

2131 D Sections Quiz 2

March 3, 2021

- 1: Suppose that your measurement of the diameter of the pickup coil is too large by 5% . How will this affect the estimate of μ ? Show your calculation.
- 2: Suppose that your measurement of the length of the drive coil is too large by 5% . How will this affect the estimate of μ ? Show your calculation, but you may ignore the $\sqrt{1 + (D/L)^2}$ in the denominator of “C” .
- 3: In part B, after the experimenter adjusts the frequency, why is it important to readjust the amplitude?
- 4: The experimenter records the following values for the important dimensions of their apparatus:
 - Length of solenoid: 10cm
 - Number of turns in solenoid: 3000
 - Diameter of pickup coil: 2cm
 - Number of turns of pickup coil: 200

They proceed to apply 40mA of alternating current at a frequency of 500Hz , and the amplitude of the signal from the pickup coil is 0.42V . Suppose that the uncertainty in all length measurements is 1mm . Is the experiment working properly? (Recall that μ is supposed to $\approx 4\pi \times 10^{-7}$ in MKS units.)