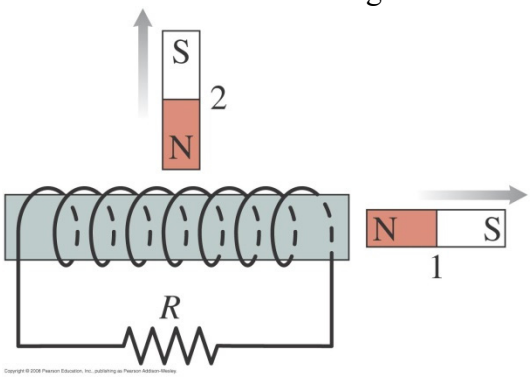
Problem 1: Ch. 29, #58

Problem 2: Ch. 29, #59

Problem 3: Ch. 29, #61

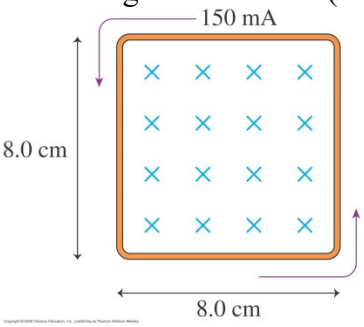
Problem 4

A solenoid is wound as shown in the figure below.
(a) Is there an induced current as magnet 1 is moved away from the solenoid? If so, what is the current direction through the resistor *R*?
(b) Is there an induced current as magnet 2 is moved away from the solenoid? If so, what is the current direction through the resistor *R*?



Problem 5

The resistance of the loop in the figure below is 0.20 Ω. The induced current in the loop is 150 mA in the counter-clock-wise direction. Is the magnetic field strength increasing or decreasing? At what rate (T/s)?



Problem 6

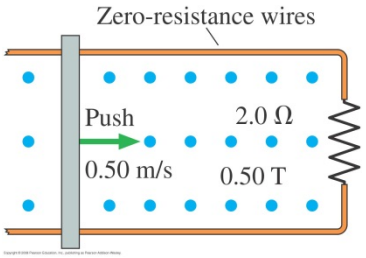
The 10-cm-wide, zero-resistance slide wire shown in the figure below is pushed toward the 2.0 Ω resistor at a steady speed of 0.50 m/s. The magnetic field strength is 0.5 T.

(a) How big is the pushing force?

(b) How much power does the pushing force supply to the wire?

(c) What are the direction and magnitude of the induced current?

(d) How much power is dissipated in the resistor?



Problem 7

You have decided to make a magnetic projectile launcher for your science project. An aluminum bar of length l slides along metal rails through a magnetic field B. The switch closes at $t = 0$ s, while the bar is at rest, and a battery of emf $\mathcal{E}_{bat}$ starts a current flowing around the loop. The battery has internal resistance r. The resistance of the rails and the bar are effectively zero.

(a) show that the bar reaches a terminal speed v_{term}, and find an expression for v_{term}.

(b) Evaluate v_{term} for $\mathcal{E}_{bat}$ =1.0 V, $r = 0.10$ Ω, $l = 6.0$ cm, and $B = 0.50$ T.