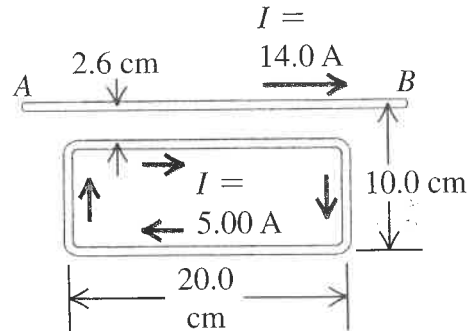


28.64 • The long, straight wire AB shown in **Fig. P28.64** carries a current of 14.0 A. The rectangular loop whose long edges are parallel to the wire carries a current of 5.00 A. Find the magnitude and direction of the net force exerted on the loop by the magnetic field of the wire.

Figure P28.64



28.53 • A long solenoid with 60 turns of wire per centimeter carries a current of 0.15 A. The wire that makes up the solenoid is wrapped around a solid core of silicon steel ($K_m = 5200$). (The wire of the solenoid is jacketed with an insulator so that none of the current flows into the core.) (a) For a point inside the core, find the magnitudes of (i) the magnetic field \vec{B}_0 due to the solenoid current; (ii) the magnetization \vec{M} ; (iii) the total magnetic field \vec{B} . (b) In a sketch of the solenoid and core, show the directions of the vectors \vec{B} , \vec{B}_0 , and \vec{M} inside the core.

28.69 • **CALC** A long, straight wire with a circular cross section of radius R carries a current I . Assume that the current density is not constant across the cross section of the wire, but rather varies as $J = \alpha r$, where α is a constant. (a) By the requirement that J integrated over the cross section of the wire gives the total current I , calculate the constant α in terms of I and R . (b) Use Ampere's law to calculate the magnetic field $B(r)$ for (i) $r \leq R$ and (ii) $r \geq R$. Express your answers in terms of I .