Chapter 29

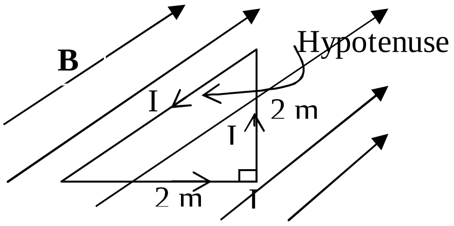
1- A proton that has velocity v = (3.0*10**6 **i** - 2.0*10**6 **j**) m/s moves in a magnetic field B = (0.50 **i**) T. Find the force on the proton. [1.6*10**(-13) k N]

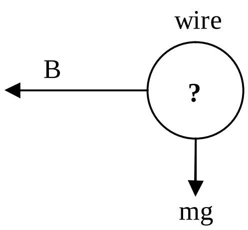
2- An electric field of 1.5*10**3 V/m and a magnetic field of 0.50 T act on a moving electron to produce no net force. Calculate the minimum speed of the moving electron.[3.0*10**3 m/s]

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 ? [2.0*10**(-5) T]

4- The magnitude of the magnetic field at 88.0 cm from the axis of an infinitely long wire is 7.30*10**(-6) T. What is the current in the wire? [32.1 A]

5- 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:12 N*m.





6- A straight horizontal length of copper wire is located in a place where the magnetic field of the earth B = 0.5*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] [1.2*10**4 A into the page]

7- At one instant an electron is moving with a velocity: v = (5*10**5 **i** + 3*10**5 **j**) m/s in a magnetic field of B = (0.8 **i**) T. At that instant the magnetic force on the electron is: [3.8*10**(-14) k N]

8- An electron that has velocity v = 3.2*10**7 **i** m/s traveling parallel to a uniform magnetic field of strength 2.60*10**(-3) Tesla. The force on the electron is: [zero]

9- 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. [3.6*10**(-3) T]

10- At a point in a uniform magnetic field the acceleration of an electron is 5.0*10**14 m/s**2 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? [24 degrees]

11- A proton moves with constant velocity, v = (8.0*10**5 m/s) **i**, through crossed electric and magnetic fields. If the magnetic field is B = (2.5 mT) **j**, what is the electric field? [(-2.0 kV/m) k]