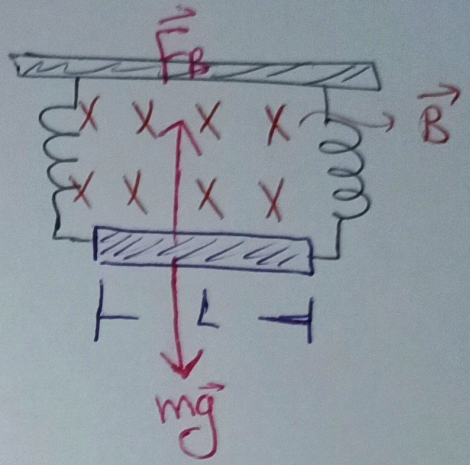
28-21 A 6.75 g wire of length $L = 15.0$ cm is suspended by a pair of flexible leads in a uniform magnetic field of magnitude 0.44 T. What are the (a) magnitude and (b) direction (left or Right) of the current required to remove the tension in the supporting leads?



$$\Rightarrow \vec{F} = i\vec{L} \times \vec{B}$$

$$mg = iLB \sin(90^\circ)$$

$$i = \frac{mg}{BL} = \frac{(6.75 \times 10^{-3}\ kg)(9.8\ m/s^2)}{(0.44\ T)(15 \times 10^{-2}\ m)}$$

$$\boxed{i = 0.98\ A}$$ Rightward

Magnetic force should be upwards to balance the weight.

So the current should be to Right

28-5 A wire 66.0 cm long carries a 0.750 A current in the positive direction of an x-axis through a magnetic field $\vec{B} = (3.00\,mT)\hat{i} + (14.0\,mT)\hat{k}$. In unit-vector notation, what is the magnetic force on the wire?

$$\vec{F} = i\vec{L} \times \vec{B}$$

$$\vec{L} = +(66 \times 10^{-2}\,m)\hat{i}$$

$$\vec{B} = (3\,mT)\hat{i} + (14\,mT)\hat{k}$$

$$i = 0.75\,A$$

$$\vec{F} = 0.75 \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 0.66 & 0 & 0 \\ 3\times10^{-3} & 0 & 14\times10^{-3} \end{vmatrix} = 0.75\left[-0.66(14\times10^{-3})\hat{j}\right]$$

$$\vec{F} = -(6.93 \times 10^{-3}\,N)\hat{j}$$