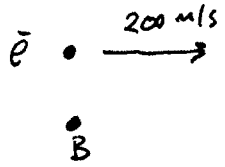
Quiz 7

Phys 296: Summer, 2015

1. We know that $\vec{F} = q(\vec{v} \times \vec{B})$. What is the magnetic force exerted on a charged particle at rest in a magnetic field? (5pt)

V=0 F=0 No Force.

2. Calculate the force on an electron with velocity $\vec{v} = 200m/s\hat{x}$ in a magnetic field $\vec{B} = 0.5T\hat{z}$(5pt).

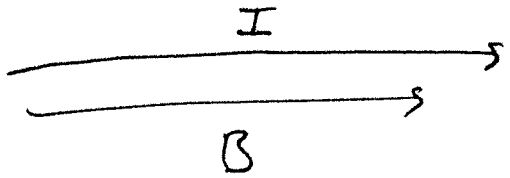


Right hand Rule

$F = qvB = -1.602\times10^{-19}C(200)(0.5) = -1.602\times10^{-17}N$

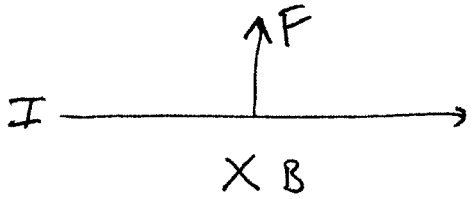
3. A 25-cm wire carrying 1-A current is placed in a magnetic field of 0.5 T. For the following two cases, calculate the magnetic force exerted on the wire and draw a diagram marking the directions of the wire, the magnetic field, and the magnetic force. (5pt)

(a) The wire is parallel to the magnetic field.



F=0

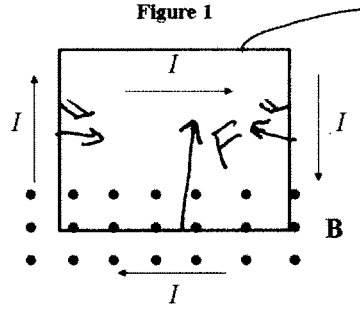
(b) The wire is perpendicular to the magnetic field.



$F = I\ell \times B = 0.125N$

4. Discuss the forces acting on the four sides of the rectangular coil in Figure 1. The magnetic field points out the paper and is non-zero only in the lower part of the coil. (5pt)

Figure 1



F=0

Sides cancel

Net force upward.