General Physics - E&M (PHY 1308) Lecture Notes

Quiz010

*SteveSekula*, 12 November 2010 (created 11 November 2010)

Name:_____

no tags

Date:_____

Rules for the Quiz:

- You are given **5 minutes at the beginning** to look over the quiz quietly and jot some notes on a 3x5-inch notecard. Use this time to think about how to attack the quiz problem(s)
- You are given **10 minutes in the middle** to discuss the quiz with your teammates. Use this time to develop strategies across the group for attacking the problem(s). You are allowed to keep notes from this discussion on the SAME 3x5-inch notecard.
- You then have **10 minutes at the end** to work individually (NO MORE DISCUSSION) to solve the problem(s). Use your notes on the 3x5-inch card to help you attack the problem(s)
- You are allowed to use a calculator
- Your grade will be determined from the weighted-average of your group and not from your individual performance. The highest grade will be weighted the most, and the lowest the least. Low grades will drag the average down, so it is in your best interest to collaborate during the discussion part of this quiz. All members of your team get the same grade, determined from that weighted average.

Part 1: (10 Points) A uniform current, I, is flowing in a conductive pipe of total length L (as shown below). Apply Ampere's Law to the path shown in the picture below, which encloses a part of the pipe length, ℓ. The magnetic field inside the pipe is uniform and non-zero and the magnetic field outside the pipe is zero. Show that the magnetic field inside the pipe is $B = \mu_0 I / L$.

View a slice of the pipe

current

ℓ

$\vec{B}$
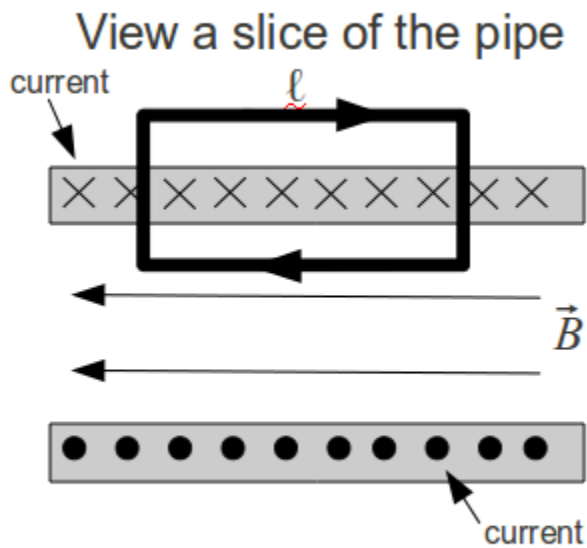
current

Part 2: (10 Points) If the pipe carries a current of 5.0A, has a length of $L = 1.0$m, and has a circular area with a radius of 1.0cm, what is the magnetic field flux through any area of the pipe?