Announcements

- Homework
  - Homework 9 is due tonight!
  - I'm getting the short HW10 posted today so you can start looking at it. Due Friday at midnight.
- Some homework requests:
  - Make it very clear when you start a new part of the problem (a,b,c,etc).
  - Make absolutely sure that the quality of your image/scan gives work that is easy to read.
  - When you submit multiple pages for a problem, please make sure they are in the proper order. You can drag them around to reorder them.
  - Part of what makes Jupyter notebooks so nice is that you can easily annotate and comment on them to describe what is being done. A notebook without comments, headings or explanations is basically on par with an unlabeled plot for what it conveys. And might start being scored accordingly.
- Read Chapter 6.2 for Wednesday

Q1

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

A. The current density $\vec{\mathbf{J}}$

B. The magnetic field $\vec{\mathbf{B}}$

C. The magnetic flux through a surface

D. It has no particular physical interpretation

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Q2

Consider a square loop of height H and length ℓ enclosing some amount of magnetic field. What happens to Φ_B as H becomes vanishingly small?

A. Φ_B stays constant

B. Φ_B gets smaller but doesn't vanish

C. Φ_B goes to 0

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Q3

When you do a vector potential multipole expansion for magnetic fields, what is the monopole term?

A. $\dfrac{\mu_0 R}{4\pi}$

B. $\dfrac{\mu_0 \pi R}{2}$

C. 0

D. Something else

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Q4

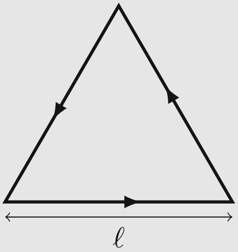
What is the magnitude of the magnetic dipole moment corresponding to the current loop on the right? You can assume a current $\mathcal{I}$ is flowing through the loop.

A. $3\ell\mathcal{I}$

B. $\ell^2\sqrt{3}\mathcal{I}$

C. $\dfrac{\ell^2\sqrt{3}}{4}\mathcal{I}$

D. $\dfrac{3\ell\mathcal{I}}{2}$



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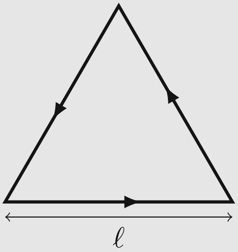
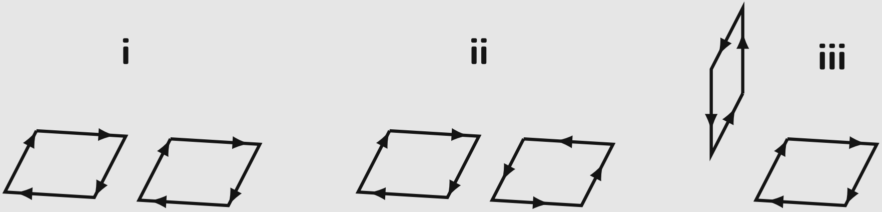


Q5

Two currents (equal in magnitude) are oriented in three different ways. Which ones will produce a dipole field at a far distance from the currents?



A. 1 only
B. 1 and 2 only
C. 1 and 3 only
D. 2 and 3 only

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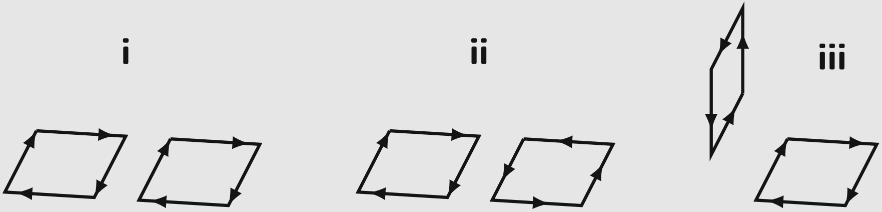

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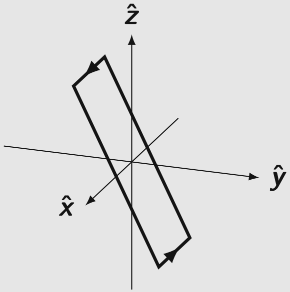
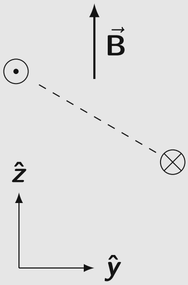
A current-carrying wire loop is in a constant magnetic field $\vec{\mathbf{B}} = B\hat{\boldsymbol{z}}$ as shown. What is the direction of the torque on the loop?





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

B. $+\hat{\boldsymbol{y}}$

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

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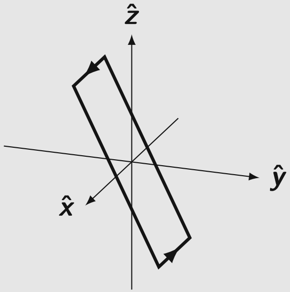

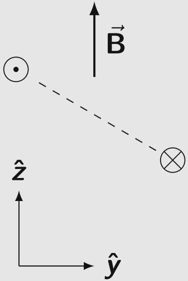

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