

ECE 330 HW 3

In class quiz Fri, Sep 21.

Copies of the textbook are kept at the Grainger Engineering Library Reserve

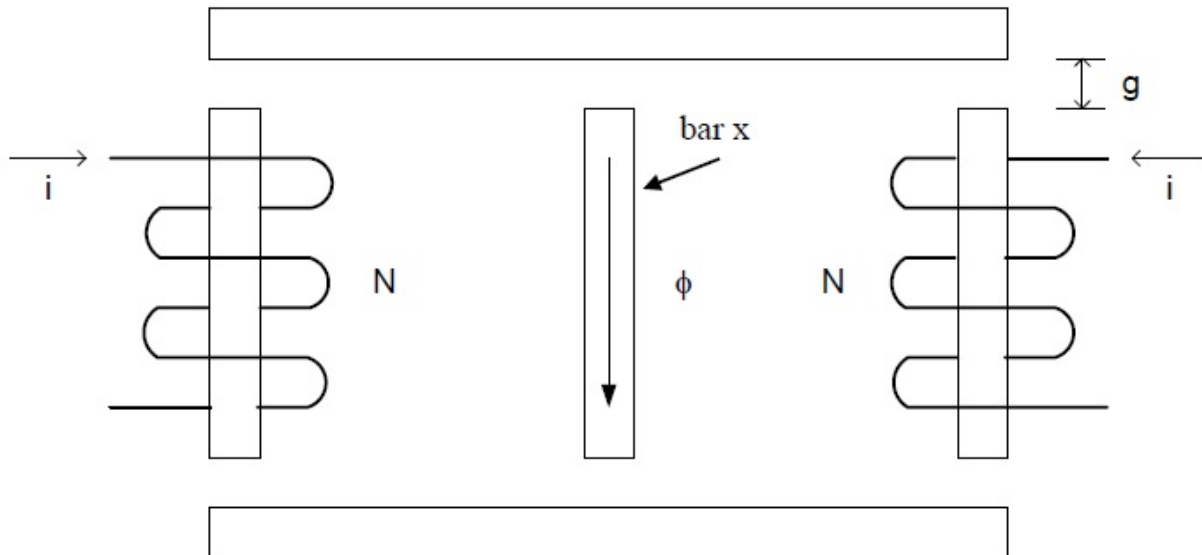
Textbook problem 3.1 (and also find the magnetic flux density in the iron) (partial answer: $L = 6.12mH$)

Textbook problem 3.2 (and compute the self-inductance L_1 and L_2 for coils 1 and 2, respectively) (partial answer: $L_1 = 3.125mH$, $L_2 = 0.78125mH$)

Textbook problem 3.3 (and compute the magnetic flux density in all legs. When fringing is accounted for, take $A' = 1.1A$, where A is the actual cross sectional area)

Special Problem #1

Consider the iron structure in the figure below. Assume $\mu = \infty$ in the iron. The structure has uniform cross sectional area of $A = 1cm^2$ in each leg. All air gaps have equal length of $g = 1mm$. Neglect fringing at the air gaps. Let each coil carry a current of i . The directions of the current are as shown in the figure. Assume each coil has $N = 100$ turns.



1. Compute the reluctance of each air gap.
2. Compute i if the flux density is $1.0T$ in bar x.
3. Find the flux linkage of the left-hand coil.