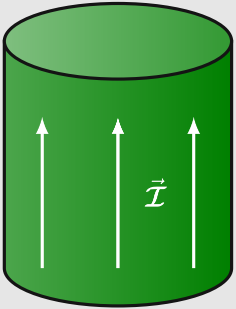
Announcements

- Exam 2
  - Take-home portion due today at 7pm
  - Deliver the hard-copy in person or email me a pdf of everything (including the signed cover page!)
- Homework
  - I'm trying to get Homework 11 out today, due after Thanksgiving
  - On all the Ch 6 material
  - Only 1 more homework after that!

Q1

A very long silver (diamagnetic) rod carries a uniformly distributed current $\mathcal{I}$ along the $+\hat{\boldsymbol{z}}$ direction. What is the direction of the bound volume current?



A. $+\hat{\boldsymbol{z}}$

B. $-\hat{\boldsymbol{z}}$

C. $+\hat{\phi}$

D. $-\hat{\phi}$

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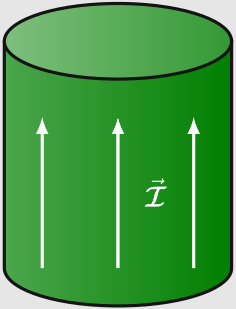


A. $+\hat{\boldsymbol{z}}$
B. $-\hat{\boldsymbol{z}}$
C. $+\hat{\phi}$
D. $-\hat{\phi}$

Q2

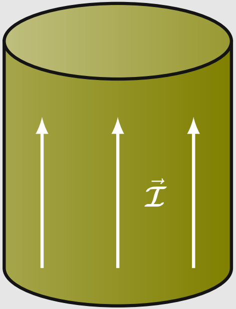
In the same long silver (diamagnetic) rod, what would be the direction of the auxiliary field $\vec{\mathbf{H}}$ and $\vec{\mathbf{M}}$?

A. Both in the $\hat{\phi}$ direction

B. Both in the $-\hat{\phi}$ direction

C. $\vec{\mathbf{H}}$ in $\hat{\phi}$ direction, but $\vec{\mathbf{M}}$ in $-\hat{\phi}$ direction

D. $\vec{\mathbf{H}}$ in $-\hat{\phi}$ direction, but $\vec{\mathbf{M}}$ in $\hat{\phi}$ direction



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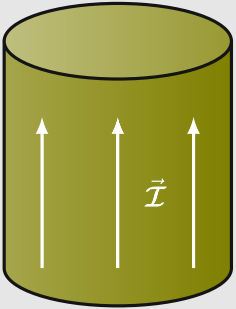
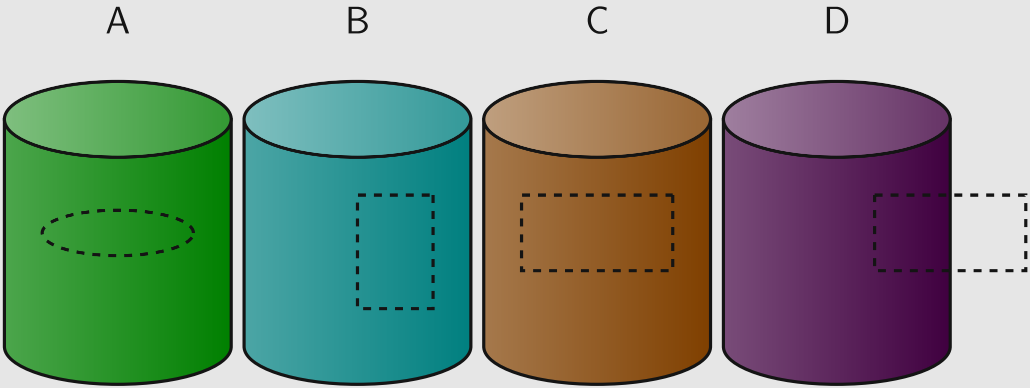


Q3

Say you wanted to determine the magnitude of $\vec{\mathbf{H}}$ inside the rod using an Amperian loop. What would be the most useful loop to draw?



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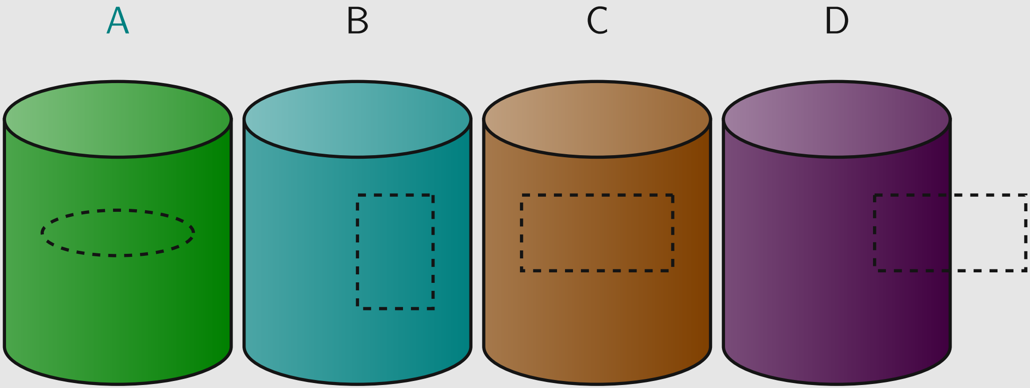

Q4

Take the case of a short, cylindrical iron magnet, which has some baked-in magnetization pointing in the $\hat{\boldsymbol{z}}$ direction. What can you conclude about the auxiliary field $\vec{\mathbf{H}}$?

A. $\vec{\mathbf{H}} = 0$

B. $\vec{\mathbf{H}} = \vec{\mathbf{M}}$

C. $\vec{\mathbf{H}} = -\vec{\mathbf{M}}$

D. None of the above

Auxiliary is Hard to Spell

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Auxiliary is Hard to Spell

Q5

Take an infinitely long, cylindrical (radius$= R$), iron magnet with a "frozen-in" magnetization given by:

$$\vec{\mathbf{M}} = M_0\hat{\boldsymbol{z}}$$

What is the magnitude of the magnetic field outside the magnet?

A. 0

B. $\mu_0 M_0$

C. $\mu_0 M_0 R$

D. $\mu_0 \dfrac{M_0 R}{s}$

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D. $\mu_0 \frac{M_0 R}{s}$