

**Work each of the following problems. SHOW ALL WORK.**

1. Using the right-hand rule, in which direction will the magnetic force act on a positively charged particle that is moving to the left and experiencing a magnetic field straight ahead?

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2. Using the right-hand rule, in which direction will the magnetic force act on a negatively charged particle that is moving to the left and experiencing a magnetic field straight down?

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3. Two charged particles with opposite signs but the same magnitude of charge enter a magnetic field that is perpendicular to their direction of motion. How will the motion of the two particles differ when they enter the magnetic field?

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4. An electron that is moving to the right experiences a magnetic field of 2.5 T directed upward. If the force on the electron is  $2.4 \times 10^{-12}$  N, what is the speed of the electron?

5. A proton that is moving north at  $7.5 \times 10^7$  m/s encounters a uniform magnetic field of 4.5 T directed east. What are the magnitude and direction of the force acting on the proton?

