2 Ch 11

1.   a) Into the page   c) out of the page

     b) Left

2.   a) $\not{q}E = \not{q}v \times B$ $\vec{F} = q\vec{v} \times \vec{B}$

        $\dfrac{E}{B} = v\dfrac{B}{B} \longrightarrow \boxed{\dfrac{E}{B} = v}$

     b) $\dfrac{E}{B} = \dfrac{I}{nqA} \to (B)\dfrac{\left(\frac{\Delta V}{\Delta x}\right)}{B} = \dfrac{I}{nqA} (B) \to \dfrac{\Delta V}{\Delta x} = \left(\dfrac{BI}{nqA}\right)\Delta x \to \boxed{\Delta V = \dfrac{B\Delta x I}{nqA}}$

3. $\left(\left(2\pi\left(0.65\times 10^{-15}m\right)^2\right)1.05\times 10^4 A\right) 2.50\,T\right) = \boxed{6.97\times 10^{-26}\,N\cdot m}$

3

1.   a) $\left(\left(\left(4\pi\times 10^{-7}\frac{H}{m}\right)500\,\frac{turns}{m}\right)0.3\,A\right) = \boxed{1.88\times 10^{-4}\,T}$

     b) $\left(\left(\left(5000\cdot 4\pi\times 10^{-7}\frac{H}{m}\right)500\,\frac{turns}{m}\right)0.3A\right) = \boxed{0.942\,T}$

2.   a) $F = qv\times B$ $V = \left(\frac{E}{B}\right)$

         $F = q\left(\frac{E}{B}\right)B$ If magnitudes are equal, then
         $F = qE$ there is a net force of zero.

         $qvB = qE \longrightarrow qvB - qE = 0$

     b) $\dfrac{mv^2}{r} = qvB$ $\to\left(\frac{1}{qE}\right)\not{q}\;m\dfrac{E^2}{B^2} = qEr\left(\dfrac{1}{qE}\right)$

         $mv^2 = qvBr$ $\dfrac{mE^2}{qEB^2} = r$

         $m\dfrac{E^2}{B^2} = q\dfrac{E}{B}Br$ $\dfrac{mE}{qB^2} = r$ $\dfrac{(16)(1.67\times 10^{-27})}{(1.6\times 10^{-19})(0.01)} = \boxed{1.67\times 10^{-5}\,m}$

$\boxed{4}$ ch 13

1. a) $-N \dfrac{d\,B(t) \cdot A}{dt} = \varepsilon$

   b) $B(t) = B_0 \left(\dfrac{1}{2} + \dfrac{2}{\pi} \sin(2\pi ft) + \dfrac{2}{3\pi}\sin(6\pi ft) + \dfrac{2}{5\pi}\sin(10\pi ft) \right)$

   $\overset{\frac{4\pi f}{\pi}}{}$ $\overset{\frac{12\pi f}{3\pi}}{}$ $\overset{\frac{20\pi f}{5\pi}}{}$

   $B_0 \dfrac{d\,B(t)}{dt} = 4f \left(\cos(2\pi ft) + \cos(6\pi ft) + \cos(10\pi ft) \right)$

   $\dfrac{d\,B(0)}{dt} = (0.1)(4)(10^3)(3)$

   $= 1200\,T$

   $-(1200)(2\pi(0.1)^2) = \boxed{-75.4 \text{ volts}}$

   c) $(\cos(2\pi(10^3)(0.001) + \cos(6\pi(10^3)(0.001) + \cos(10\pi(10^3)(0.001))$
   $= 2.79$

   $(0.1)(4)(10^3)(2.79) = 1117.5\,T$

   $-(1117.5)(2\pi(0.1)^2) = -70.2 \text{ volts}$

   $\dfrac{-70.2 \text{ volts}}{5.0\,\Omega} = \boxed{-14.04\,A}$

$\boxed{5}$ ch 14

1. a) $\dfrac{0.150V}{0.50H} = \boxed{0.30 \text{ A/s}}$

2. $\dfrac{(0.002H)(0.100A)}{500\,V} = \boxed{4 \times 10^{-7} \text{ seconds}}$