

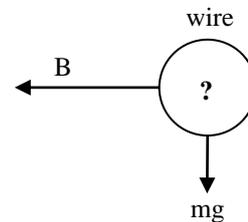
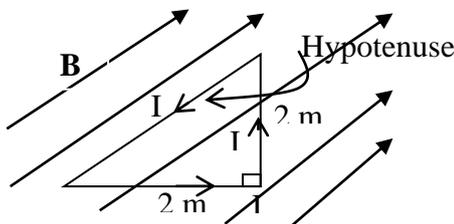
Chapter 28 (Magnetic Fields)

1- A proton that has velocity $\mathbf{v} = (3.0 \times 10^6 \mathbf{i} - 2.0 \times 10^6 \mathbf{j})$ m/s moves in a magnetic field $\mathbf{B} = (0.50 \mathbf{i})$ T. Find the force on the proton. (A: 1.6×10^{-13} k N)

2- An electric field of 1.5×10^3 V/m and a magnetic field of 0.50 T act on a moving electron to produce no net force. Calculate the minimum speed of the moving electron. (A: 3.0×10^3 m/s)

3- What uniform magnetic field, applied perpendicular to a beam of electrons moving at 1.4×10^6 m/s is required to make the electrons travel in a circular orbit of radius 0.40 m? (A: 2.0×10^{-5} T)

4- In the figure, a loop of wire carrying a current, I , of 3.0 A is in the shape of a right triangle with two equal sides, each 2.0 m long. A 2.0 T uniform magnetic field is in the plane of the triangle and is parallel to the hypotenuse. The resultant torque on the loop is: (A: 12 N m)



5- A straight horizontal length of copper wire is located in a place where the magnetic field of the earth $\mathbf{B} = 0.5 \times 10^{-4}$ T (see the figure). What minimum current in the wire is needed to balance the gravitational force on the wire? [The linear density of the wire is 60.0 gram/m]. (A: 1.2×10^4 A into the page)

6- At one instant an electron is moving with a velocity: $\mathbf{v} = (5 \times 10^5 \mathbf{i} + 3 \times 10^5 \mathbf{j})$ m/s in a magnetic field of $\mathbf{B} = (0.8 \mathbf{i})$ T. At that instant the magnetic force on the electron is: (A: 3.8×10^{-14} k N)

7- An electron that has velocity $\mathbf{v} = 3.2 \times 10^7 \mathbf{i}$ m/s traveling parallel to a uniform magnetic field of strength 2.60×10^{-3} Tesla. The force on the electron is: (A: zero)

8- An electron moving at right angle to a uniform magnetic field completes a circular orbit in 10^{-8} s. What is the magnitude of the magnetic field. (A: 3.6×10^{-3} T)

9- At a point in a uniform magnetic field the acceleration of an electron is 5.0×10^{14} m/s² and its speed is 7.0×10^6 m/s. If the magnitude of the magnetic field is 1.0 mT, what is the angle between the electron's velocity and the magnetic field? (A: 24 degrees)

10- A proton moves with constant velocity, $\mathbf{v} = (8.0 \times 10^5 \text{ m/s}) \mathbf{i}$, through crossed electric and magnetic fields. If the magnetic field is $\mathbf{B} = (2.5 \text{ mT}) \mathbf{j}$, what is the electric field? (A: -2.0 kV/m \mathbf{k})