THE UNIVERSITY OF ZAMBIA
SCHOOL OF ENGINEERING
Dept of Electrical & Electronic Engineering

EEE 3352: Electromechanics and Electrical Machines

ASSIGNMENT 3: MAGNETIC CIRCUITS. *(Due 20/10/2022)*

1.

The magnetic circuit in Fig. Q1 is made of steel of relative permeability 2000. It has a uniform cross-sectional area of 25 cm^2.

(a) Calculate the mmf of the coil to establish a 1-T flux density in the air gap.
(b) If the coil has 90 turns, calculate the energy stored in the coil, air gap and in the iron.
(c) Calculate the inductance of the coil
      (i)excluding the effect of the iron core (i.e. assuming the core to be infinitely permeable)
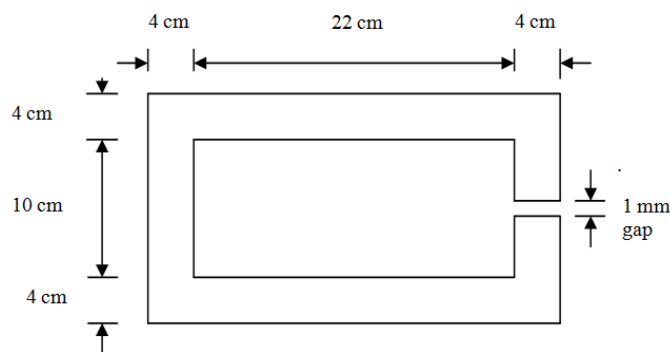   (ii)including the effect of the iron core.

Fig 1 for Q1.

2.

For the magnetic circuit shown Fig. Q2, determine the flux in limbs *A*, *B* and *C* for the following conditions:
(a) i_1=10 A, i_2=0 (b) i_1=0, i_2=20A *(c) i_1=10 A, i_2=20 A.*
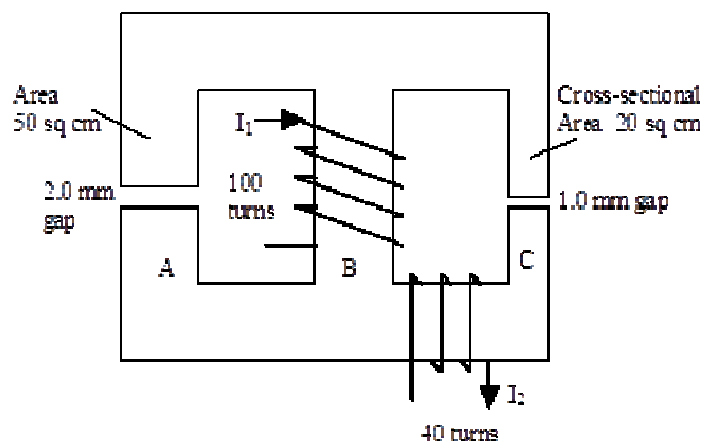Assume that the leakage flux is negligible and the magnetic material is ideal.

Fig. Q2

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