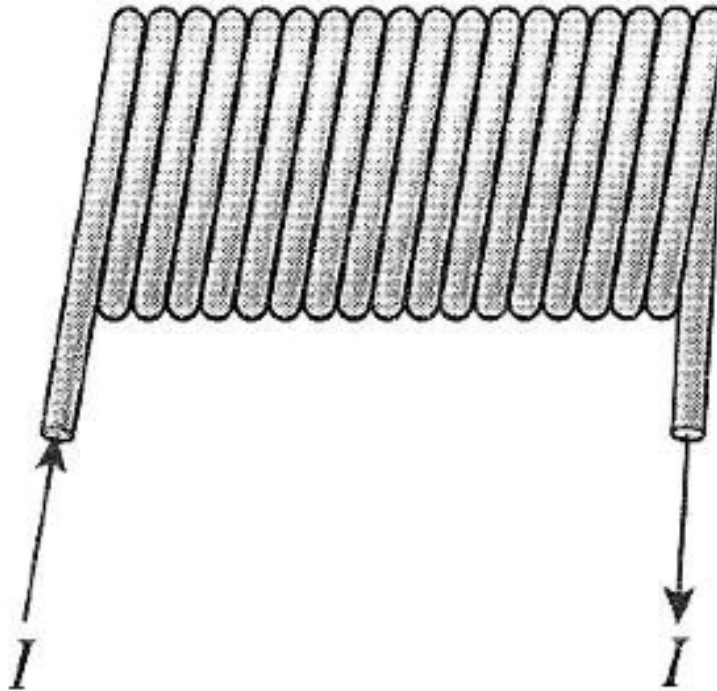


FIGURE 32.29 A solenoid.

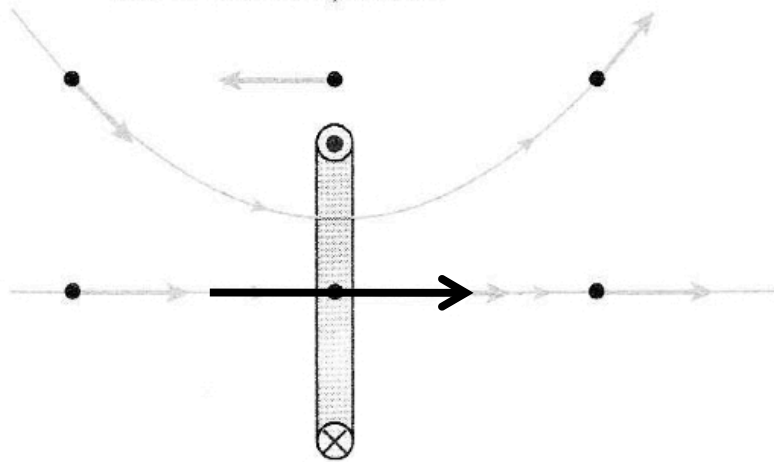


figs. from Knight

FIGURE 32.30 Using superposition to find the magnetic field of a stack of current loops.

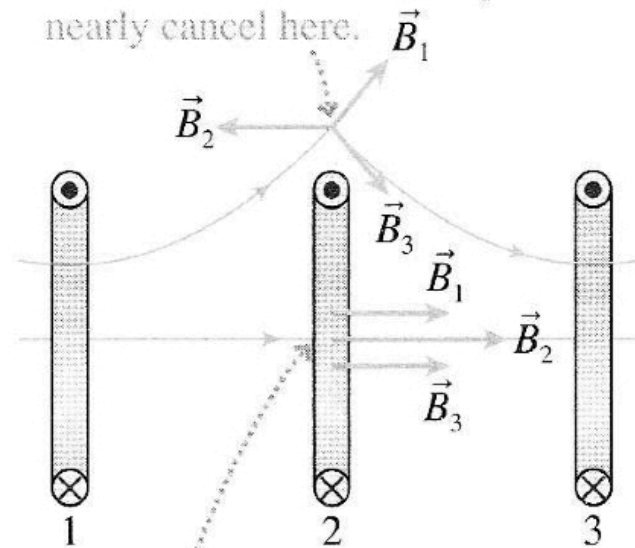
(a) A single loop

The magnetic field vector is shown at six points.



(b) A stack of three loops

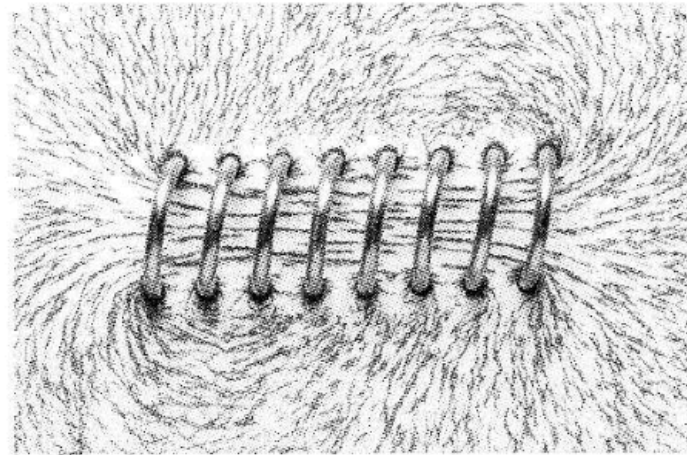
The fields of the three loops nearly cancel here.



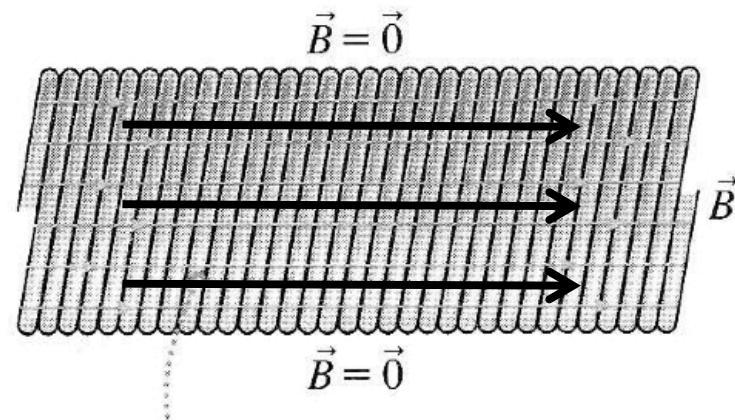
The fields reinforce each other here.

FIGURE 32.31 The magnetic field of a solenoid.

(a) A short solenoid



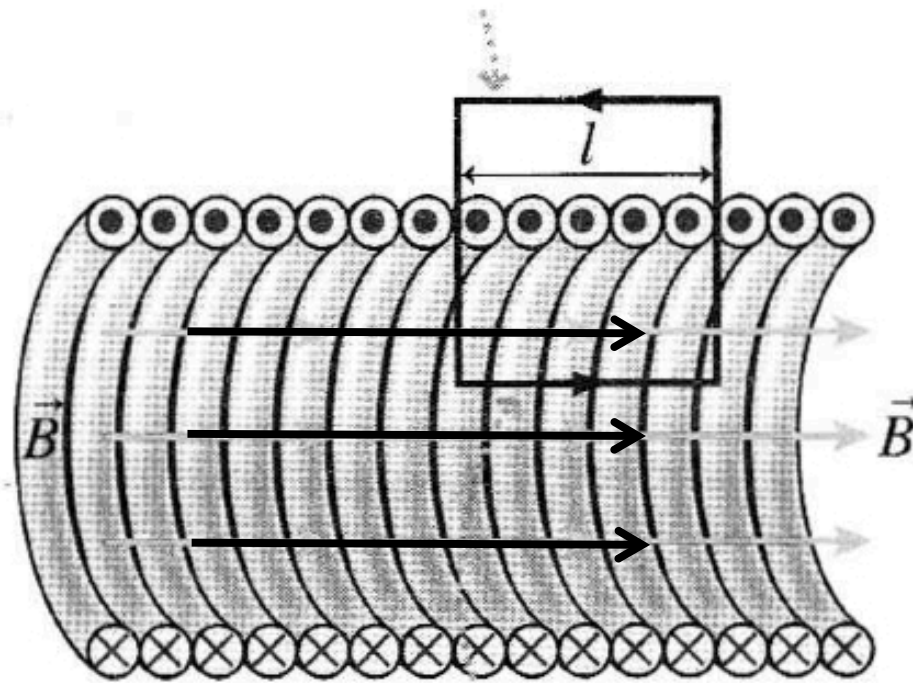
(b)



The magnetic field is uniform inside this section of an ideal, infinitely long solenoid. The magnetic field outside the solenoid is zero.

FIGURE 32.32 A closed path inside and outside an ideal solenoid.

This is the integration path for Ampère's law. There are N turns inside.



\vec{B} is tangent to the integration path along the bottom edge.

Solenoid acts like a bar (electro-)magnet

FIGURE 32.33 The magnetic fields of a finite-length solenoid and of a bar magnet.

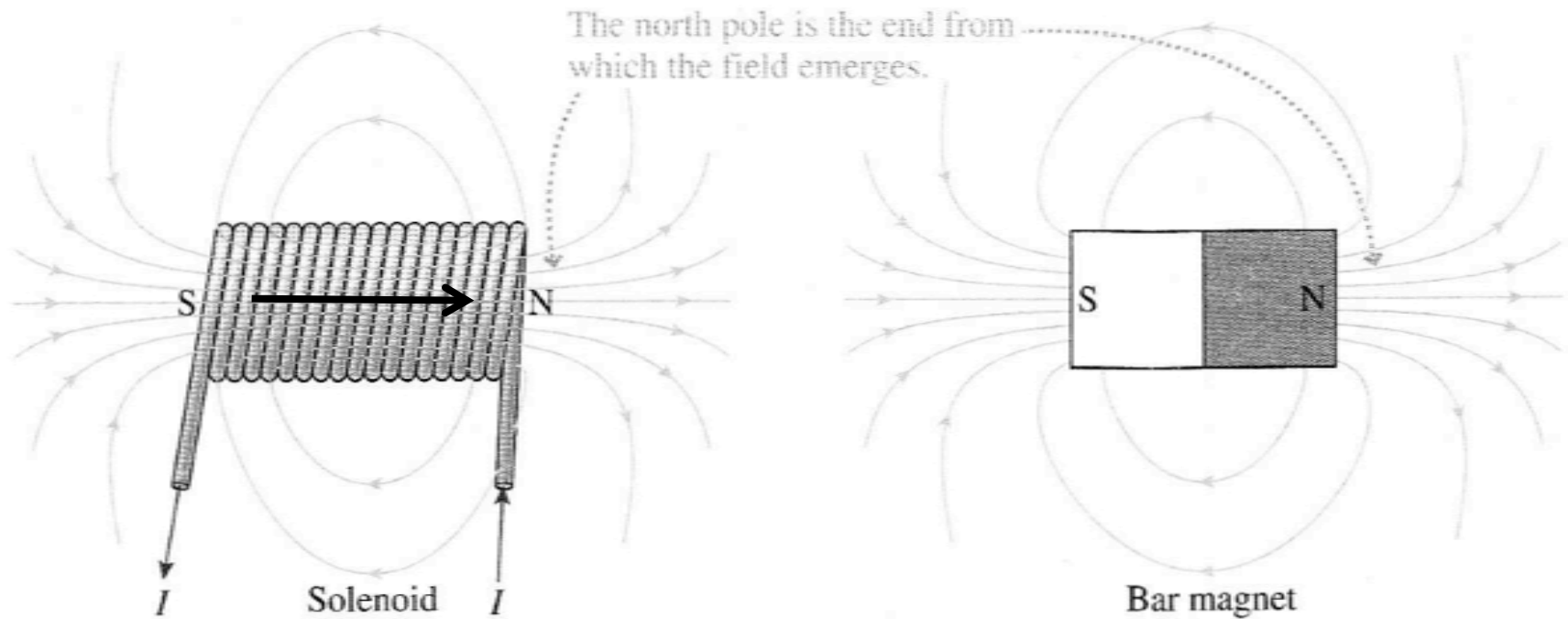


FIGURE 32.34 Ampère's experiment to observe the forces between parallel current-carrying wires.

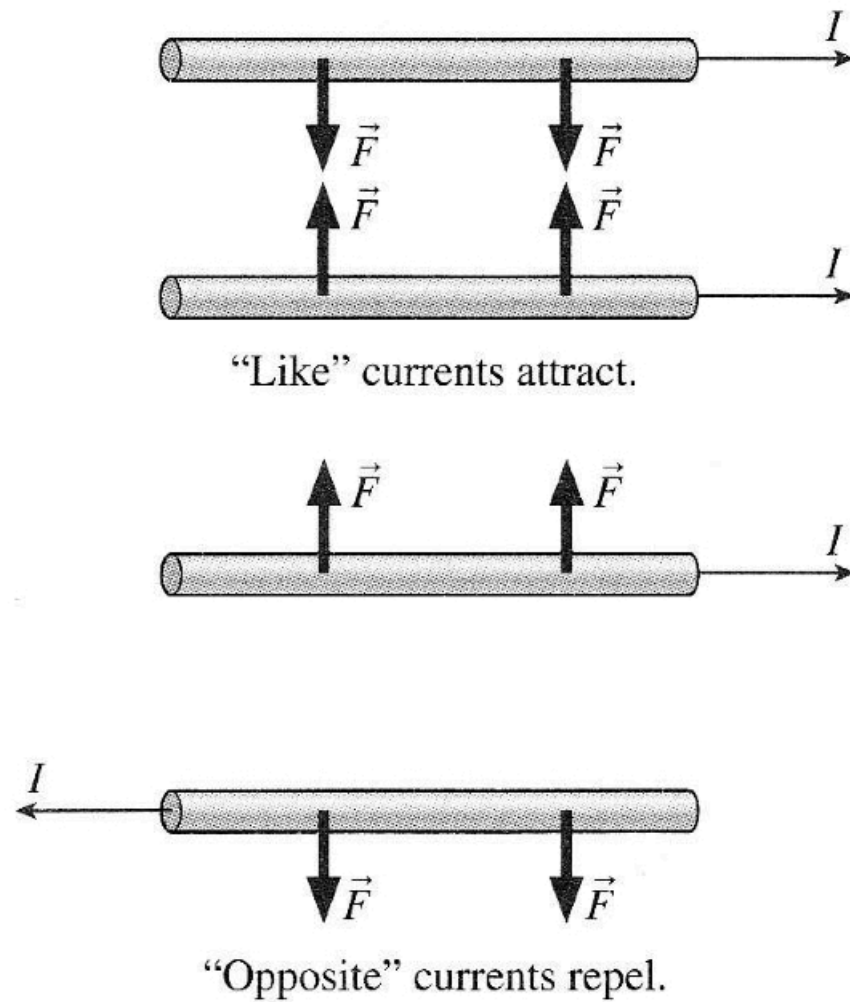


FIGURE 32.35 The relationship among \vec{v} , \vec{B} , and \vec{F} .

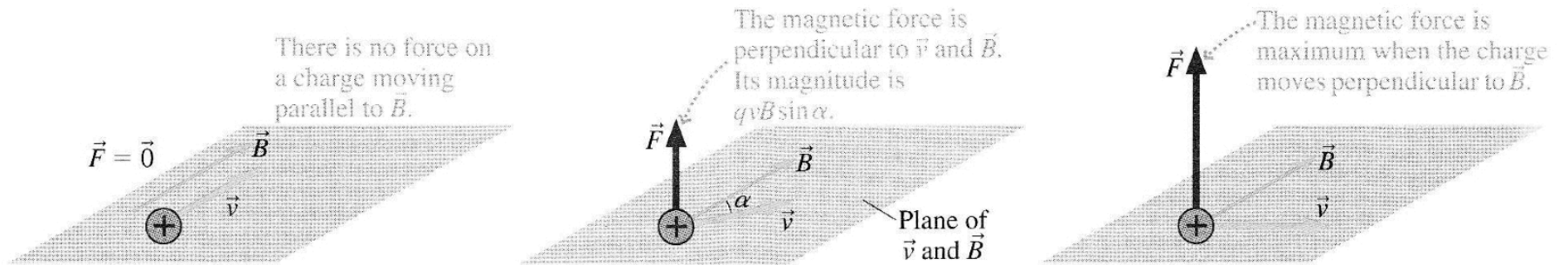


FIGURE 32.36 The right-hand rule for magnetic forces.

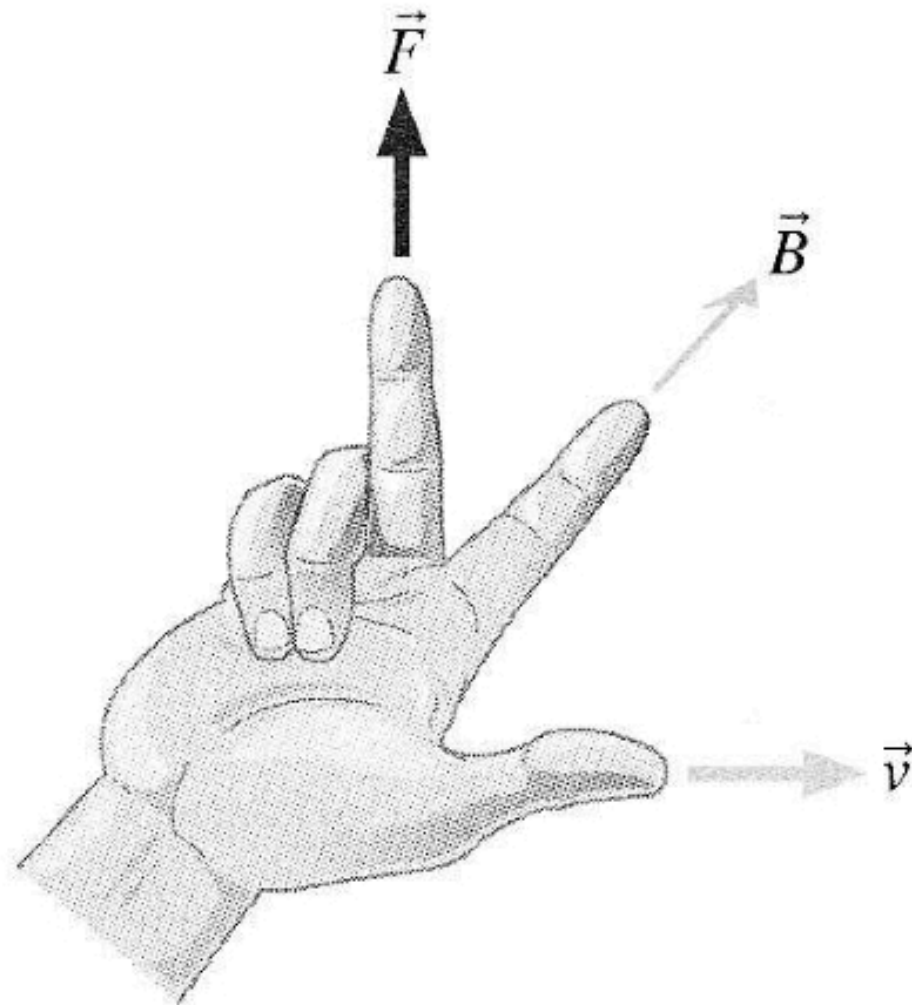


FIGURE 32.36 The right-hand rule for magnetic forces.

alternate version

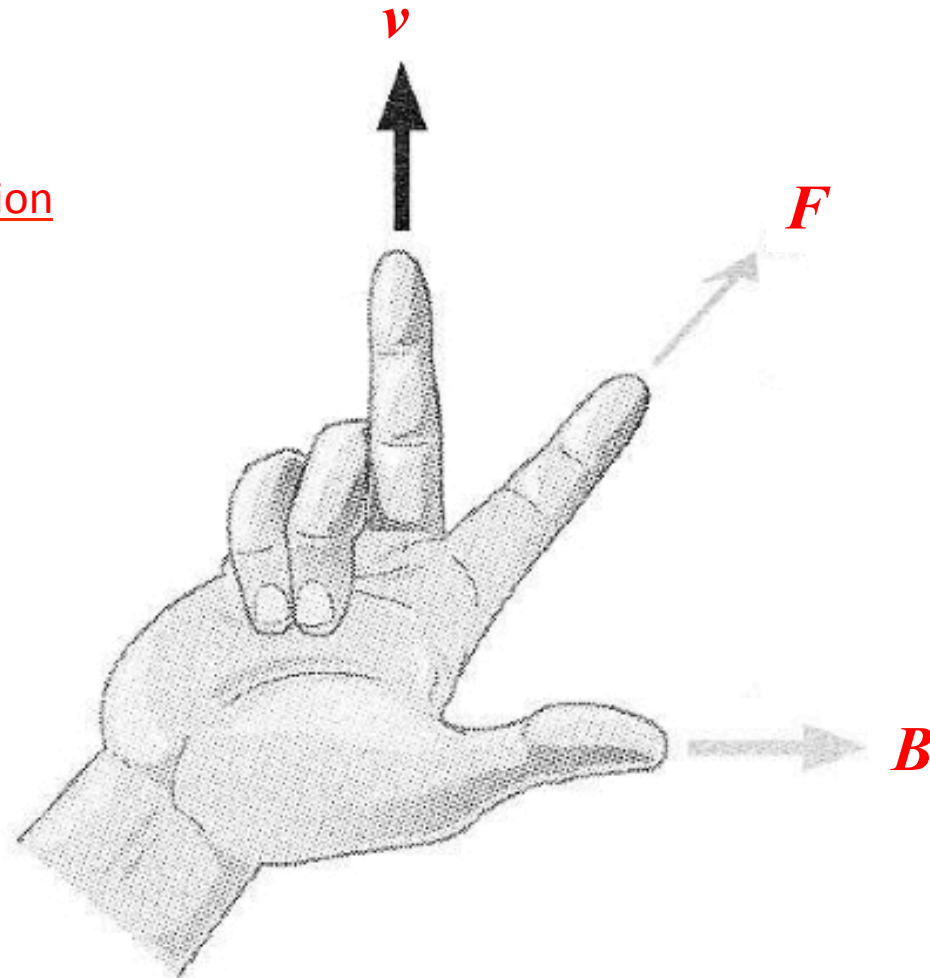


FIGURE 32.37 Magnetic forces on moving charges.

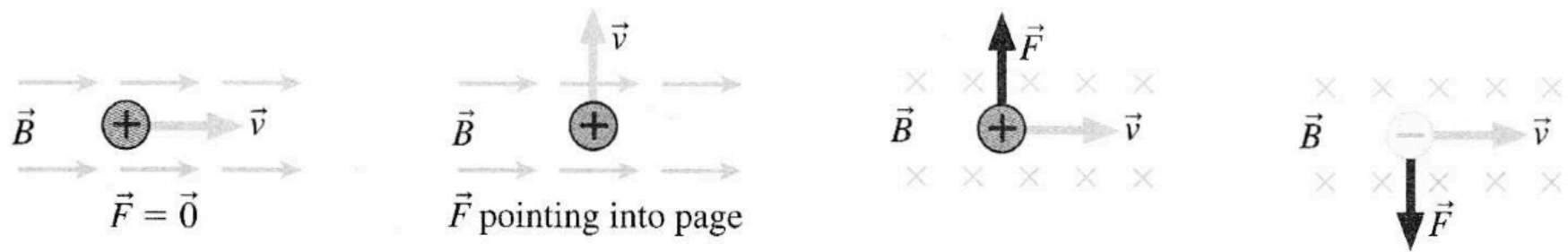


FIGURE 32.39 Cyclotron motion of a charged particle moving in a uniform magnetic field.

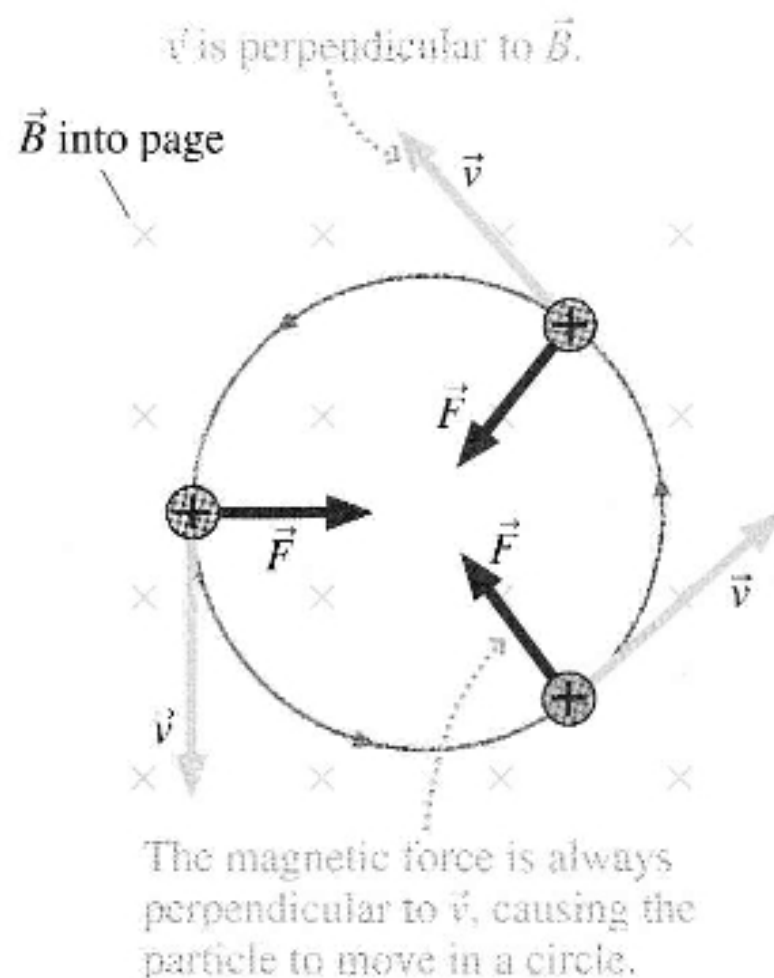
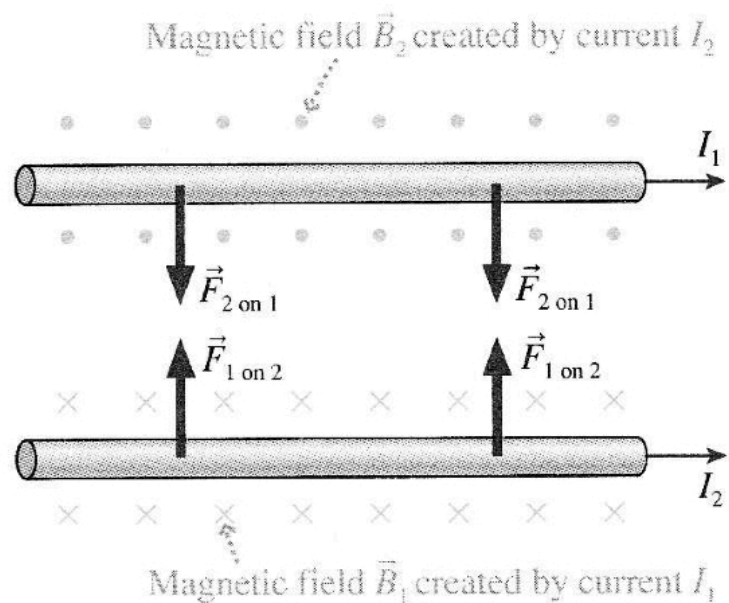
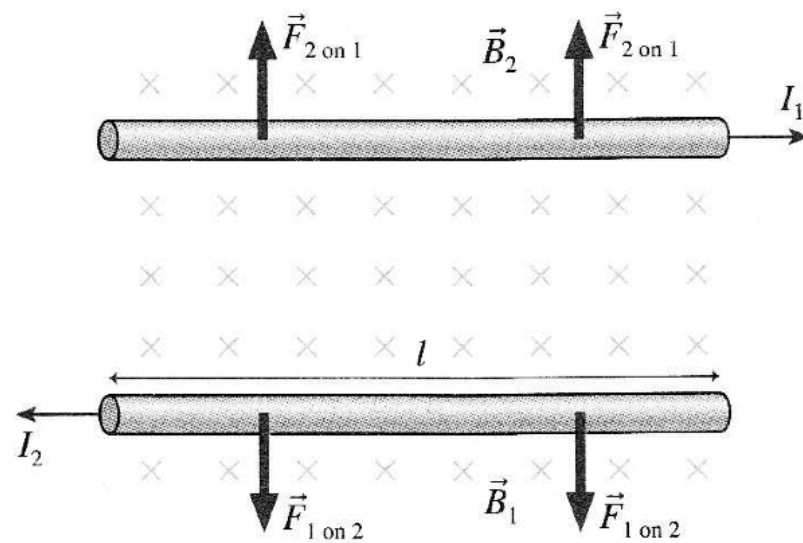


FIGURE 32.47 Magnetic forces between parallel current-carrying wires.

(a) Currents in same direction



(b) Currents in opposite directions



Hall Effect

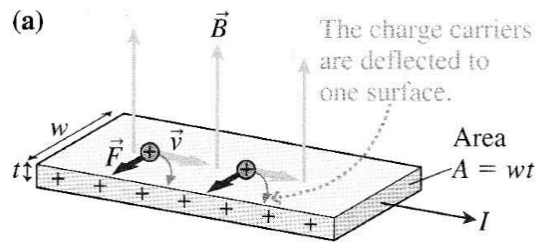


FIGURE 32.43 The charge carriers in a current are deflected to one surface of a conductor, creating the Hall voltage ΔV_H .

