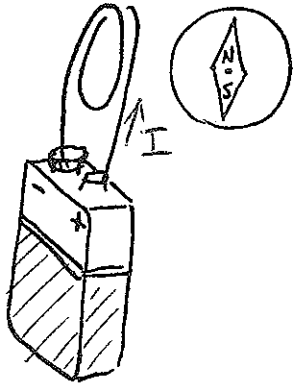


MAGNETISM WORKSHEET

Question 1



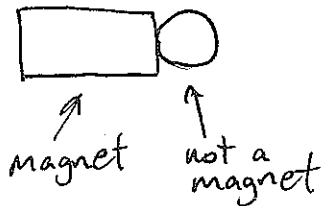
A wire is connected to a 9V battery as shown. What happens to the compass needle? What if the loop is turned around the other way?

Current flows in direction + \rightarrow -

Magnetic field through loop in direction to the left. (thumb: direction of current, fingers: direction of field winding around wire)

Question 2

Why does a magnet attract a metal ball?



Magnetic field: causes electron spins in ball to align (magnetic polarization)

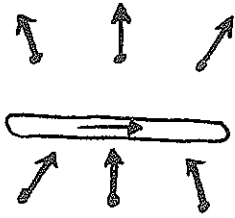
Magnetically polarized ball acts like another magnet so attracted



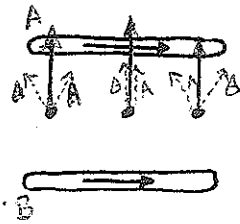
electrons act like little magnets.

Ball not in field:  NO NET MAGNETIC MOMENT

Question 3



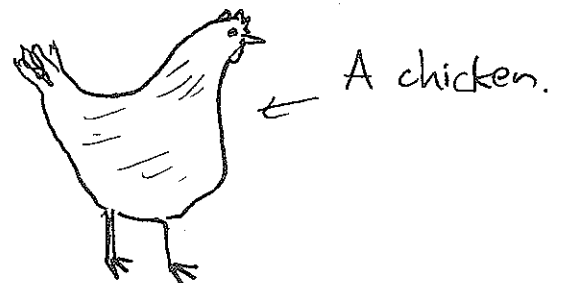
The magnetic field at various points near a loop of current (shown edge-on) is pictured to the left. In the figure below, two of these loops are brought nearby each other. Determine the direction of the net field at the three marked points.



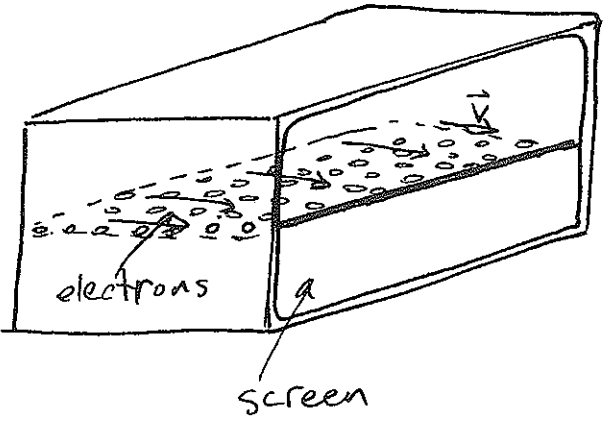
Net field up at all three points.

Field at p
 = field from A at p
 + field from B at p.

Free space. →

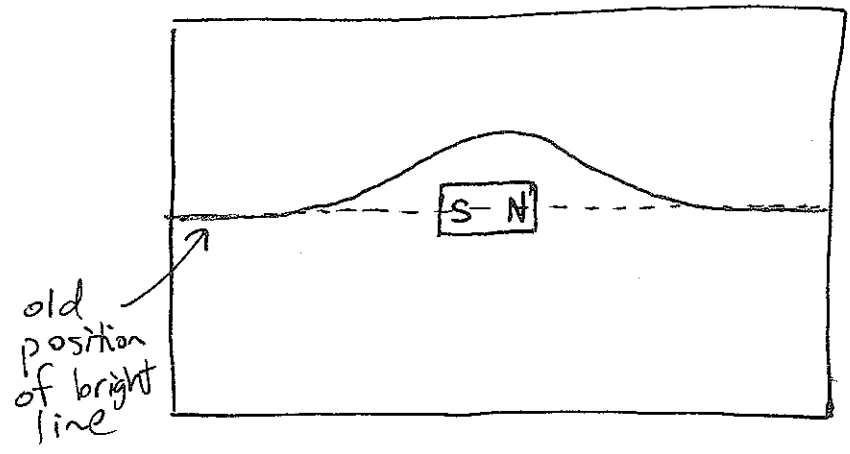


Question 4

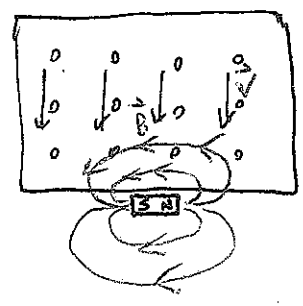


In a trip to the thrift shop, Macklemore buys a big coat and an old piece of physics equipment that sends electrons toward a screen. The screen lights up along the line where

the electrons are hitting. If Macklemore now holds a strong magnet up to the screen as shown below, what will happen to the pattern on the screen?



top view:

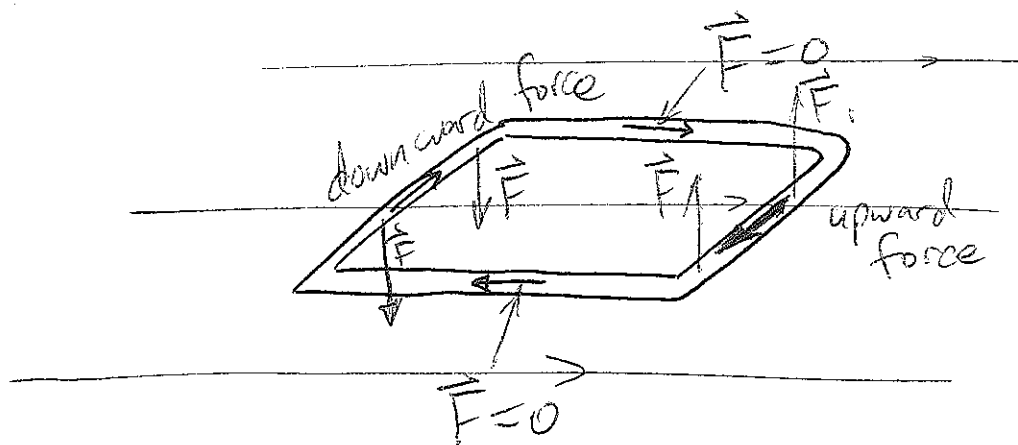


$\vec{v} \times \vec{B}$: down wards
 $q\vec{v} \times \vec{B}$: up wards

\therefore get up wards deflection
 -stronger B near magnet.

Question 5

A loop of current sits horizontally in a magnetic field that points to the right.



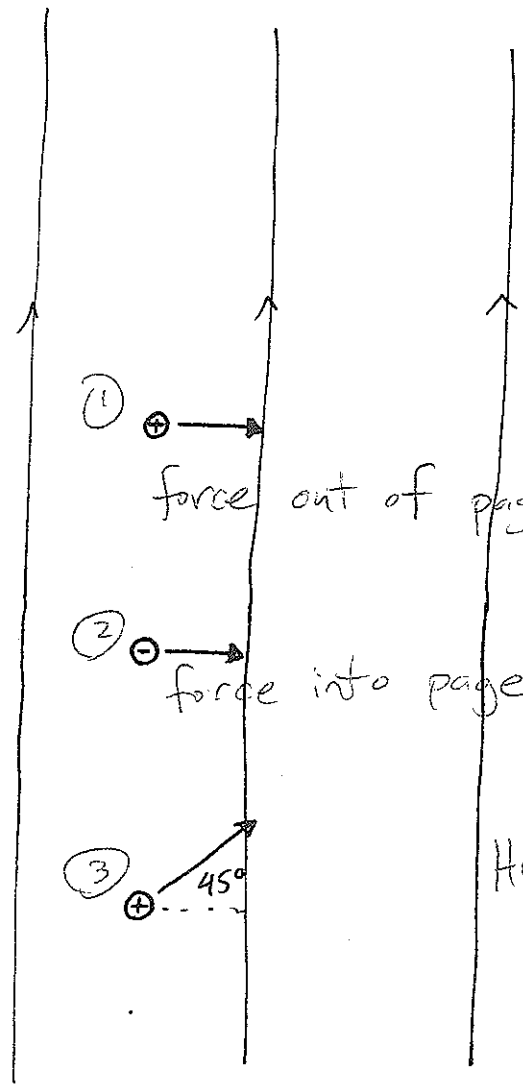
Find the direction of the force on each segment of the square loop. Is there a net force? Does anything happen to the loop?

No net force

But: net torque so loop rotates.

Question 6

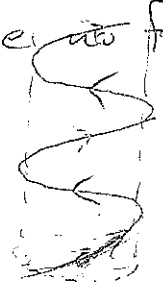
A uniform upward magnetic field fills space. Describe the trajectories of the three charged particles shown.



force out of page: charge moves in circle perpendicular to page

force into page: charge moves in circle (starting into page)

Horizontal motion: circular
Vertical motion: constant velocity up since no forces
: helix



TOP VIEW:

