

**KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
ELECTRICAL ENGINEERING DEPARTMENT**

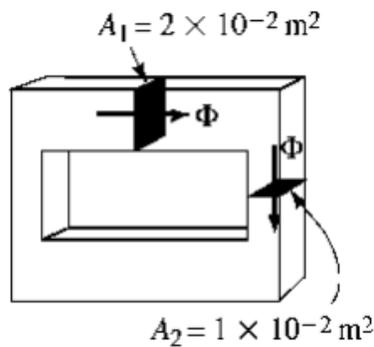
EE 306 – Term 191

HW # 2: Magnetic Circuits

Due Date: (Sep. 25th, 2019)

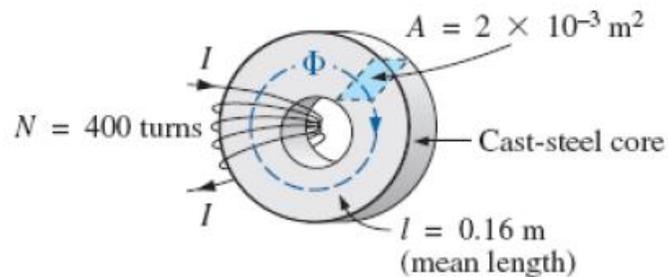
Problem # 1:

For the magnetic core shown below, the flux density at cross section 1 is $B_1 = 0.4$ T. Determine B_2 .

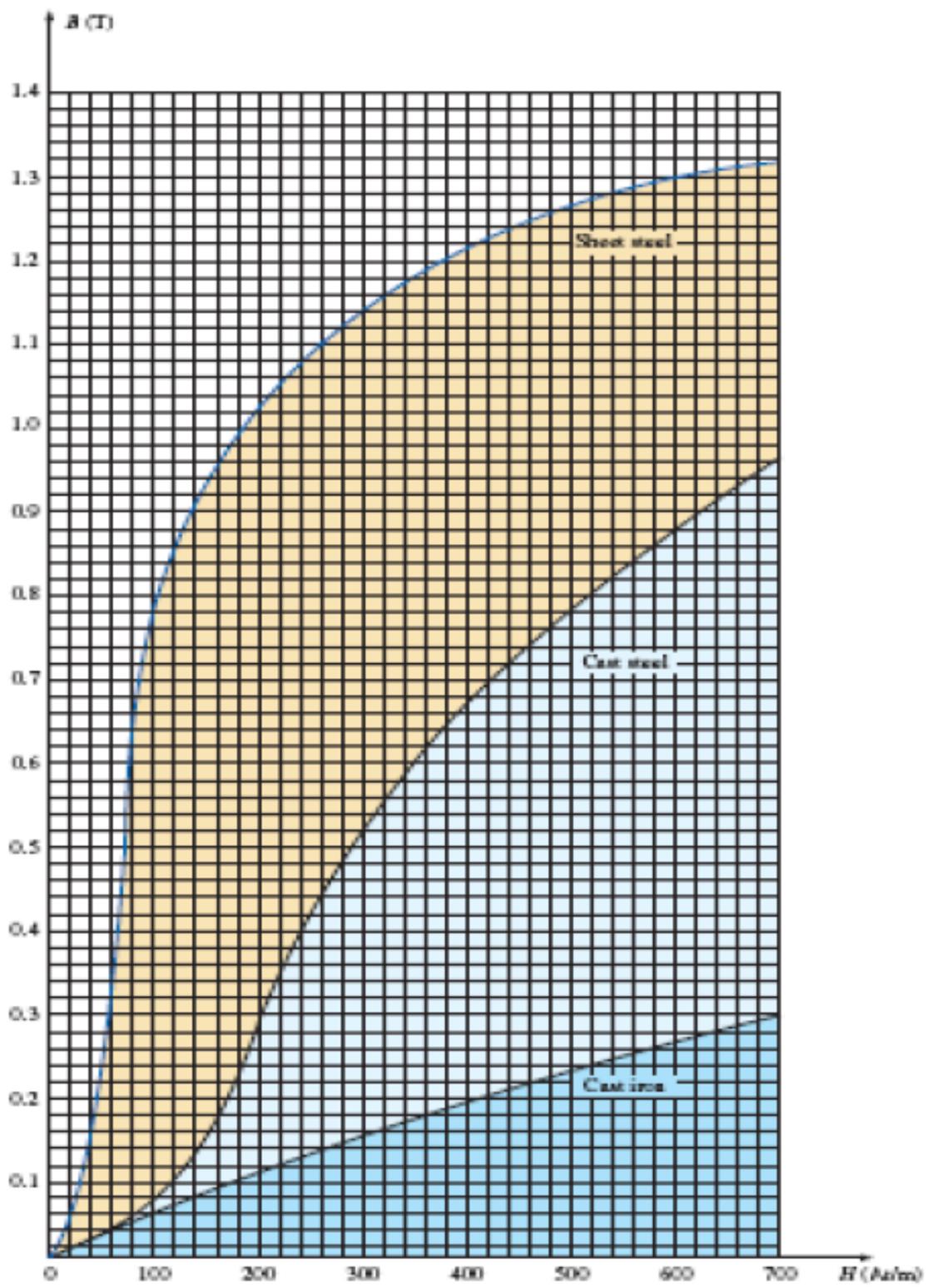


Problem # 2:

For the magnetic core shown below,



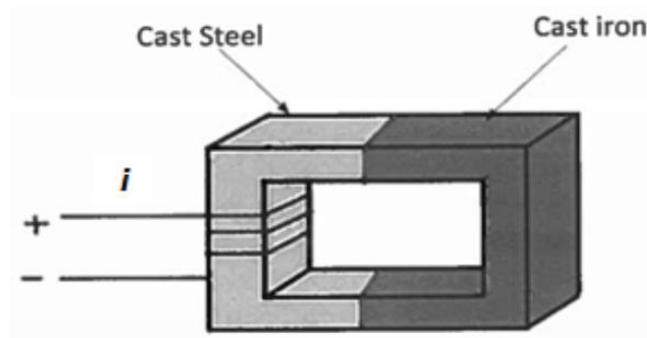
- Find the value of I required to develop a magnetic flux of 4×10^{-4} Wb.
- Determine μ and μ_r for the material under these conditions.



Problem # 3:

Consider a magnetic circuit as shown below. The core of the circuit is composed of cast steel and cast iron. Each material has a mean length of 20 cm. The cross section area of the core is 16 cm^2 . The coil has 350 turns and it carries a current of 1.2 A. The relative permeability of the cast steel is 800 and that of cast iron is 250. Determine the following:

- 1) The flux in the core
- 2) The total flux linkage
- 3) The magnetic flux density B in the core



Problem # 4:

The core loss of a magnetic core is 2000 W at 50 Hz. Keeping the flux density constant, the frequency of the supply is raised to 75 Hz resulting in core loss of 3200 W. Compute separately hysteresis and eddy current losses at both the frequencies.