Lenz's Law Lab

Procedure

Briefly, but completely, describe the procedure for this lab – and include labeled sketches.

Data ***Magnet Mass =*** _____ ***Tube Length =*** _____ ***Tube*** F_g = _____

(Note: ΔFg = change in tube weight)

	t	ΔF_g
Avg		

Questions

1) Imagine looking down the tube from above. As the magnet descends, it induces a current in the copper tube both above and below the magnet. Figure out whether the current is clockwise, or counterclockwise, immediately above and below the magnet – as seen from above – for when the N side is down and for when the S side is down. You should have 4 answers. Explain your results, using diagrams.

2) Using your average time, the length of the tube, and kinematic equations – find the acceleration of the magnet as it fell down the tube. Show your work.

3) Using a FBD, the mass of the magnet, and its acceleration from #2 – write a net force equation for the magnet as it falls. Call the resistive force exerted on the magnet by the induced currents in the pipe F_B, and find this value.

4) Use Lenz's Law and other physical laws to explain why the change in the tube weight is equal to the resistive force exerted on the magnet, F_B. Find the average value.

5) Using your answer to #4 as your accepted value, and your answer to #3 as your experimental value – find the percent error for this result.

Error Analysis

Thoroughly explain what the main sources of error are for this lab, and how you would correct them.

Heinrich Lenz, or Civil War General