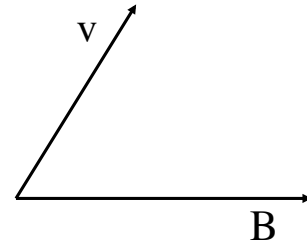


Problem 19.34

A proton travels at 5.02×10^6 m/s at a 60 degree angle with a .18 Tesla magnetic field. What is the magnitude of the force on the proton and its acceleration?

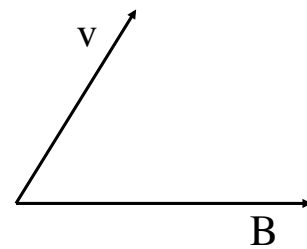


1.)

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$$\begin{aligned} F &= qvB \sin \theta \\ &= (1.6 \times 10^{-19} \text{ C})(5.06 \times 10^6 \text{ m/s})(.18 \text{ T}) \sin 60^\circ \\ &= 1.26 \times 10^{-13} \text{ nts} \end{aligned}$$

Sooo

$$\begin{aligned} a &= \frac{F}{m} \\ &= \frac{1.26 \times 10^{-13} \text{ nts}}{6.67 \times 10^{-27} \text{ kg}} \\ &= 1.89 \times 10^{13} \text{ m/s}^2 \end{aligned}$$

Note that this acceleration would be centripetal!

2.)