

**PH 1120 - The Magnetic Field - Lab Report**

**Your Name: ? Partner’s Name: ?**

**Section: ? Date: ?**

1. Explain briefly what must be going on with the magnetic field measurement when the magnet is in a fixed location relative to the Hall Effect probe and a paper clip is slipped in between the magnet and probe (touching both at either end) and then removed. In other words, explain briefly your view of why the probe reading changes as the paper clip is slipped in and out.
2. Explain briefly what must be going on with the paper clip when it registers a magnetic field with the probe when the bar magnet is first taken away, but then shows very little magnetic field after being thrown vigorously to the floor a few times.
3. From the data on your Data Sheet, calculate the ratio of maximum magnetic field to corresponding current for each of the four pairs of values recorded. Does the maximum field value at least approximately scale in linear proportionality with the current?
4. For the coil used in your experiment, there were 400 windings in a span of 3.9 cm. Calculate the magnetic field you would expect to measure inside an infinitely-long solenoid of winding density 400 turns per 3.9 cm carrying a current equal to the greatest current value on you Data Sheet.
5. As an added calculation arising from Problem 2, calculate the percent deviation of your measured maximum magnetic field from that predicted by the ideal solenoid equation. (Because the coil you used is quite short, your measured maximum field should be about 80% of the solenoid prediction – maybe even a bit more than 80%. Is it?)