King Fahd University of Petroleum & Minerals
Electrical Engineering Department
EE 360: Home Work #2
Due Dates (Sep 24th for SMW Classes & Sep 25th for UT Classes)

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1. Problem 1-12 from the text book.

2. Find the value of *I* required to establish a magnetic flux of $\Phi = 0.75 \times 10^{-4}$ Wb in the series magnetic circuit as shown in **figure 1**. Calculate the force exerted on the armature (moving part) when the flux is established. The relative permeability for the steel is μr = 1424.

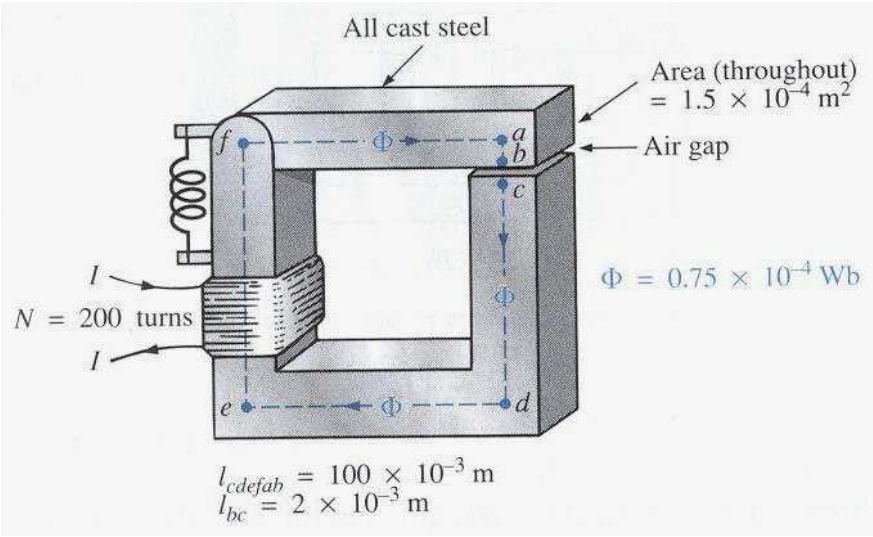

Figure 1

3. Determine the value of *I* required to establish a magnetic flux of $\Phi = 1.54 \times 10^{-4}$ Wb in the section of the core indicated in **figure 2**. The relative permeability for the steel at region *bcde*, *be*, and *efab* are μ_2 = 4972, μ_1 = 4821, and μ_T = 2426, respectively.

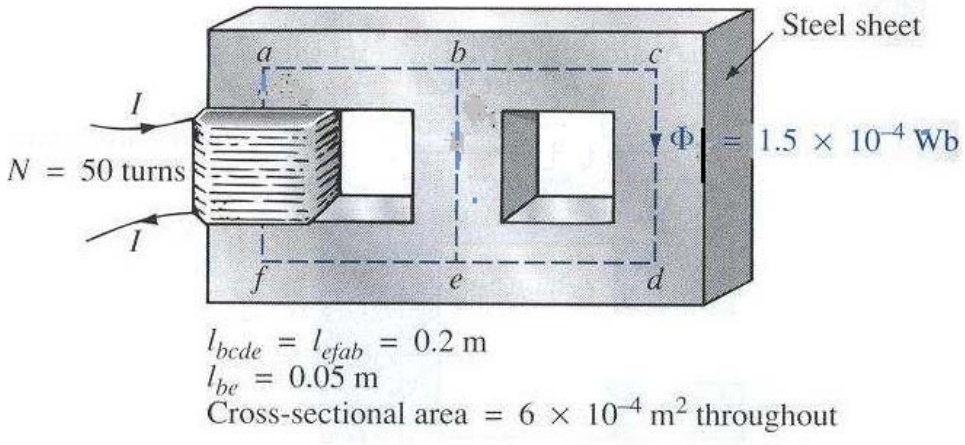

Figure 2

4. The core of **figure 3** is made of cast steel. Calculate the current *I* that needed to establish a flux of $\Phi_g = 6 \times 10^{-3}$ Wb at the air gap if fringing field is neglected.

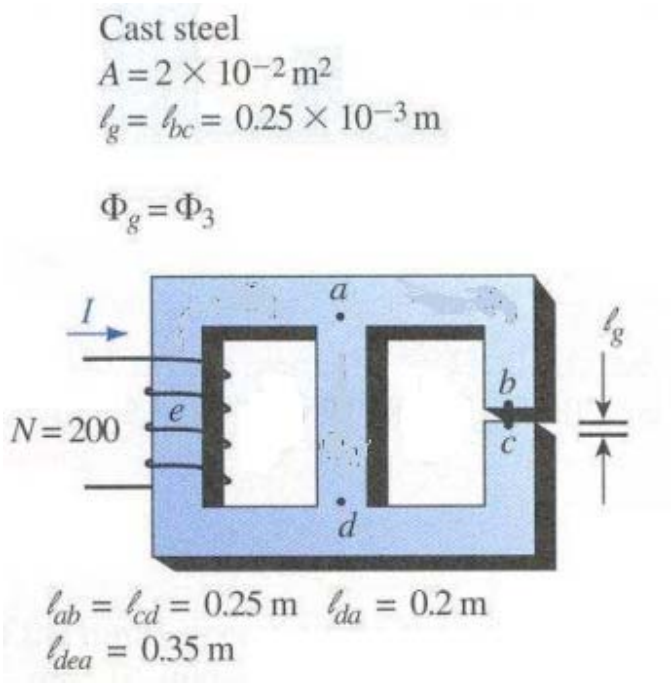

Figure 3

5. The total core loss for a specimen of magnetic sheet steel is found to be 1800 W at 60 Hz. If the flux density is kept constant and the frequency of the supply increases 50%, the total core loss is found to be 3000 W. Compute the separate hysteresis and eddy-current losses at both frequencies.