

Lab 4S

Magnetism

(Physics 7, Experiment #4)

Purpose:

- 1) To observe and draw the magnetic field of permanent magnets.
- 2) To observe electromagnetic induction and study the factors affecting it.

Equipment:

2 bar magnets
1 U-shaped magnet
Iron filings
Glass jar with iron filing in oil
Clear plastic plates
Small compass
Galvanometer
Connecting wires
Thin cylindrical magnet
Coil of wire

Discussion:

A magnetic field surrounds magnets. The shape of the magnetic field can be 'seen' through its effect on iron filings. The direction of the magnetic field can be determined by a small compass.

Procedure:

- 1) Place a bar magnet on the table. Put the clear plastic plate on the top of the magnet [use your book or notebook to support one edge of the plastic plate so it stays horizontal]. Pinch a bit of iron filings and *gently drop* them on the plastic plate from a *height of 2 inches* above the plate. Tap the plastic plate gently so the iron filings will align along the magnetic field lines. Continue doing this until you have 'mapped' the magnetic field lines a distance of 3 inches all around the magnet paying attention to the area around or between the poles. Also, use a small compass to determine the direction of the magnetic field lines. *Sketch* the general shape of the magnetic field lines and *use arrows* to indicate direction. Be sure to label the poles of the magnet in your diagram.

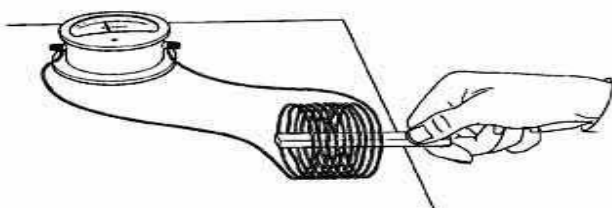


- 2) Place two bar magnets on the table as shown below [about 2 inches apart] with
 - a) unlike poles facing each other and
 - b) like poles facing each other. As in step 1, sketch the magnetic field surrounding each pair of magnets.

a)

b)

- 3) Sketch the jar of iron filing in oil and immediately put a strong U-shaped magnet against the glass. Carefully observe the magnetic field lines as traced by the alignment of the iron filings. Is magnetic field 3 dimensional?
- 4) Connect a coil of wire to the terminals of a galvanometer. Move the thin cylindrical magnet in and out of the coil and observe the galvanometer. [It is important to note that a galvanometer deflects whenever there is current through it].
Try moving the magnet at different speeds [fast or slow].
Using a coil of wire with *more turns*, repeat the above steps.
If a magnet of different strength [stronger or weaker] is available, repeat the above steps.



Name of Student: _____

Date Performed: _____

Instructor's Initial: _____