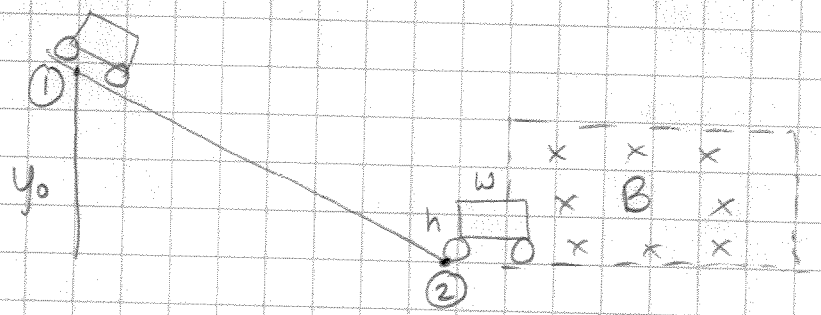

a) Use conservation of energy:

$$PE_1 + KE_1 = PE_2 + KE_2$$

$$m \cdot g \cdot h + 0 = 0 + \frac{1}{2} \cdot m \cdot v^2$$

$$g \cdot y_0 = \frac{1}{2} \cdot v^2 \qquad \text{so} \qquad \boxed{v = \sqrt{2 \cdot g \cdot y_0}}$$

b) i $\mathcal{E} = B \cdot l \cdot v$ $\quad v = \sqrt{2 \cdot g \cdot y_0}$ (from part a)

$l = h$ of cart

$$\boxed{\mathcal{E} = B \cdot h \cdot \sqrt{2 \cdot g \cdot y_0}}$$

ii $\mathcal{E} = B \cdot h \cdot \sqrt{2 \cdot g \cdot y_0}$ $\quad V = I \cdot R$ so

$R = R$ $\quad (B \cdot h \cdot \sqrt{2 g \cdot y_0}) = I \cdot R$

$$\boxed{I = \frac{B \cdot h \cdot \sqrt{2 \cdot g \cdot y_0}}{R}}$$

c) → Cart is moving <u>into</u> B, so Φ_m is increasing

→ $\Phi_{induced}$ acts to oppose change, so $B_{induced}$ is opposite existing B ($B_{induced}$ is Out)

→ To induce B_{out} within the rectangle, $I_{induced}$ must be [Counter-clockwise] by RHR #2