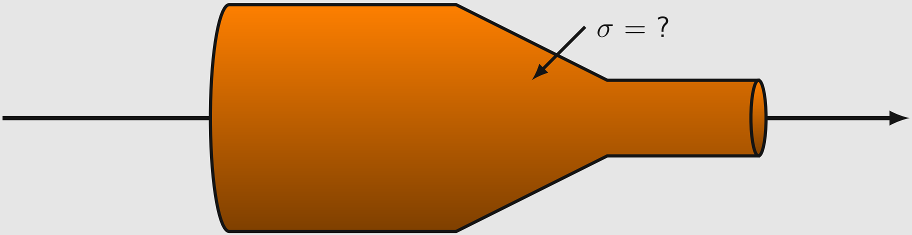
Announcements

- Homework
  - Homework 12 is posted!
  - 5 problems but generally I think more straightforward
  - If you have it to me on time I'll do everything I can to have it graded by the last day of class.
- Forgot to mention that I decided to give everyone an extra point on the Exam 2 since the in-class portion maybe ended up a smidgeon long.
- Still working on the grade reports, sorry. It's been a crazy week.
- I'll be giving blood or at the Senior talks the entire afternoon if you are trying to find me.
- Read the rest of 7.2 for Monday

Q1

Still looking at the narrowing piece of our copper here. Assuming there is a steady current flowing through the copper what can you say about surface charge collecting on the sloped walls?



A. No charge will accumulate
B. Positive charge will accumulate
C. Negative charge will accumulate
D. Positive will accumulate on the top and negative on the bottom

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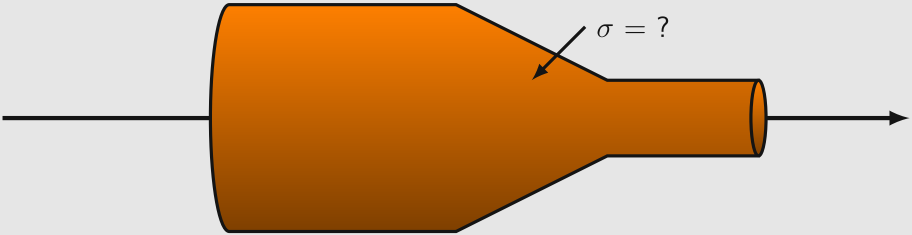

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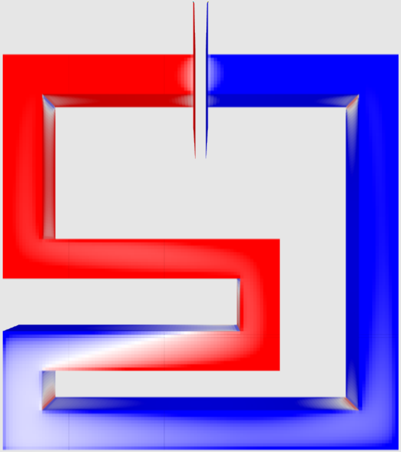
Demo for Surface Current



WILLAMETTE UNIVERSITY
ELECTROMAGNETICS

Its E-motional!

Q2

A circuit with an ideal battery is attached to a resistor. The force per charge inside the battery is

$$\vec{\mathbf{f}} = \vec{\mathbf{f}}_{bat} + \vec{\mathbf{E}}$$

and A and B are the locations of the two terminals of the battery.
How many of the following statements are true?

$$\mathcal{E} = \oint \vec{\mathbf{f}} \cdot d\vec{\ell} \qquad \mathcal{E} = \oint \vec{\mathbf{f}}_{bat} \cdot d\vec{\ell}$$

$$\mathcal{E} = \int_A^B \vec{\mathbf{E}} \cdot d\vec{\ell} \qquad \mathcal{E} = \int_A^B \vec{\mathbf{f}}_{bat} \cdot d\vec{\ell}$$

A. 1
B. 2
C. 3
D. 4

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Q3

Given that the emf is the line integral of the total force per unit charge around a closed loop, what are the units of the emf? (And can you prove it?)

A. Joules
B. Amps
C. Newtons
D. Volts

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Q4

A metal bar moves with a constant speed to the right. A constant magnetic field points into the page. What happens to the electrons in the bar (as seen in the frame of the moving bar)?

A. They move upward
B. They move downward
C. They move right
D. Nothing

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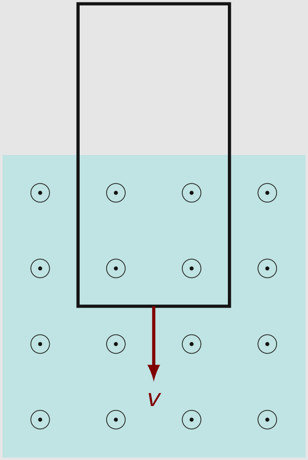
Q5

One end of a rectangular metal loop enters a region of uniform magnetic field $\vec{\mathbf{B}}$ pointing out of the page. As the loop enters the field is there a non-zero emf around the loop?

A. Yes, current will flow CW

B. Yes, current will flow CCW

C. No



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