29.20

① Datos

$\ell = 1.5\ m$

$v = 5.0\ cm/s$

$B = 0.750\ T$

$R = 25.0\ \Omega$

$\varepsilon_i - ?$

② $\varepsilon_i = -N\dfrac{d\phi_B}{dt}$

③ $\phi_B = \int \vec{B}\cdot \vec{ds}$ B es constante

$\phi_B = B\int ds\cos\theta$

θ es 180 pues toma el vector $\vec{ds}$ saliendo del plano del libro

$\phi_B = -B\,\ell\,a_{(t)}$

el signo es debido a que el $\cos 180 = -1$.

④ $\dfrac{d\phi_B}{dt} = \dfrac{d}{dt}\left(-B\,\ell\,a_{(t)}\right)$

$\dfrac{d\phi_B}{dt} = -B\ell\dfrac{da_{(t)}}{dt} = -B\ell v$

$\dfrac{d\phi_B}{dt} = -B\ell v$

⑤ $\varepsilon_i = -(1)(-B\ell v)$

$\varepsilon_i = B\ell v = (0.750)(1.5)(5.0\cdot 10^{-2}) = 5.6\cdot 10^{-2}\ V$

⑥ $i = \dfrac{\varepsilon}{R} = \dfrac{5.6\cdot 10^{-2}\ V}{25.\ \Omega}$

⑦