More Lab E-4 notes:

1. Remember that the force on an electron is opposite what the right-hand rule says because it's charge is negative. We often do examples assuming it's a positive charge.

2. The end results of your write-up are your estimates of the electron mass and the earth's magnetic field strength, your calculated uncertainties in these values and how you arrived at them, including the formulas you used and how you obtained them. There are repeated calculations using the same formula for which you only have to show one of each explicitly with the numbers as an example. The result is adequate for the rest of them.

3. There is an easier, alternative approach to that in the Appendix for calculating uncertainties for combinations of multiplication and division:

   Calculate the percentage uncertainty for each parameter. For instance, I=2.00+/− 0.01A is 2A ± 0.5%. All you have to do is add the percentage uncertainties for each parameter of a formula (it doesn't matter if it's in the numerator or denominator), to get the total percentage uncertainty. It's best to convert the total percentage back to units of whatever you're calculating and express as ±. This is approximate, but very good for small uncertainties less than a few percent.

Here are the uncertainties to use:

   Current: I ± 0.01A
   Helmholtz radius: R ±0.005m
   Anode Voltage: V ±0.1V
   electron radius: r ±0.001m