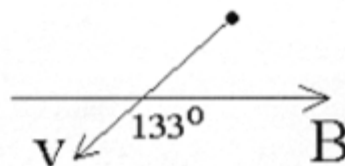


Name: KEY

PHYSICS 2220 - QUIZ #6 - SPRING 2009

1. An electron travels at a speed of 350 m/s through a uniform magnetic field  $\mathbf{B}$  of magnitude  $5.2 \times 10^{-3}$  T. (An electron has a charge of  $-1.6 \times 10^{-19}$  C and a mass of  $9.11 \times 10^{-31}$  kg.) The angle between  $\mathbf{v}$  and  $\mathbf{B}$  is  $133^\circ$ .



- a. What is the magnitude of the magnetic force acting on the electron? Is the direction of the force into or out of the page?

$$\begin{aligned} F &= |q| |v| |B| \sin \theta \\ &= (1.6 \times 10^{-19} \text{ C}) (350 \frac{\text{m}}{\text{sec}}) (5.2 \times 10^{-3} \text{ T}) \sin 133^\circ \\ &= \boxed{2.13 \times 10^{-19} \text{ N, into the page}} \end{aligned}$$

- b. Find the acceleration of the electron.

$$a = \frac{F}{m} = \frac{2.13 \times 10^{-19} \text{ N}}{9.11 \times 10^{-31} \text{ kg}} = \boxed{2.34 \times 10^{11} \frac{\text{m}}{\text{sec}^2}}$$

- c. Does the speed of the particle increase, decrease, or remain equal to 350 m/s?