ECE 330 HW 5

In class quiz: Tuesday, July 2.
Copies of the textbook are kept at the Grainger Engineering Library Reserve

Text problem 4.1 (a) and (b) only

Text problem 4.2 (a) only, partial solution: $L_1 = \frac{\mu_0 N^2}{4}(\frac{A_{g0}}{g_0} + \frac{A_{g1}}{g_1})$

Special Problem #1 (see Exam 2 Spring 2004 for solution)
For the structure drawn in Figure 1 below, the movable member is constrained to move left and right only as indicated in the figure where x is the distance to the right edge of the movable member. The large member with the coil is fixed, and the depth into the page for both members is 2 cm. The gap g is 1 mm, and the number of turns $N = 100$. Find:

1. Total reluctance of the main flux path (through the two gaps).
2. Flux linkage, λ. (defined for the voltage polarity shown)
3. An expression for the voltage, v.

Express all of these as functions of current and/or position (x) and/or velocity and/or time as appropriate. You may neglect fringing in the gap, and you may assume the iron is infinitely permeable.