SHOW ALL WORK!!!!!!

REPORT ALL NUMBERS TO THREE SIGNIFICANT FIGURES!

Use the conversion constants and data given on the front page.

In the drawing, the horizontal lines represent conducting rails. The rod, A, has a mass of 75.0 g. The switch A is closed at t = 0. There is a magnetic field perpendicular to the paper, and INTO the paper, whose strength is B = 0.930 T.

(a) Which direction, right or left, would the rod move?
(b) Just after t = 0, what is the force on the rod?
(c) Just after t = 0, what is the acceleration of the rod?
(d) If the rod moves without friction, what is its maximum speed?
(e) What is the time constant for the approach to this maximum speed?

\[ F = I L \times B \quad \text{RH Rule gives } E_B \text{ to the Right} \]

\[ a = \frac{F}{m} = \frac{E L B}{R_m} \quad \text{Right} \]

\[ V_{max} \text{ when } E - \frac{dE}{dt} = 0 \]

\[ V_{max} = \frac{E}{BL} = 84.9 \text{ m/s} \]

\[ F = m \frac{dv}{dt} = I A \quad \rightarrow \quad \frac{E}{R} A - \frac{(A B)^2}{R} v \]

\[ \frac{dv}{dt} + \frac{(A B)^2}{mR} v = \frac{E L B}{m R} \]

\[ \frac{[m R]}{(E A B)^2} \quad \frac{dv}{dt} + v = \frac{E}{A B} \]

\[ t = \frac{m R}{(A B)^2} = 19.2 \text{ s} \]