HOMEWORK for THURSDAY JULY 7, 2005

1. Determine the magnitude and direction of the magnetic force on the following charges in a magnetic field of 0.20 T directed east:

(a) A charge $q = +4.0\ \mu$C moving north at 35 m/s.

(b) An electron moving vertically upward at 6000 m/s.

2. Determine the magnitude and direction of magnetic force on a straight wire of length 0.75 m carrying a current of 3.0 A vertically downward in a magnetic field of 0.50 T directed south.

3. The magnetic field at the point A, 10 cm from a current-carrying wire, is 4×10^{-4} T and directed upward (out of the plane of the paper).

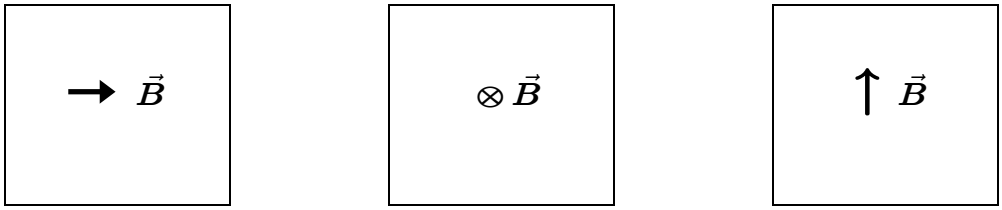
· A

· B

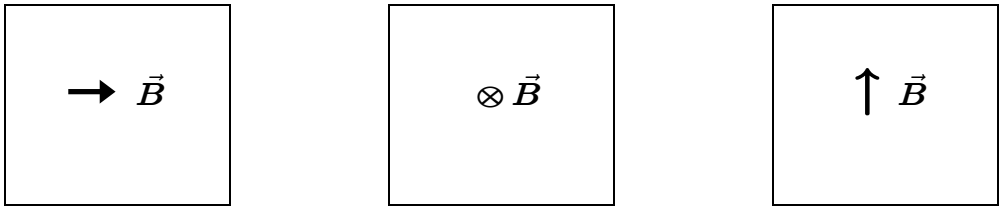
(a) In which direction is the current flowing? Mark it on the diagram.

(b) What is the magnitude and direction of the magnetic field at point B, 20 cm from the wire?

4. In the following situations, the direction of a uniform magnetic field is shown. Determine and mark (with the usual symbols: 0, $\leftarrow$ $\rightarrow$ $\uparrow$ $\downarrow$ $\otimes$ $\odot$) the direction of the force on each side of the current loop placed in that field.
(a) Assume clockwise currents flow in these circuits:



(b) Assume counterclockwise currents flow in these circuits:



5. An electron located in a uniform magnetic field is moving counterclockwise in a circle of radius $R = 10$ μm with speed $v = 3.0 \times 10^5$ m/s. Determine the magnitude and direction of the magnetic field that produces this motion.