In the picture below, the top and bottom lines are fixed metal rails and the right line is a movable rail. The distance between the fixed rails is 9 m. The battery establishes a current of 5 A, the magnitude of the magnetic field is 4 T, and the mass of the moveable rail is 18 kg.

3. What direction does the moveable rail go? (3 points)

b. If the moveable rail is initially at rest, what speed will it be moving after 3 s? (7 points)

\[ F = I \times B \]
\[ F = 5 \times 4 = 20 \text{ N} \]
\[ a = \frac{F}{m} = \frac{20}{18} = \frac{10}{9} \text{ m/s}^2 \]
\[ V_f = V_i + at = (0) + \left( \frac{10}{9} \right) (3) = \frac{30}{9} = 3.33 \text{ m/s} \]