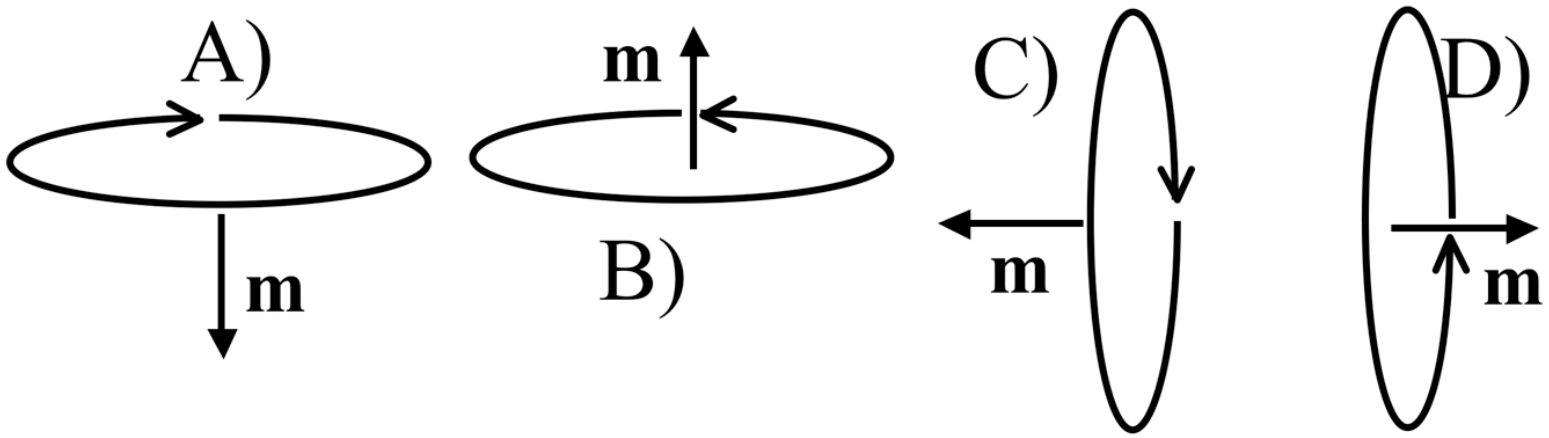
The torque on a magnetic dipole in a B field is:

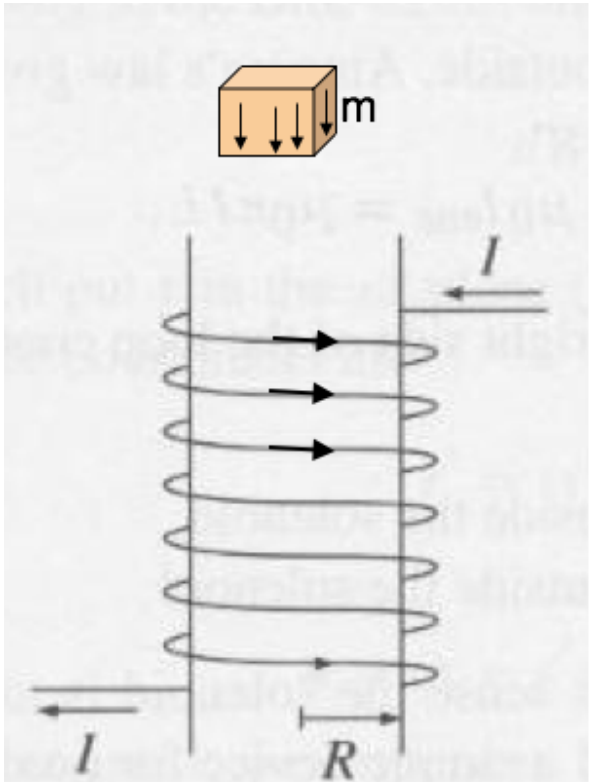
$$\tau = \mathbf{m} \times \mathbf{B}$$

How will a small current loop line up if the B field points uniformly up the page?



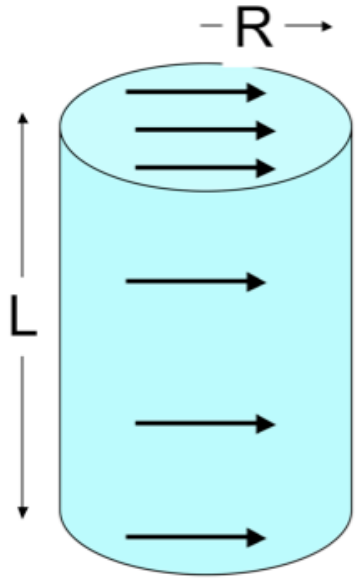
A small chunk of material (the “tan cube”) is placed above a solenoid. It magnetizes, weakly, as shown by small arrows inside. What kind of material must the cube be?

A. Dielectric
B. Conductor
C. Diamagnetic
D. Paramagnetic
E. Ferromagnetic

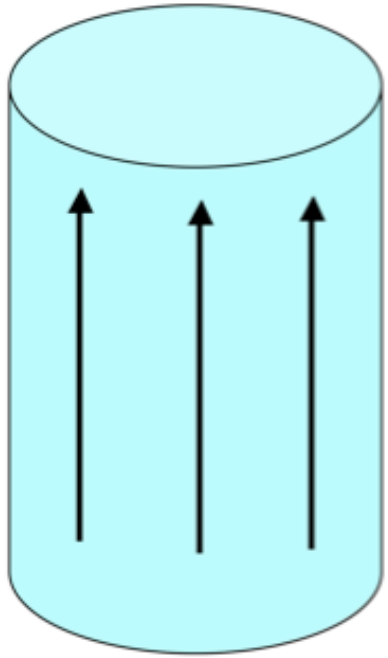


A solid cylinder has uniform magnetization $\mathbf{M}$ throughout the volume in the x direction as shown. What's the magnitude of the total magnetic dipole moment of the cylinder?

A. $\pi R^2 LM$
B. $2\pi RLM$
C. $2\pi RM$
D. $\pi R^2 M$
E. Something else/it's complicated!

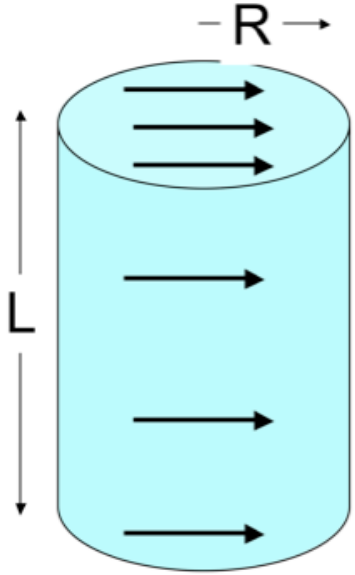


A solid cylinder has uniform magnetization $\mathbf{M}$ throughout the volume in the z direction as shown. Where do bound currents show up?



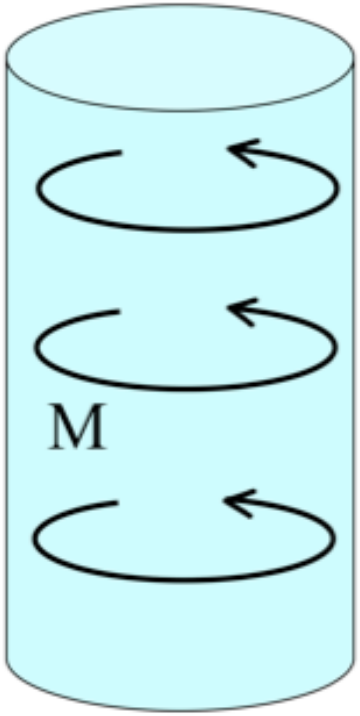
A. Everywhere
B. Volume only, not surface
C. Top/bottom surface only
D. Side (rounded) surface only
E. All surfaces, but not volume

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



A. Top/bottom surface only
B. Side (rounded) surface only
C. Everywhere
D. Top/bottom, and parts of (but not all of) side surface (but not in the volume)
E. Something different/other combination!

A solid cylinder has uniform magnetization $\mathbf{M}$ throughout the volume in the ϕ direction as shown. In which direction does the bound surface current flow on the (curved) sides?



A. There is no bound surface current.
B. The current flows in the $\pm\phi$ direction.
C. The current flows in the $\pm s$ direction.
D. The current flows in the $\pm z$ direction.
E. The direction is more complicated.

A sphere has uniform magnetization $\mathbf{M}$ in the $+z$ direction. Which formula is correct for this surface current?

A. $M \sin\theta \, \hat{\theta}$

B. $M \sin\theta \, \hat{\phi}$

C. $M \cos\phi \, \hat{\theta}$

D. $M \cos\phi \, \hat{\phi}$

E. Something else