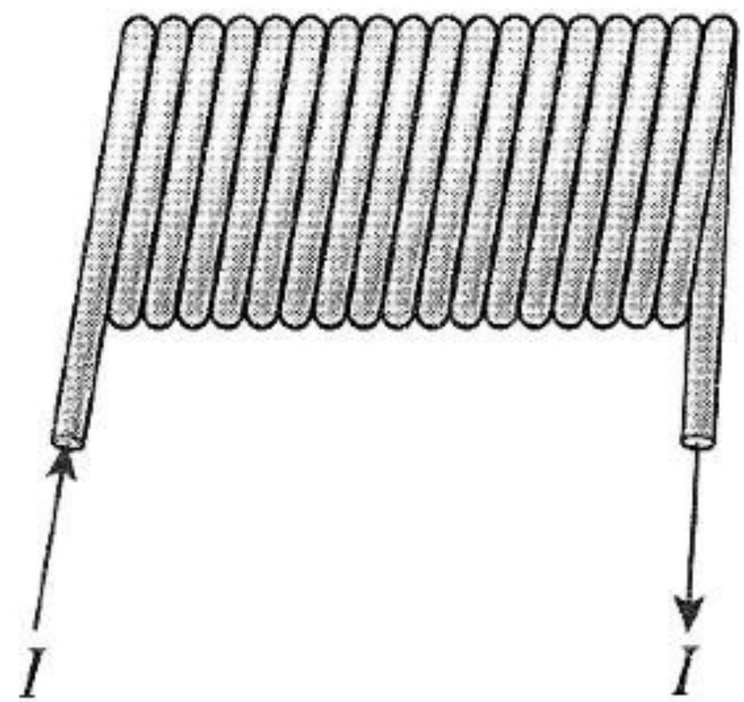
FIGURE 32.29 A solenoid.



figs. from Knight

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

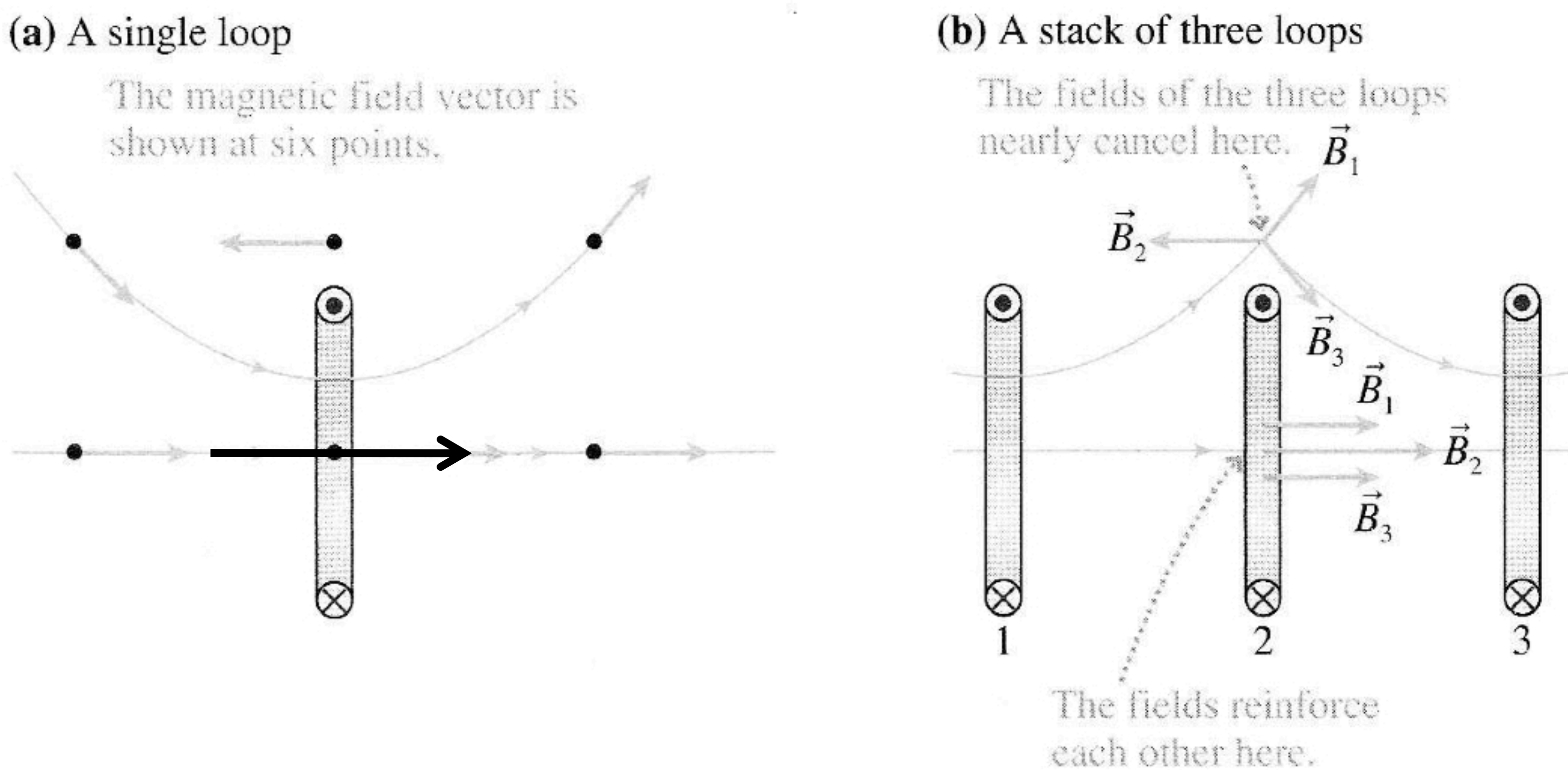
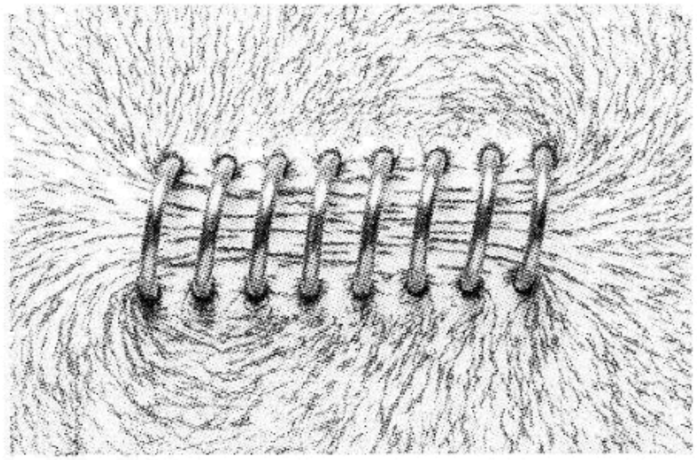
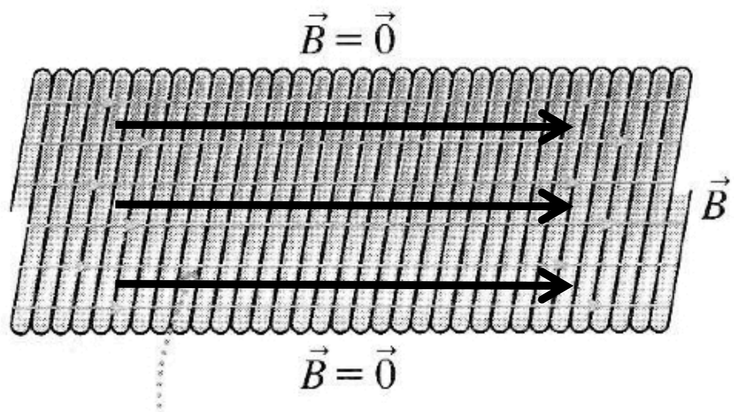


FIGURE 32.31 The magnetic field of a solenoid.

(a) A short solenoid

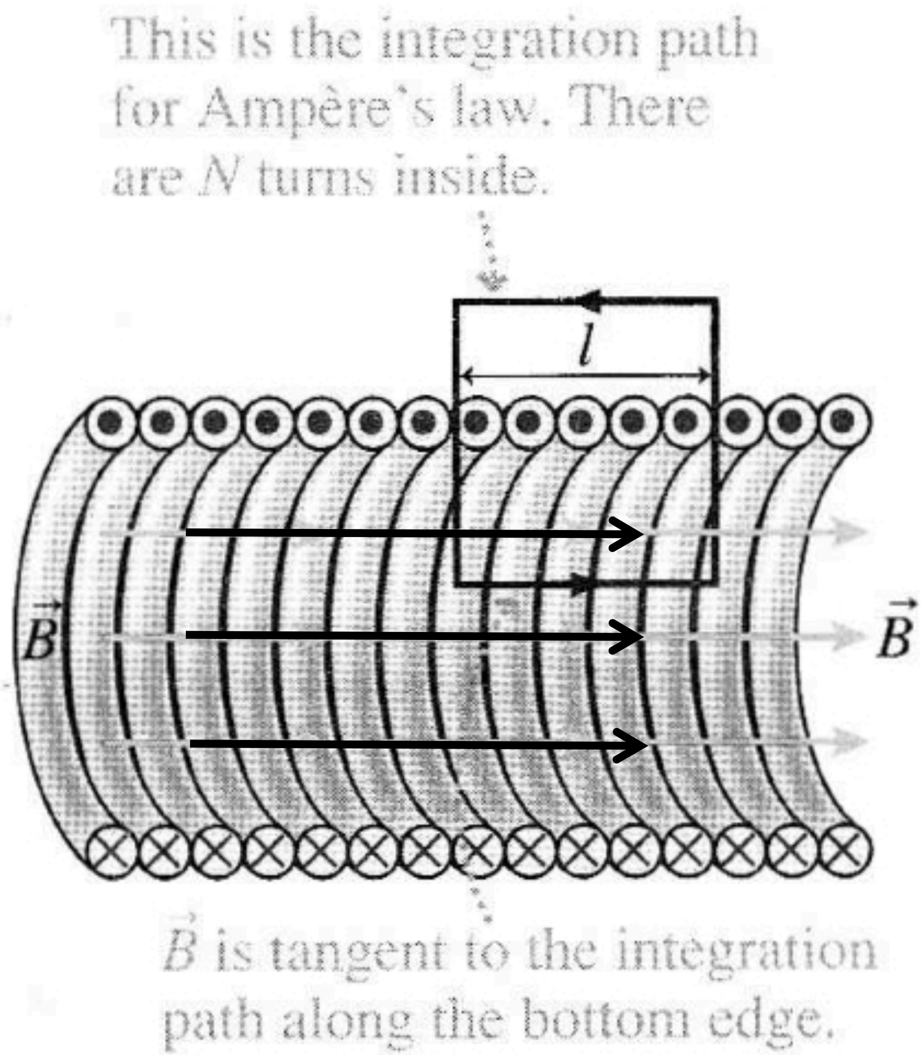


(b)



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.



Solenoid acts like a bar (electro-)magnet

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

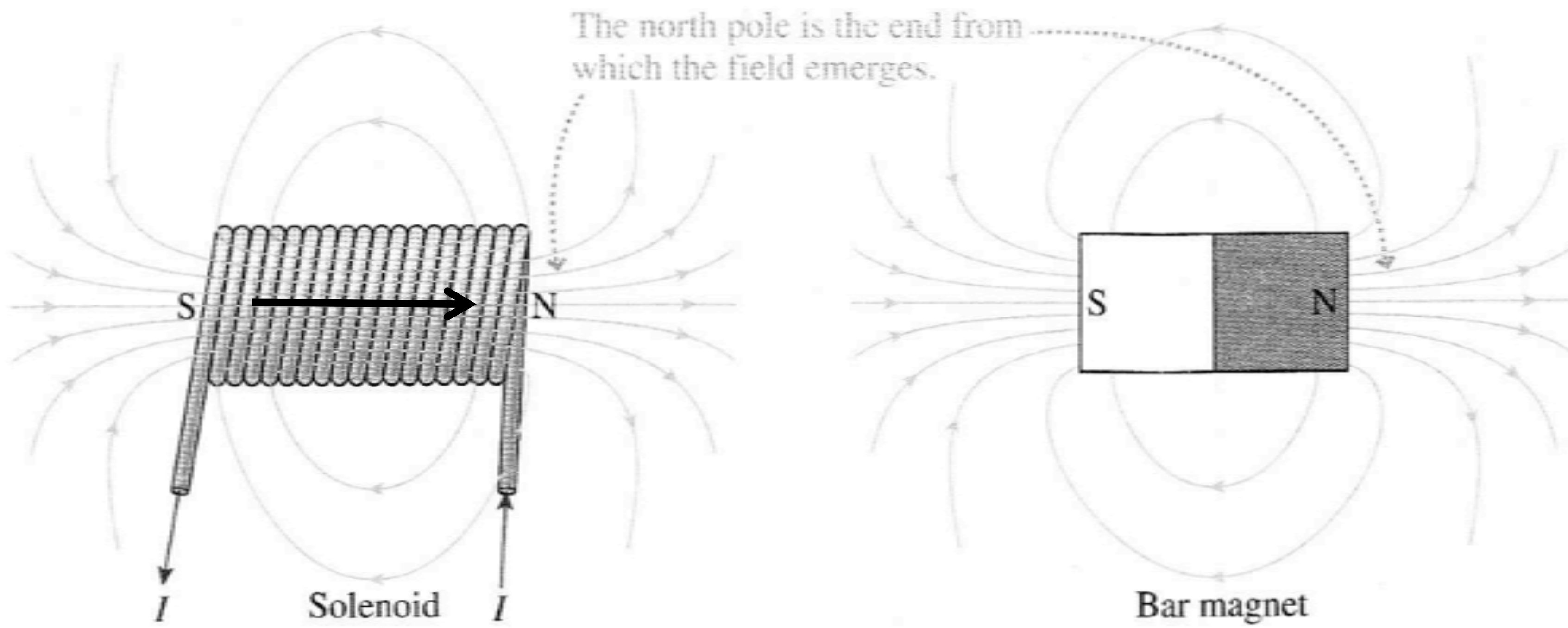
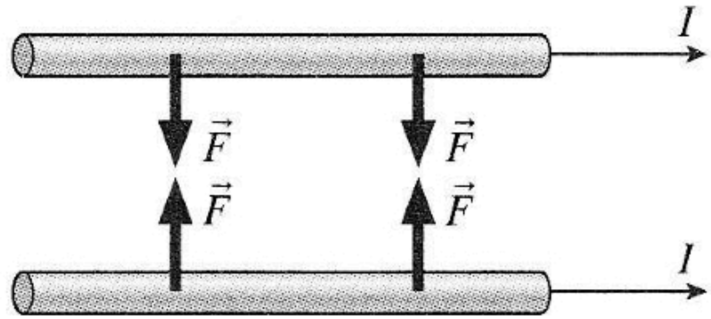
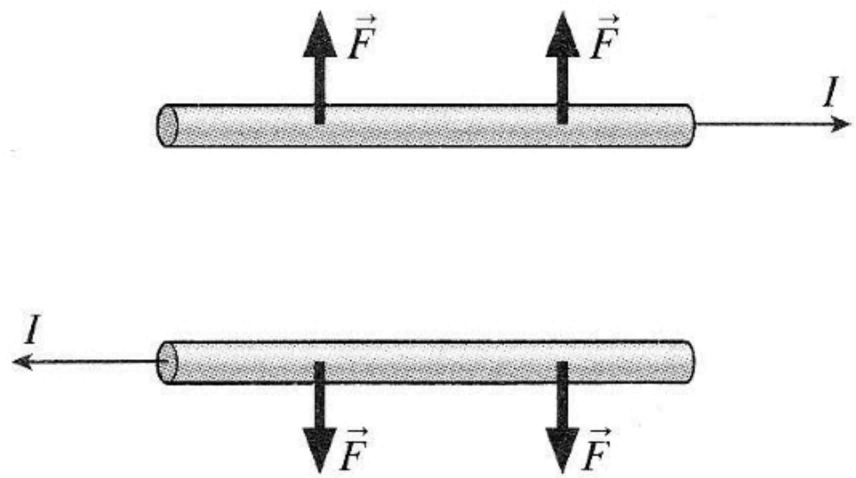


FIGURE 32.34 Ampère's experiment to observe the forces between parallel current-carrying wires.



"Like" currents attract.



"Opposite" currents repel.

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

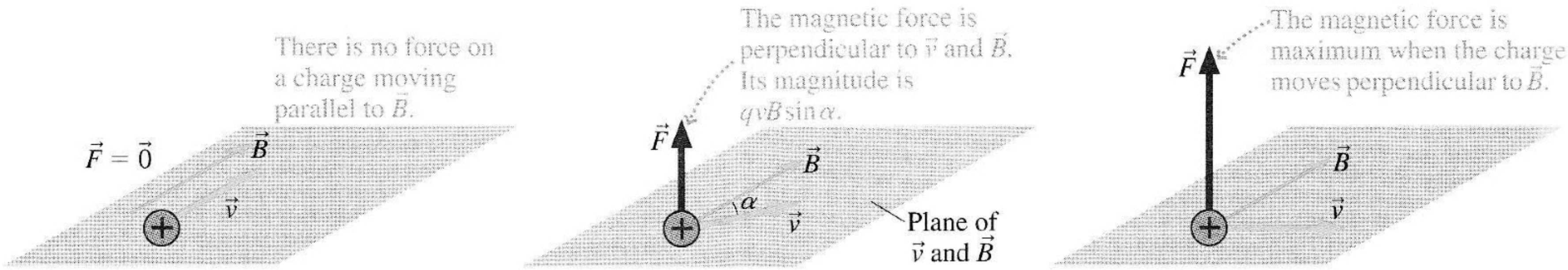


FIGURE 32.36 The right-hand rule for magnetic forces.

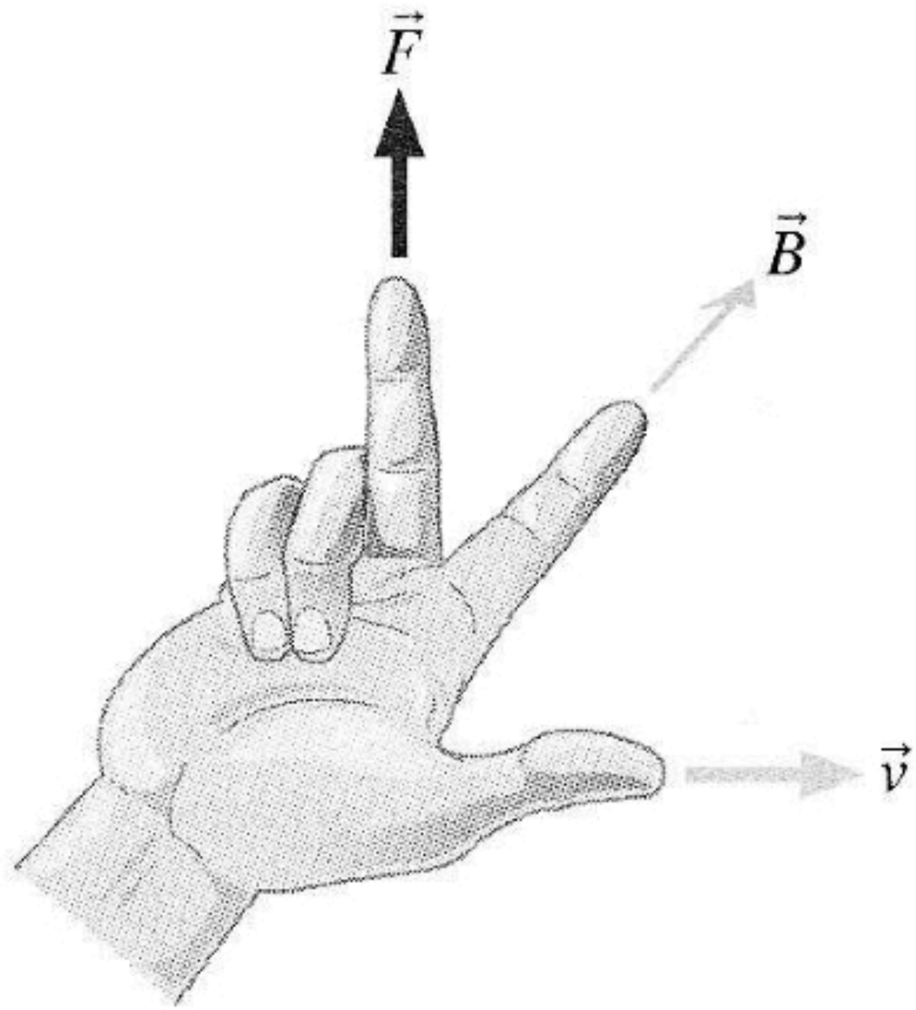


FIGURE 32.36 The right-hand rule for magnetic forces.

alternate version

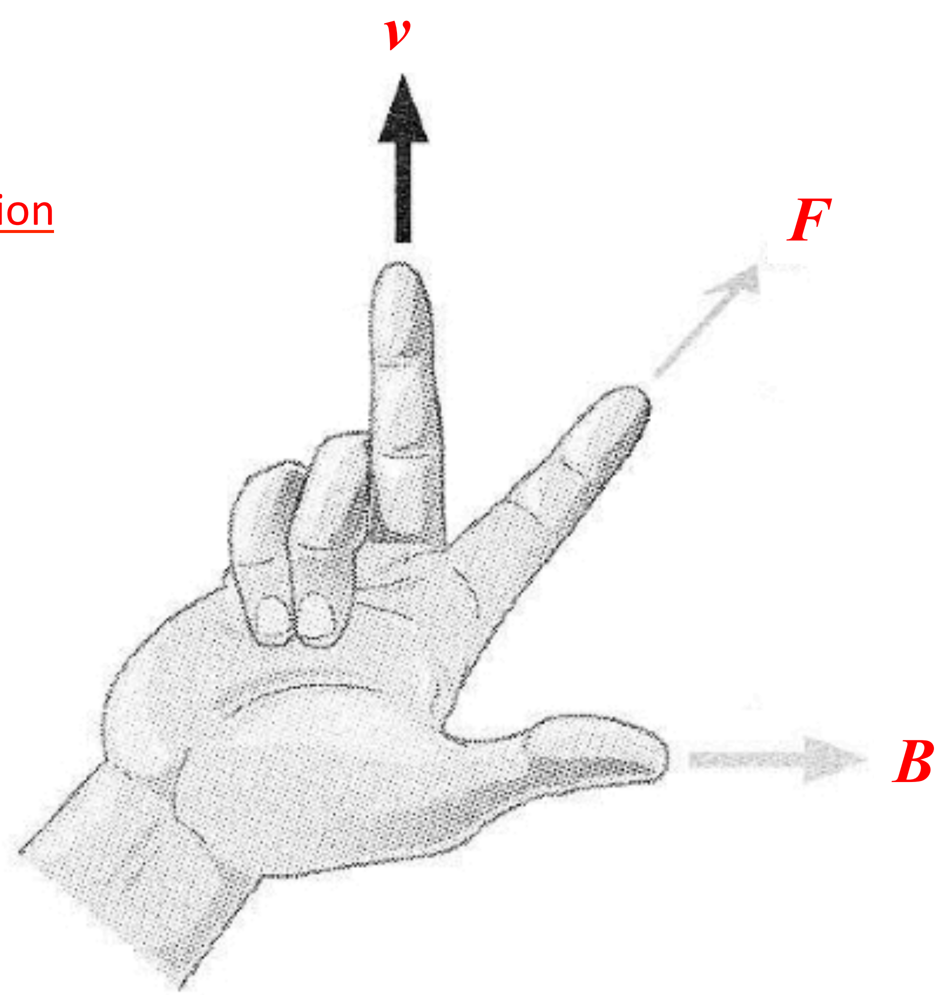


FIGURE 32.37 Magnetic forces on moving charges.

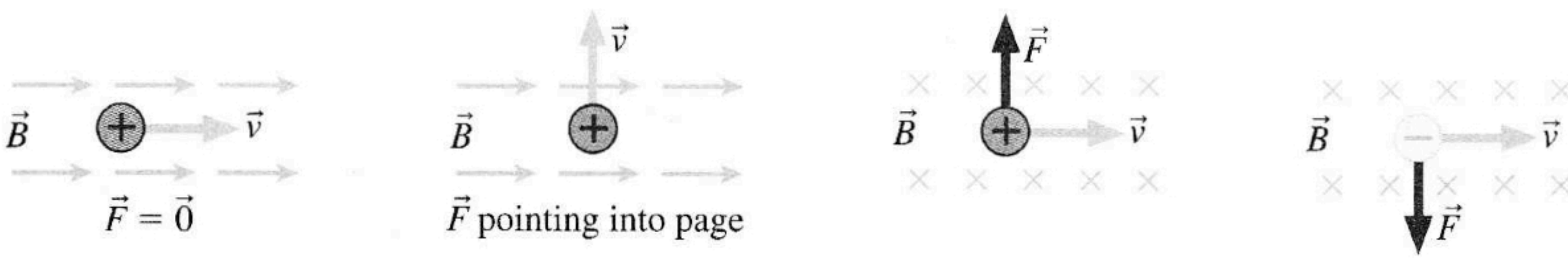


FIGURE 32.39 Cyclotron motion of a charged particle moving in a uniform magnetic field.

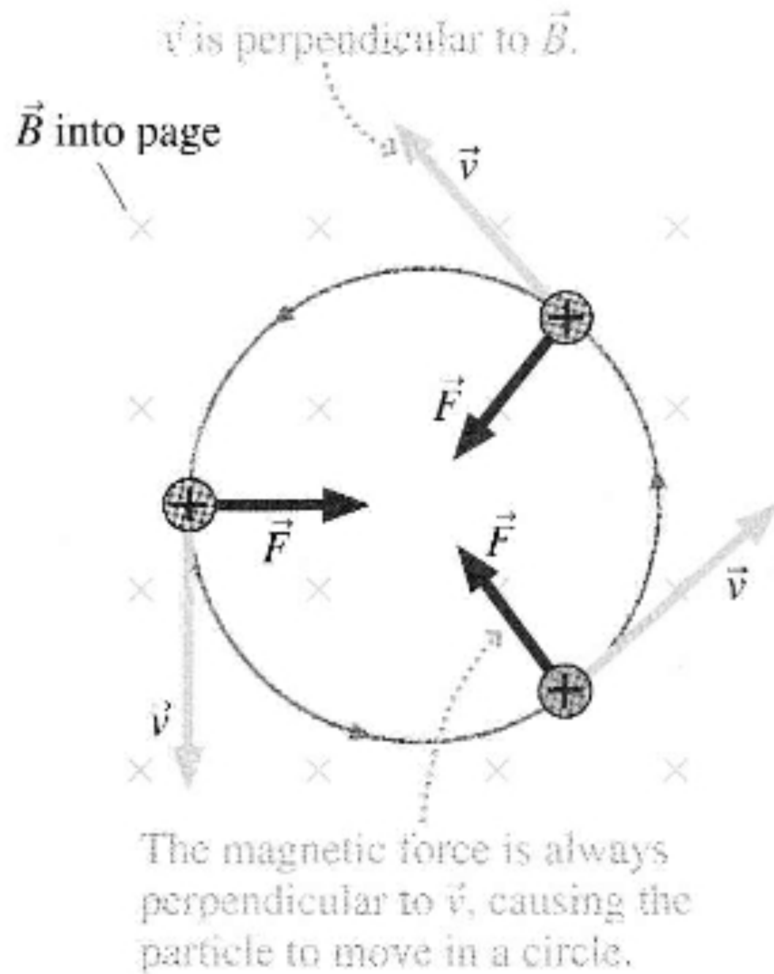
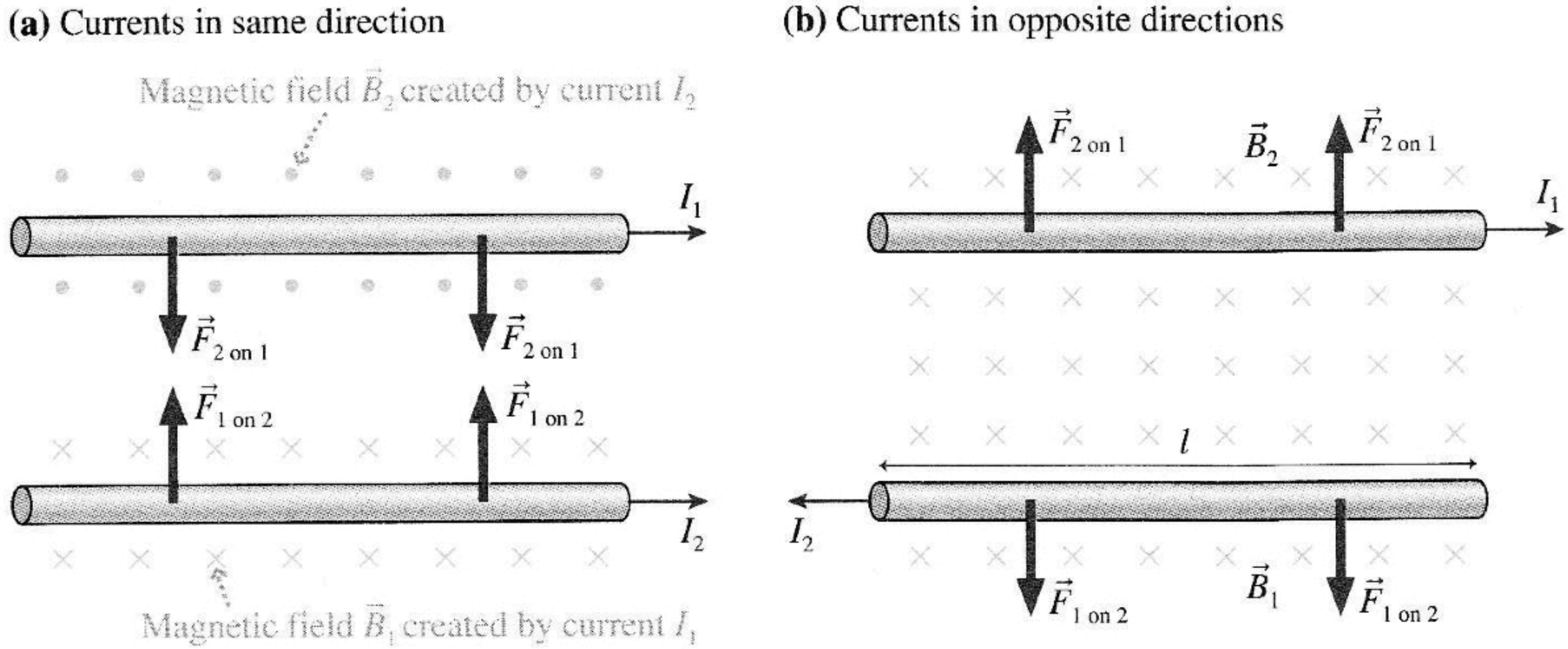


FIGURE 32.47 Magnetic forces between parallel current-carrying wires.



Hall Effect

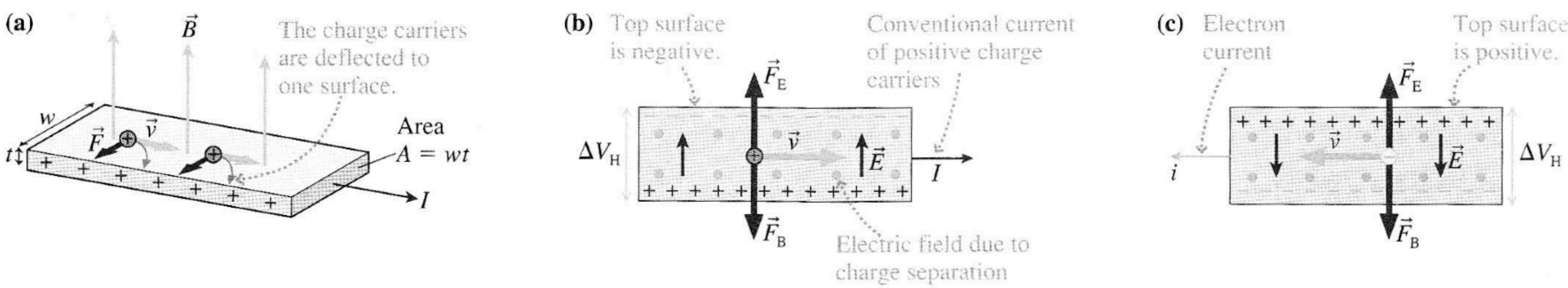


FIGURE 32.43 The charge carriers in a current are deflected to one surface of a conductor, creating the Hall voltage ΔV_H.