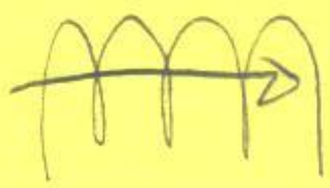
Problem 2

1. $B = \mu_0 \frac{N}{\ell} I$

$B = (4\pi \times 10^{-7} \ \frac{T \cdot m}{A}) \left( \frac{100}{0.0254 m} \right) \cdot (3.0 A)$

$B = 14.8 \ m\bar{T} \approx 148$ gauss

2. 

3. 0 ← The magnetic flux is not changing

Then

1. counter clockwise

2. $\mathcal{E} = - \frac{d\Phi_B}{dt}$

$\mathcal{E} = - A \frac{dB}{dt} = - A \mu_0 \frac{N}{\ell} \frac{dI}{dt}$

$I_{ring} = \frac{\mathcal{E}}{R_{ring}} = + \frac{A}{R_{ring}} \mu_0 \frac{N}{\ell} \left( +20 \frac{Amp}{s} \right) = \frac{\pi r^2}{R_{ring}} \mu_0 \frac{N}{\ell} (20 \frac{A}{s})$

$I_{ring} = 0.14$ Amps

3. 0 ← neglecting self force

# Problem 4

1. $\frac{h}{V_0}$

2. Counter - Clockwise

3. $\mathcal{E} = -\frac{d\phi_B}{dt} = -(-B\omega V) = IR$

$$I = +\frac{BV_0\omega}{R}$$

4. A → down
   B → Left
   C → up

$F_A = I \ell B$

$F_A = I h B = B^2 \frac{\omega h}{R} V_0$

$F_C = I h B = B^2 \frac{\omega h}{R} V_0$

$F_B = I \omega B = B^2 \frac{\omega^2}{R} V_0$

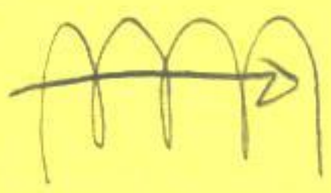
(5) $\frac{\Delta W}{\Delta t} = F_B V = B^2 \frac{\omega^2}{R} V_0 \cdot V_0 = I^2 R$ ✓

Problem 2

1. $B = \mu_0 \frac{N}{\ell} I$

$B = (4\pi \times 10^{-7} \ \frac{T \cdot m}{A}) \left( \frac{100}{0.0254m} \right) \cdot (3.0A)$

$B = 14.8 \ mT = 148 \ gauss$

2. 

3. 0 ← The magnetic f Flux is not changing

Then

1. counter clockwise
2. $\mathcal{E} = - \frac{d\Phi_B}{dt}$

$\mathcal{E} = - A \frac{dB}{dt} = - A \mu_0 \frac{N}{\ell} \frac{dI}{dt}$

$I_{ring} = \frac{\mathcal{E}}{R_{ring}} = + \frac{A}{R_{ring}} \mu_0 \frac{N}{\ell} \left( +20 \frac{Amp}{s} \right) = \frac{\pi r^2}{R_{ring}} \mu_0 \frac{N}{\ell} (20 \frac{A}{s})$

$I_{ring} = 0.14 \ Amps$

3. 0 ← neglecting self force

↖ N