Announcements

- Homework
  - Homework 11 has been posted
  - Due Wednesday night after break
  - All Ch 6 material (and maybe a smidge of 5)
- Physics Tea at 3!
- Don't forget to wow your family with E&M knowledge over dinner next Thursday!
  - I will actually throw some extra credit toward your worst test score if you film yourself explaining some E&M concept to a clueless family member or friend. Say a 1-3 minute explanation!

Q1

We defined the polarizability in terms of the $\vec{\mathbf{E}}$:

$$\vec{\mathbf{P}} = \epsilon_0 \chi_e \vec{\mathbf{E}}$$

Yet we define the magnetization in terms of $\vec{\mathbf{H}}$:

$$\vec{\mathbf{M}} = \chi_m \vec{\mathbf{H}}$$

Why?

A. It is different physics. The magnetization actually depends only on $\vec{\mathbf{H}}$.
B. It is easier to measure quantities related to $\vec{\mathbf{H}}$ in the lab.
C. It is more convenient algebraically to write it this way.
D. It is simply an old tradition like calling the current the direction that positive charges flow.

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Q2

For linearly magnetizable materials, the relationship between the magnetization and the H-field is

$$\vec{\mathbf{M}} = \chi_m \vec{\mathbf{H}}$$

What do you expect the sign of χ_m to be for a paramagnetic/diamagnetic material?

A. Both positive
B. Both negative
C. Para positive and Dia negative
D. Para negative and Dia positive

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Q3

A 100 A current is measured running through a 10 mm diameter copper wire. What is the magnetic field halfway from the center to the outer edge?

A. 999.99 μT
B. 1999.98 μT
C. 3999.96 μT
D. 4000 μT

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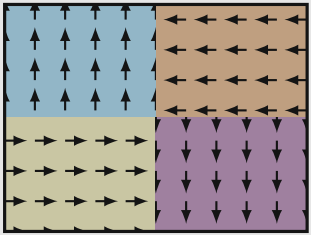
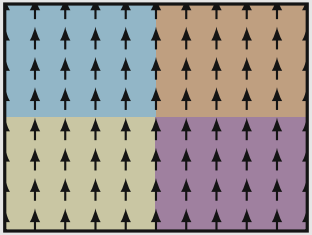
Q4

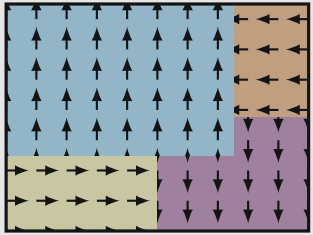
A ferromagnet has domains with dipoles moments as indicated to the right. After being placed in a magnetic field which points in the upward direction, which image below best depicts the ferromagnet?



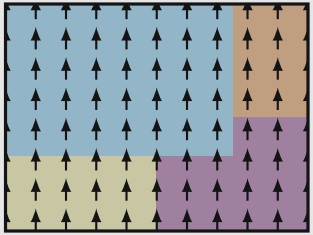
A



B



C



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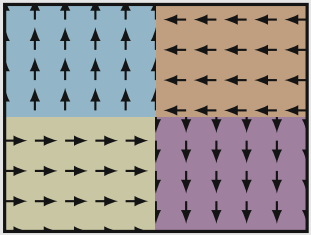
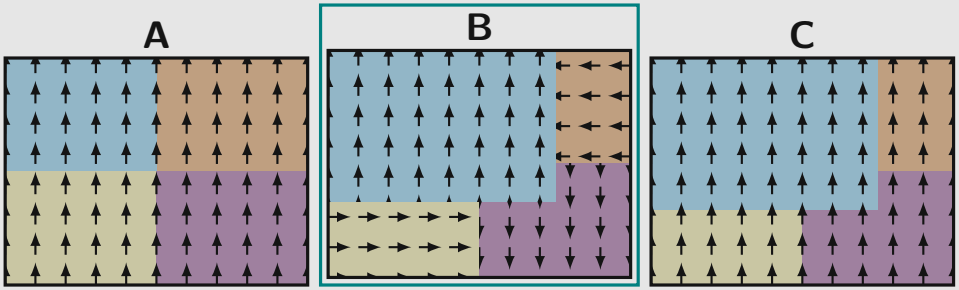
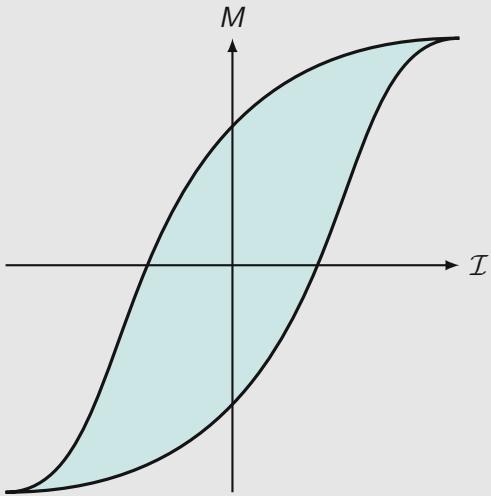




Q5

The image to the right is a hysteresis loop for a ferromagnetic material with a current carrying wire wrapped about it. As the current is turned from positive to negative and back, what direction does one travel around the loop?

A. Clockwise
B. Counterclockwise
C. It depends on other factors



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