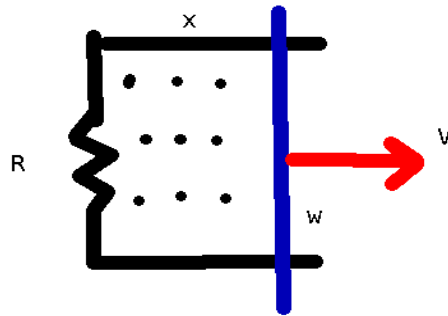


Physics 220: Unquiz 06

A bar of width w is on conducting rails with a resistance R . A magnetic field B is directed outward as shown. The bar has an instantaneous position given by:

$$x = x_0 + vt$$

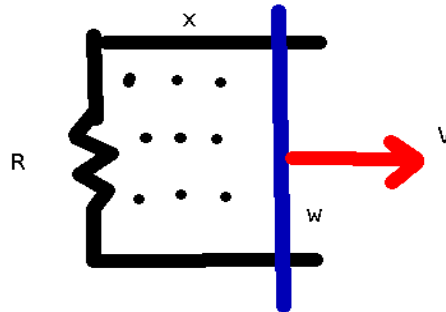
- (a) does the induced current circulate clockwise or counterclockwise?
- (b) Find the magnitude of the induced emf
- (c) find the magnitude of the induced current.



A bar of width w is on conducting rails with a resistance R . A magnetic field B is directed outward as shown. The bar has an instantaneous position given by:

$$x = x_0 + vt$$

- (a) does the induced current circulate clockwise or counterclockwise?
 (b) Find the magnitude of the induced emf
 (c) find the magnitude of the induced current.



The current circulates clockwise.

$$\text{emf} = -\frac{\Delta \phi}{\Delta t} : \phi = \sum_{\Delta A_i} \vec{B}_i \cdot \Delta \vec{A}_i = B \sum \Delta A_i = BW(x_0 + vt) : \frac{\Delta \phi}{\Delta t} = BVW$$

$$\Rightarrow \text{emf} = -BVW \Rightarrow |\text{emf}| = BVW$$

$$\text{emf} = IR \Rightarrow I = \frac{\text{emf}}{R} = \frac{BVW}{R}$$

