

5-1)

First we'll find the radius of the arc of the path, knowing that half of the circumference is 5 cm:

$$s = \frac{1}{2}2\pi r \quad \rightarrow \quad 2 = \frac{s}{\pi} = \frac{0.05}{\pi} = 0.016 \text{ m} .$$

We found in class that a charged object moving perpendicularly to a uniform magnetic field will move in a circle of radius

$$r = \frac{mv}{qB} .$$

Then,

$$B = \frac{mv}{qr} = \frac{(1.67 \times 10^{-27})(3000)}{(1.6 \times 10^{-19})(0.016)} = 2.0 \times 10^{-3} \text{ T} .$$