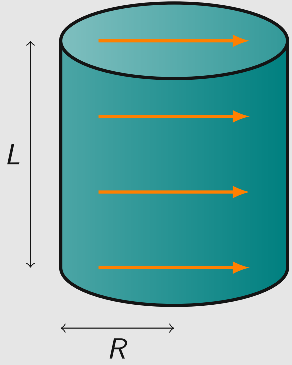
Announcements

- Homework
  - HW9 is graded
  - HW10 due tonight!
  - I'll grade HW10 tomorrow
- Exam 2
  - Don't forget Exam 2 is Monday!
  - In-class portion similar to Exam 1
  - Also a small take-home portion due on Wednesday
  - I'm working on objectives for you to study from
  - I'll be around a portion of Sunday if you have questions

Q1



A solid cylinder has uniform magnetization $\vec{\mathbf{M}}$ throughout the volume in the x direction as shown. What is the magnitude of the total magnetic dipole moment of the cylinder?

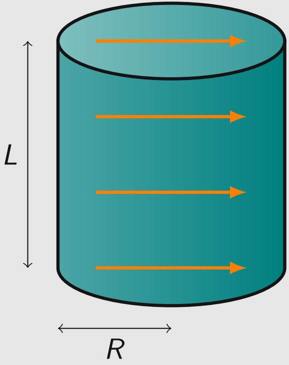
A. $\pi R^2 L M$

B. $2\pi R L M$

C. $2\pi R M$

D. $\pi R^2 M$

Q1



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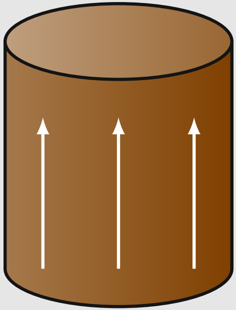
A. $\pi R^2 LM$
B. $2\pi RLM$
C. $2\pi RM$
D. $\pi R^2 M$

Q2

A solid cylinder has uniform magnetization $\vec{\mathbf{M}}$ throughout the volume in the z direction as shown. Where do bound currents show up?

A. All surfaces, but not volume
B. Volume only, not on surface
C. Top/bottom surface only
D. Side (curved) surface only



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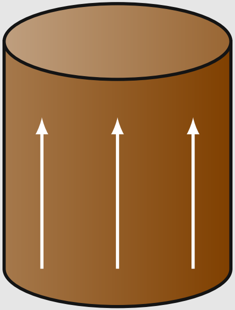
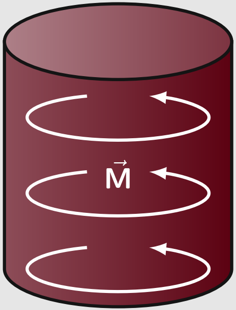


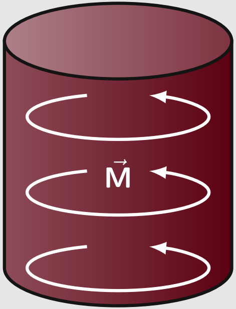
Q3



A solid cylinder has uniform magnetization $\vec{\mathbf{M}}$ throughout its volume in the $\hat{\phi}$ direction as shown. In what direction does the bound surface current flow on the curved sides?

A. There is no bound surface current
B. The current flows in the $+\hat{\phi}$ direction
C. The current flows in the $+\hat{\boldsymbol{z}}$ direction
D. The current flows in the $-\hat{\boldsymbol{z}}$ direction

Q3



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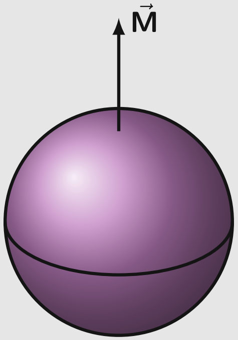
Q4

A sphere has uniform magnetization $\vec{\mathbf{M}}$ in the $+\hat{\boldsymbol{z}}$ direction. What formula is correct to describe the bound surface current about the sphere?

A. $M \sin\theta \hat{\boldsymbol{\theta}}$
B. $M \sin\theta \hat{\boldsymbol{\phi}}$
C. $M \cos\phi \hat{\boldsymbol{\theta}}$
D. $M \cos\phi \hat{\boldsymbol{\phi}}$



Q4

A sphere has uniform magnetization $\vec{\mathbf{M}}$ in the $+\hat{\boldsymbol{z}}$ direction. What formula is correct to describe the bound surface current about the sphere?

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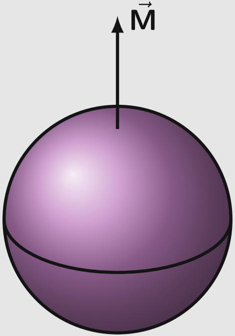

Q5

Predict the results of the following experiment.
A paramagnetic bar and a diamagnetic bar are pushed inside of a solenoid.

A. The paramagnet is pushed out, the diamagnet sucked further in
B. The diamagnet is pushed out, the paramagnet sucked further in
C. Both are sucked further in, but with different force
D. Both are pushed out, but with different force

Q5

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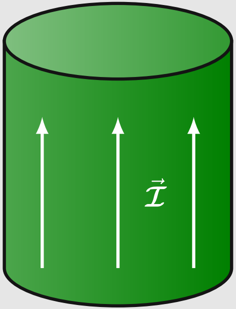
Q6

A very long aluminum (paramagnetic) 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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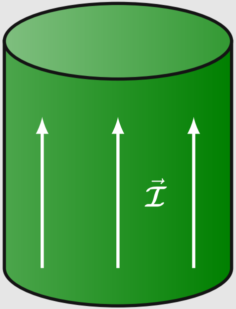

A. $+\hat{\boldsymbol{z}}$

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

C. $+\hat{\phi}$

D. $-\hat{\phi}$