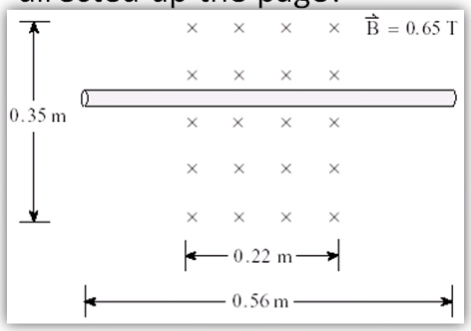
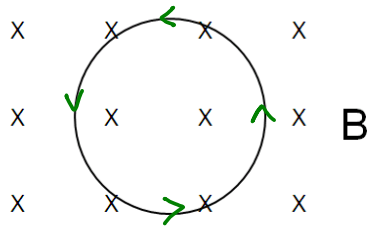
Note Title 29/05/2011

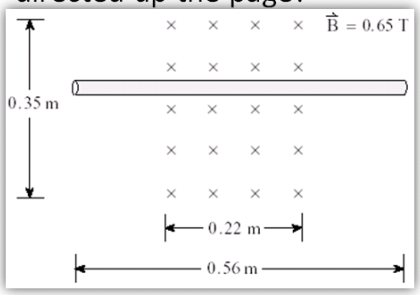
A long conductor is placed in a 0.65 T magnetic field as shown below. What are the **magnitude** and **direction** of the current that produces a 1.6 N force on the wire directed up the page?



A 4.0×10^{-25} kg charged particle enters a 1.5 T magnetic field directed into the page. It travels in a counter-clockwise circle of radius 1.2×10^{-4} m at 2.5×10^{7} m/s. What is the **magnitude** and **polarity** of the charge?



A long conductor is placed in a 0.65 T magnetic field as shown below. What are the **magnitude** and **direction** of the current that produces a 1.6 N force on the wire directed up the page?



$F_m = BIl$

$I = \frac{F_m}{Bl} = \frac{1.6\,N}{(0.65\,T)(0.22\,m)}$

$= 11.2\,A$ ✓ right ✓

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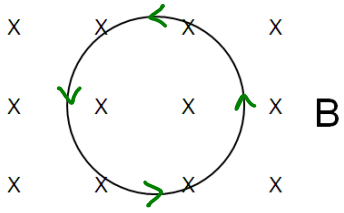

$F_c = F_m$ ✓

$\frac{mv^2}{r} = qvB$

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

$q = \frac{mv}{rB} = \frac{(4.0 \times 10^{-25}\,kg)(2.5 \times 10^{7}\,m/s)}{(1.2 \times 10^{-4}\,m)(1.5\,T)}$

$= 5.6 \times 10^{-14}\,C$ ✓

Using RHR charge is positive ✓