What is the physical interpretation of $\oint \mathbf{A} \cdot d\mathbf{l}$?

A. The current density $\mathbf{J}$
B. The magnetic field $\mathbf{B}$
C. The magnetic flux Φ_B
D. It's none of the above, but is something simple and concrete
E. It has no particular physical interpretation at all

ANNOUNCEMENTS

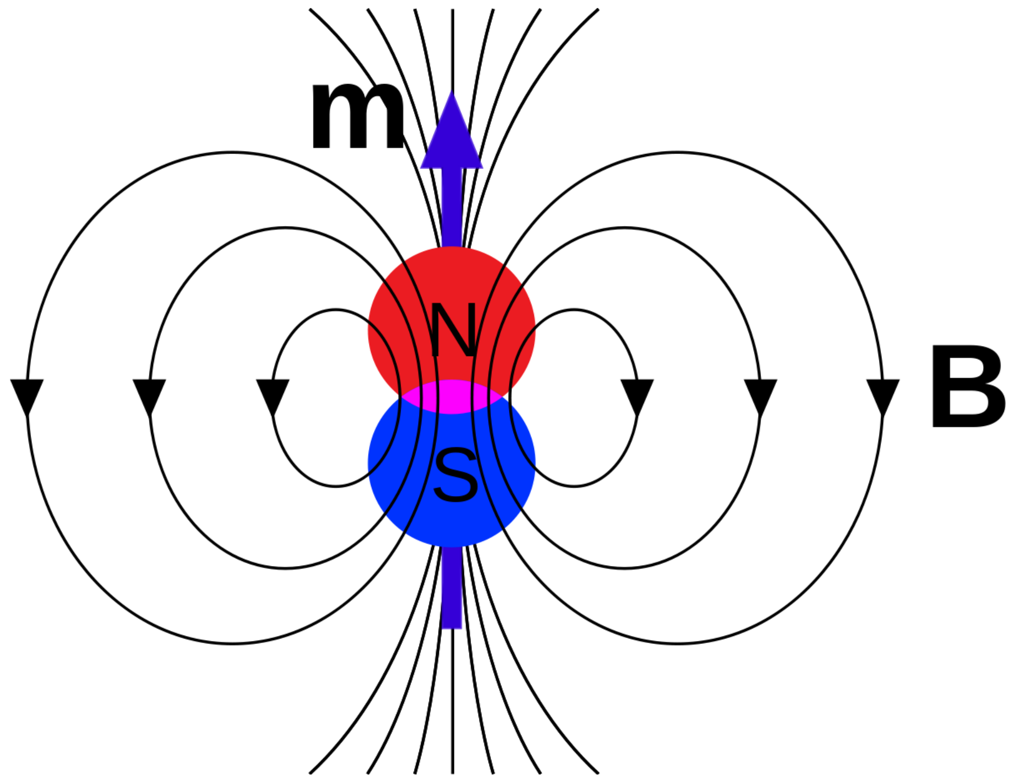
- Homework 13
  - Due Wednesday Dec 6th
- Last class: Friday Dec 8th
  - Full wrapup of everything we learned this year
  - Don't miss it!
- Final Exam: Tuesday Dec 12th
  - 12:45pm-2:45pm
  - In this room (BPS 1415)
  - See mee for accomodations

SPECIAL COLLOQUIUM

DANNY'S PROMOTION TALK

- Tuesday, Dec 5th
- 4:10pm-5:10pm
- In this room (BPS 1415)

MAGNETIC DIPOLES

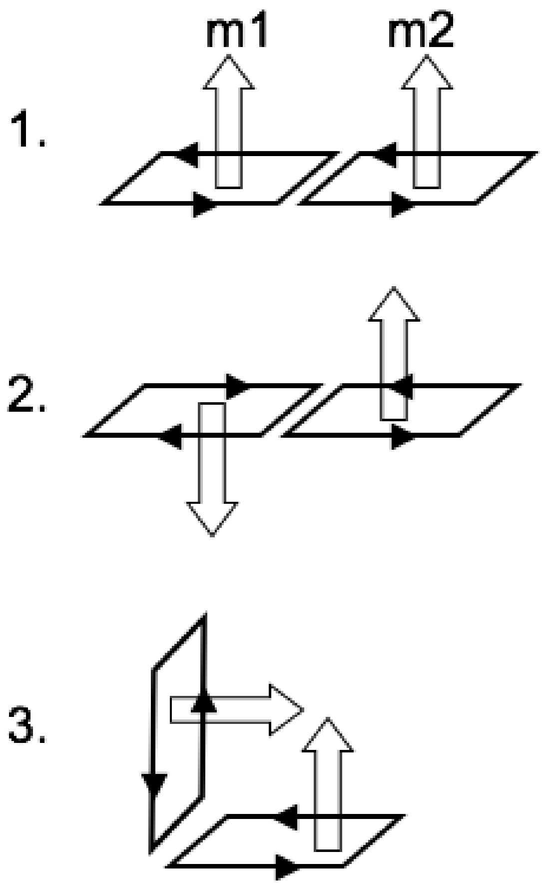


The leading term in the vector potential multipole expansion involves:

$$\oint d\mathbf{l}'$$

What is the magnitude of this integral?

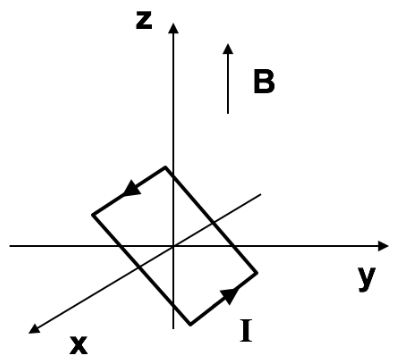
A. R
B. $2\pi R$
C. 0
D. Something entirely different/it depends!

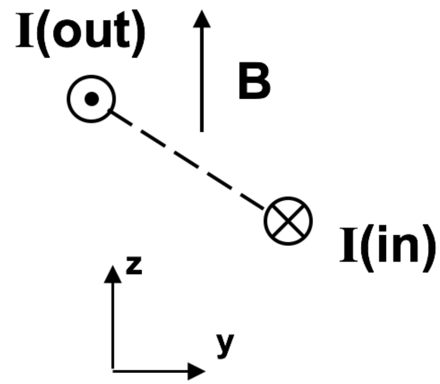


Two magnetic dipoles m_1 and m_2 (equal in magnitude) are oriented in three different ways.

Which ways produce a dipole field at large distances?

A. None of these
B. All three
C. 1 only
D. 1 and 2 only
E. 1 and 3 only





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

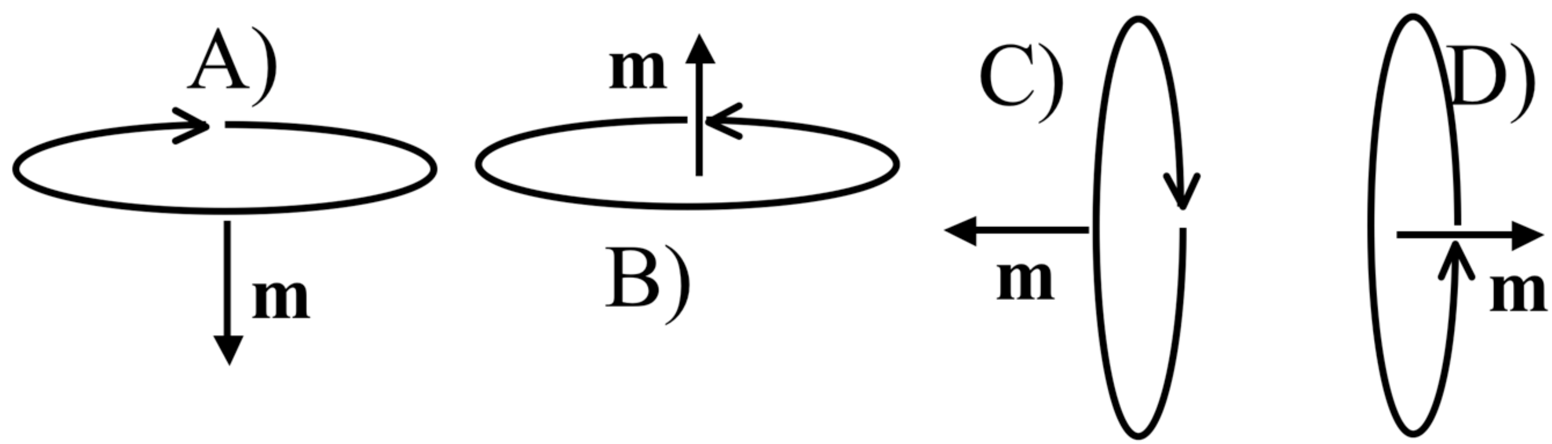
D. +z

E. None of these

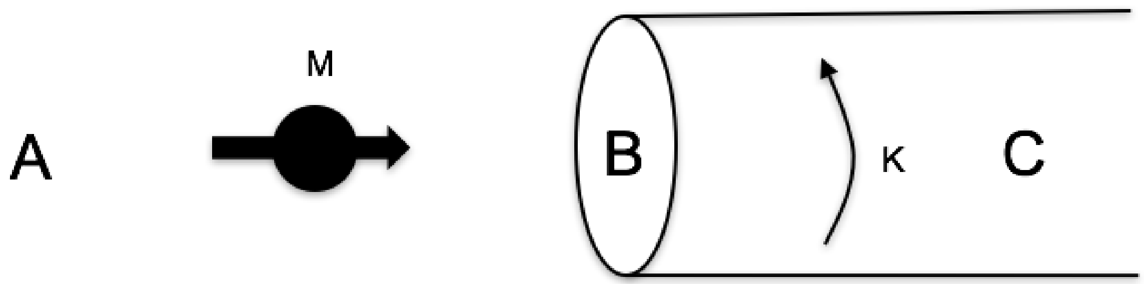
The torque on a magnetic dipole in a B field is:

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

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



Suppose I place a small dipole $\mathbf{M}$ at various locations near the end of a large solenoid. At which point is the magnitude of the force on the dipole greatest?



D) Not enough information to answer

E) There is no net force on a dipole

Recall: $\mathbf{F} = \nabla(\mathbf{m} \cdot \mathbf{B})$