Text problem 4.1 (a) and (b) only

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

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, \( \lambda \) (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.