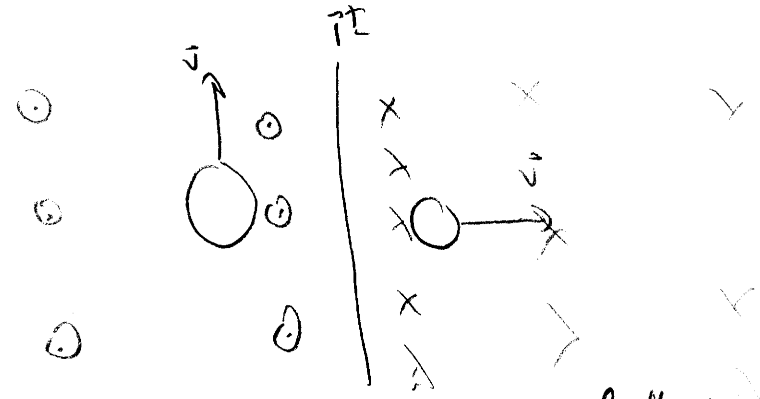
Ch29

HW 12

Q4

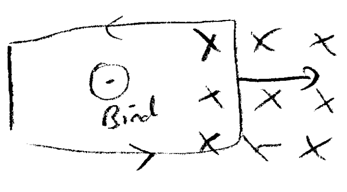


- There is no induced current in the left loop, since the magnetic field is constant as it is moved.
- As the second loop moves to the right Φ_B decreases. An induced current must be cw to generate a mag. field into the page and opposing the decrease in flux.

Q5 As the right loop moves, its field caused by the induced current moves too, creating a small change in flux in the left loop. This decreasing flux induces a ccw current in the first loop.

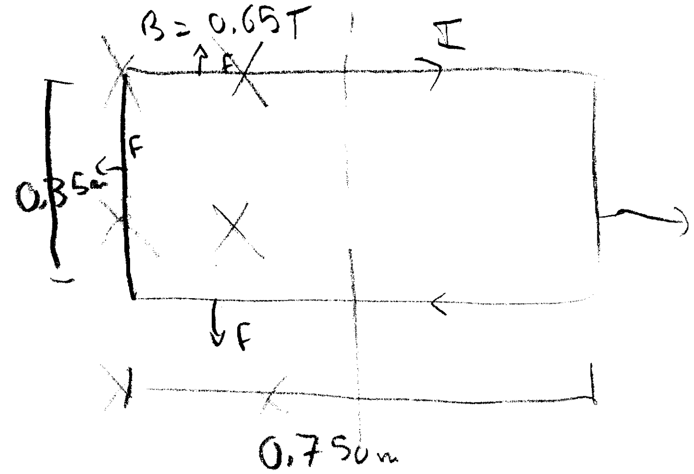
there is an attractive force (very small)

P3



- flux increases
- current opposes flux increase, creating field out of page
- current must be in ccw direction

P12



$R = 0.280\,\Omega$

$v = 3.4\,m/s$

$F_{pull} = F_{mag}$ for constant velocity

current induced is cw $\quad I = \frac{\mathcal{E}}{R}$

$\vec{F} = I\,\vec{l} \times \vec{B} \quad (\theta = 90)$

$= \frac{\mathcal{E}}{R}(0.35m)(0.65T)$

$\mathcal{E} = ? \quad \mathcal{E} = -\frac{d\Phi_B}{dt} = -\frac{d}{dt}BA = -\frac{B\,l\,v\,dt}{dt} = Blv$ (as found in class)

$F = \frac{Blv\,l\,B}{R}$

$= \frac{B^2 l^2 v}{R} = \frac{(0.65T)^2(0.35m)^2(3.4m/s)}{0.280\,\Omega}$ $\boxed{= 0.628N}$