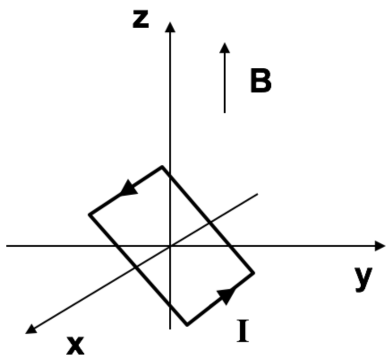
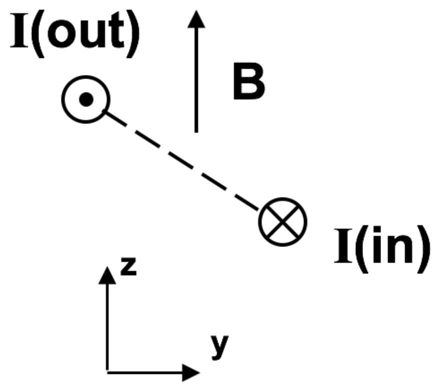




The force on a segment of wire L is $\mathbf{F} = I\mathbf{L} \times \mathbf{B}$ A current-carrying wire loop is in a constant magnetic field $\mathbf{B} = B\hat{z}$ as shown. What is the direction of the torque on the loop?

A. Zero

B. +x

C. +y

D. +z

E. None of these

ANNOUNCEMENTS

- Final Exam!
  - 12:45-2:45pm, Tues Dec. 11
  - In this room (1415 BPS)

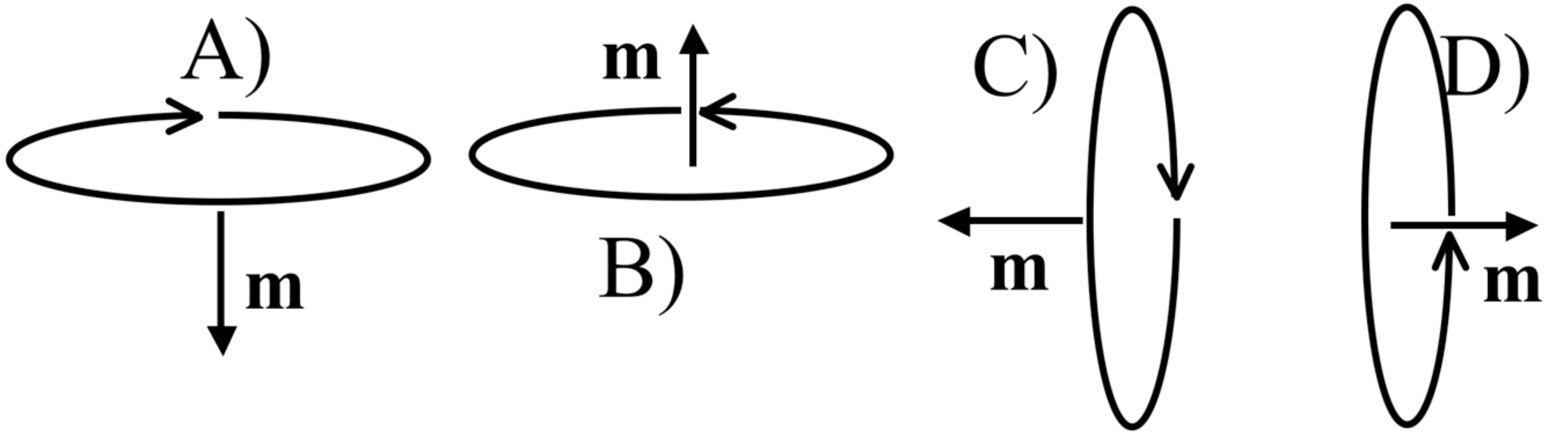
WHAT'S ON THE FINAL EXAM?

- A few true/false questions conceptual questions.
- Determine bound charge, $\mathbf{E}$, $\mathbf{D}$, $\mathbf{P}$ for some material with χ_e, and explain where the bound charge is.
- Setup magnetic vector potential and field calculations. Compare the appraoches.
- Determine the $\mathbf{B}$ for some $\mathbf{J}$ using Ampere's Law.
- (BONUS) Determine bound currents, $\mathbf{B}$, and $\mathbf{H}$ for some material with a "simple" free current, and explain properties of the bound currents

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?



Consider a paramagnetic material placed in a uniform external magnetic field, $\mathbf{B}_{ext}$. The paramagnetic magnetizes, so that the total magnetic field just outside the material is now...

A. smaller than
B. larger than
C. the same as

it was before the material was placed.

In our model of diamagnetism, the electron (charge, $-e$) travels around the "loop" in a time,

$$T = \frac{2\pi R}{v}.$$

What is the magnitude of magnetic dipole moment of this arrangement?

A. evR
B. $\dfrac{evR}{2}$
C. evR^2
D. $\dfrac{evR^2}{2}$
E. Something else?

E. Something else?

In our model of diamagnetism, let the angular momentum associated with the orbiting electron point in the $+z$ direction.

What is the direction of the magnetic moment?

A. Also $+z$

B. $-z$

C. It depends