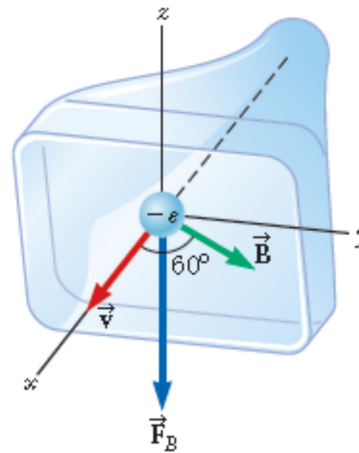


An Electron Moving in a Magnetic Field

Friday, 29 January, 2021 21:25

An electron in an old-style television picture tube moves toward the front of the tube with a speed of $8.0 \times 10^6 \text{ m/s}$ along the x axis. Surrounding the neck of the tube are coils of wire that create a magnetic field of magnitude 0.025 T , directed at an angle of 60° to the x axis and lying in the xy plane. Calculate the magnetic force on the electron.



A Proton Moving Perpendicular to a Uniform Magnetic Field

Thursday, 4 February, 2021 15:55

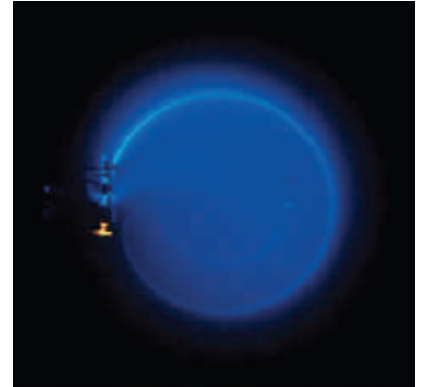
A proton is moving in a circular orbit of radius 14 cm in a uniform 0.35 T magnetic field perpendicular to the velocity of the proton. Find the speed of the proton.

Bending an Electron Beam

Thursday, 4 February, 2021 15:57

In an experiment designed to measure the magnitude of a uniform magnetic field, electrons are accelerated from rest through a potential difference of 350 V and then enter a uniform magnetic field that is perpendicular to the velocity vector of the electrons. The electrons travel along a curved path because of the magnetic force exerted on them, and the radius of the path is measured to be 7.5 cm .

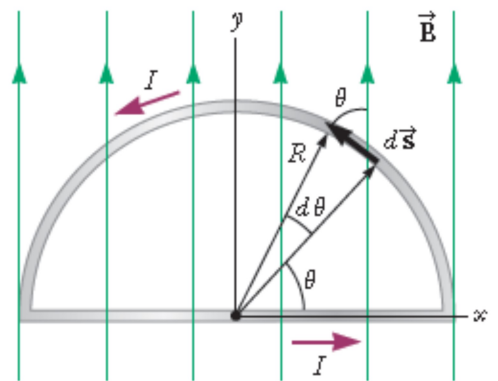
- What is the magnitude of the magnetic field?
- What is the angular speed of the electrons?



Force on a Semicircular Conductor

Thursday, 4 February, 2021 16:01

A wire bent into a semicircle of radius R forms a closed circuit and carries a current I . The wire lies in the xy plane, and a uniform magnetic field is directed along the positive y axis as shown. Find the magnitude and direction of the magnetic force acting on the straight portion of the wire and on the curved portion.



The Magnetic Dipole Moment of a Coil

Thursday, 4 February, 2021 16:04

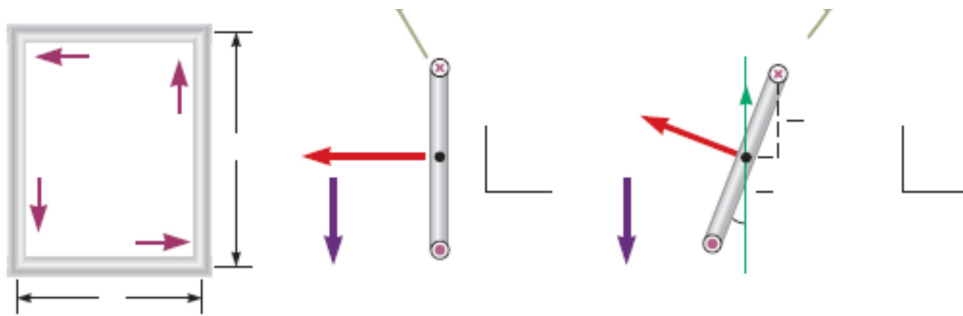
A rectangular coil of dimensions $5.40 \text{ cm} \times 8.50 \text{ cm}$ consists of 25 turns of wire and carries a current of 15.0 mA . A 0.350 T magnetic field is applied parallel to the plane of the coil.

- Calculate the magnitude of the magnetic dipole moment of the coil.
- What is the magnitude of the torque acting on the loop?

Rotating a Coil

Thursday, 4 February, 2021 16:06

Consider the loop of wire in Figure 29.25a. Imagine it is pivoted along side, which is parallel to the axis and fastened so that side remains fixed and the rest of the loop hangs vertically in the gravitational field of the Earth but can rotate around side (Fig. 29.25b). The mass of the loop is 50.0 g , and the sides are of lengths 0.200 m and 0.100 m . The loop carries a current of 3.50 A and is immersed in a vertical uniform magnetic field of magnitude 0.0100 T in the positive direction (Fig. 29.25c). What angle does the plane of the loop make with the vertical?



The Hall Effect for Copper

Thursday, 4 February, 2021 16:10

A rectangular copper strip 1.5 cm wide and 0.10 cm thick carries a current of 5.0 A . Find the Hall voltage for a 1.2 T magnetic field applied in a direction perpendicular to the strip.