Instructor: Virendra Saxena

Current Score : 13 / 13 **Due :** Tuesday, October 16 2012 11:59 PM EDT

1. 3/3 points | Previous Answers MI3 19.5.X.049

A steady-state current flows through the Nichrome wire in the circuit shown in the figure.



Before attempting to answer these question, draw a copy of this diagram. All of the locations indicated by letters are inside the wire.
(a) On your diagram, show the electric field at the locations indicated, paying attention to relative magnitude.
(b) Carefully draw pluses and minuses on your diagram to show the approximate surface charge distribution that produces the electric field you drew. Make your drawing show clearly the differences between regions of high surface charge density and regions of low surface charge density.
Use your diagram to answer the following question:

Which of the following statments about this circuit are true?

- [ ] The magnitude of the electric field inside the wire is larger at location *G* than at location *C*.
- [ ] The electric field at location *D* points to the left.
- [x] The electric field points to the left at location *A*.
- [ ] There is no excess charge on the surface of the wire.
- [ ] There is excess charge on the surface of the wire near the batteries, but nowhere else.
- [x] The magnitude of the electric field is the same at locations *A* and *E*.
- [ ] Inside the metal wire the magnitude of the electric field is zero.
- [x] There is some excess negative charge on the surface of the wire near location B.
- [ ] Because the current is not changing, the circuit is in static equilibrium.

- *Read the eBook*
- Section 19.5

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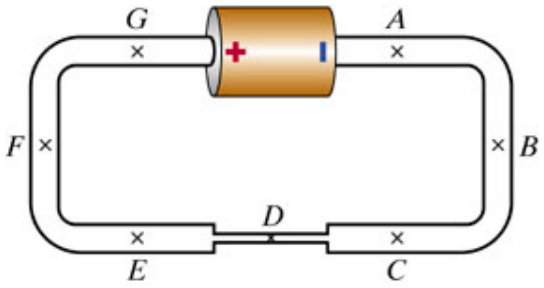
2. 3/3 points | Previous Answers MI3 19.5.X.050

In the circuit shown in the figure, all of the wires are made of Nichrome, but one wire is very thin and the others are thick.



Before attempting to answer these questions, draw a copy of this diagram. All of the locations indicated by letters are inside the wire.
(a) On your diagram, show the electric field at the locations indicated, paying attention to relative magnitude.
(b) Carefully draw pluses and minuses on your diagram to show the approximate surface charge distribution that produces the electric field you drew. Make your drawing show clearly the differences between regions of high surface charge density and regions of low surface charge density.

Use your diagram to answer the following question: Which of the following statements about this circuit are true?

- [x] The magnitude of the electric field at location *G* is smaller in this circuit than it would be if all the wires were thick.
- [x] The magnitude of the electric field at location *D* is larger than the magnitude of the electric field at location *G*
- [ ] Fewer electrons per second pass location *E* than location *C*.
- [x] The electron current in this circuit is less than the electron current would be if all the wires were thick.
- [x] The electron current is the same at every location in this circuit.
- [x] There is a large gradient of surface charge on the wire between locations *C* and *E*.
- [ ] The magnitude of the electric field is the same at every location in this circuit.
- [ ] There is no surface charge at all on the wire near location *G*.

- *Read the eBook*
- Section 19.5

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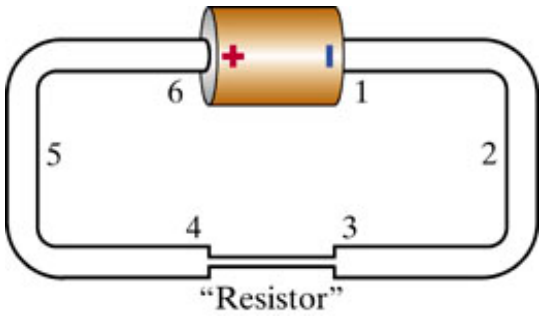
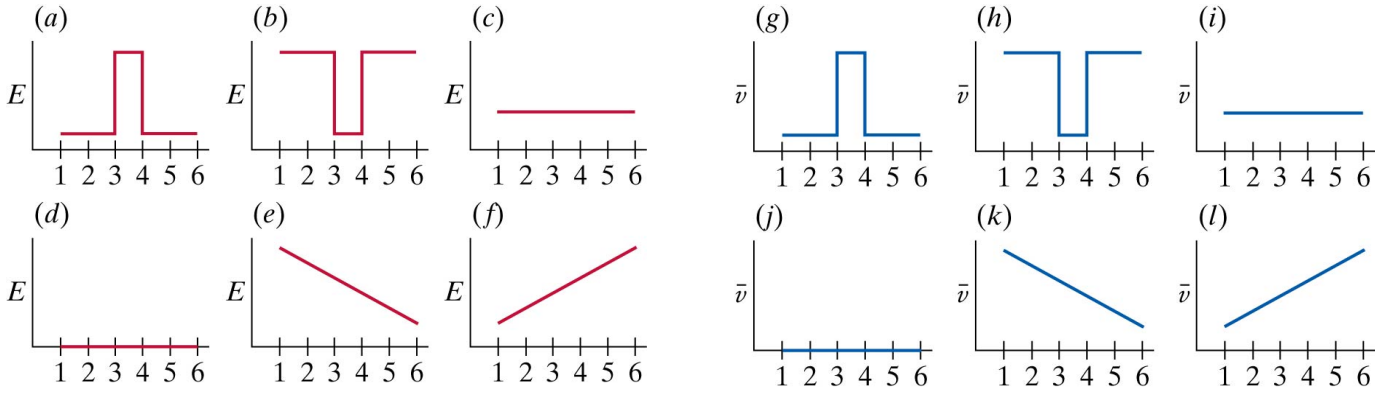
3. 3/3 points | Previous Answers MI3 19.3.X.039

In the circuit below the narrow resistor is made of the same material as the thick connecting wires.



In the steady state, which graphs correctly show the magnitude of the electric field at locations around the circuit, and the drift speed of the electrons at locations around the circuit? Select the two correct graphs.

Electric field: Drift speed:

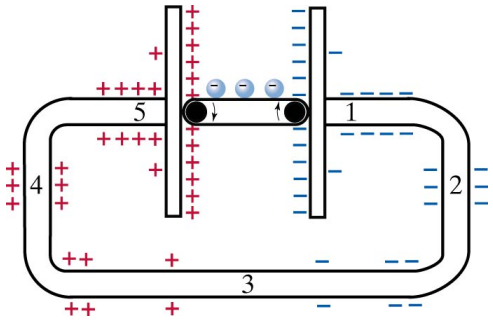


- [x] (a)
- [ ] (b)
- [ ] (c)
- [ ] (d)
- [ ] (e)
- [ ] (f)
- [x] (g)
- [ ] (h)
- [ ] (i)
- [ ] (j)
- [ ] (k)
- [ ] (l)

- *Read the eBook*
- Section 19.3

4. 2/2 points | Previous Answers MI3 19.5.X.051.alt01

In the circuit shown below a mechanical battery keeps a steady-state current running in a wire which has rather low electron mobility.



Which of the following statements about the circuit are true? Select all that apply.

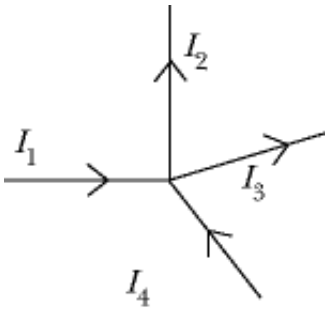
- [ ] The nonzero electric field inside the wire is created by the moving electrons in the wire.
- [x] At location 3 inside the wire the electric field points to the right.
- [ ] The electric field inside the wire varies in magnitude, depending on location.
- [ ] At location 3 the electric field points to the left.
- [ ] The electric field is zero at all locations inside the metal wire.
- [x] At every location inside the wire the direction of the electric field is parallel to the wire.
- [x] The magnitude of the electric field inside the wire is the same at all locations inside the wire.

- *Read the eBook*
- Section 19.5

5. 2/2 points | Previous Answers MI3 19.2.X.001

Write the node equation for the circuit in the figure. If I_1 = 6 A, I_4 = 4 A, and I_3 = 4 A, what is the value of the outward-going current I_2?

6 ✔ A



- *Read the eBook*
- Section 19.2