ECE 09.303 Fall 2018
Homework 7
Chapter 7/26 - Magnetism: Force and Field

1.

A beam of electrons moving in the x-direction at 8.7 Mm/s enters a region where a uniform 180-G magnetic field points in the y-direction. The boundary of the field region is perpendicular to the beam. How far into the field region does the beam penetrate?

2.

A wire of negligible resistance is bent into a rectangle as in Fig. 26.40, and a battery and resistor are connected as shown. The right-hand side of the circuit extends into a region containing a uniform 38-mT magnetic field pointing into the page. Find the magnitude and direction of the net force on the circuit.

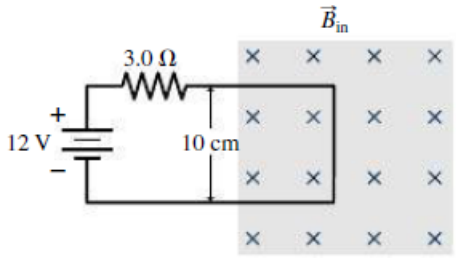

FIGURE 26.40 Problem 50

3.

A solenoid used in a plasma physics experiment is 10 cm in diameter, is 1.0 m long, and carries a 35-A current to produce a 100-mT magnetic field. (a) How many turns are in the solenoid? (b) If the solenoid resistance is 2.7 Ω, how much power does it dissipate?

4.

A disk of radius a carries uniform surface charge density σ and rotates with angular speed ω about the disk axis. Show that the magnetic field at the disk's center is $\frac{1}{2}\mu_0\sigma\omega a$.