The University of Sheffield
Department of Electrical and Electronic Engineering

EEE117 Homework 6

Q1. A rectangular iron core, shown in Figure 1 below, has a coil of 1000 turns wound on it. The mean length of **each** side of the core is 15cm and it has a cross-section of 3cm × 3cm. If the relative permeability of the iron is 800, calculate the coil current required to establish a flux density of 1.2T in the core. (*You can assume* $\mu_0 = 4\pi \times 10^{-7} H/m$).

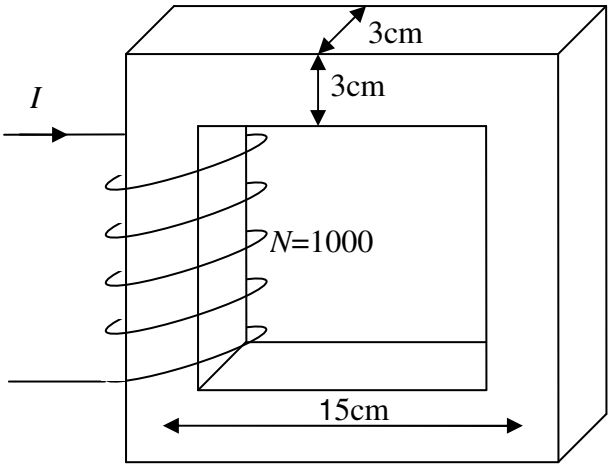

Figure 1

Q2. The iron core in the previous question now has a 2mm wide gap cut through one of the sides as shown in Figure 2 below. Calculate the new value of current required to maintain a flux density of 1.2T in the air-gap.

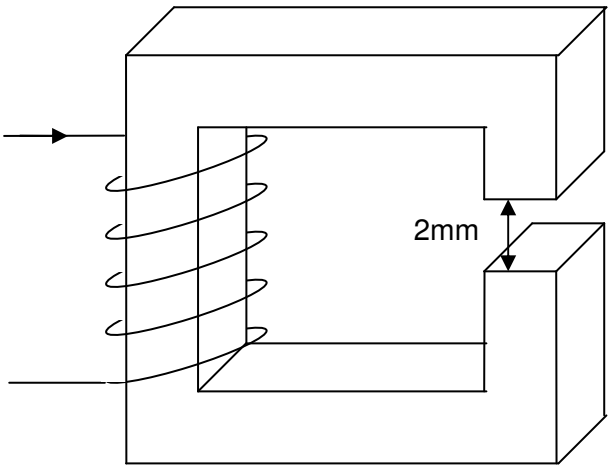

Figure 2

Answers should be handwritten. Please remember to include your name or registration number on your answer sheet.