

32.36. Model: Assume that the field is uniform. The wire will float in the magnetic field if the magnetic force on the wire points upward and has a magnitude mg , allowing it to balance the downward gravitational force.

Visualize: Please refer to Figure Ex32.36.

Solve: We can use the right-hand rule to determine which current direction experiences an upward force. The current being from right to left, the force will be *up* if the magnetic field \vec{B} points out of the page. The forces will balance when

$$F = ILB = mg \Rightarrow B = \frac{mg}{IL} = \frac{(2.0 \times 10^{-3} \text{ kg})(9.8 \text{ m/s}^2)}{(1.5 \text{ A})(0.10 \text{ m})} = 0.131 \text{ T}$$

Thus $\vec{B} = (0.131 \text{ T, out of page})$.