

P610 1, 2, 5, 11, 12, 14, 15

$$\textcircled{1} \mathcal{E} = -\frac{N\Delta\Phi}{\Delta t} = \frac{-2(38 \text{ Wb} - 50 \text{ Wb})}{0.42 \text{ s}} = \underline{-420 \text{ V}}$$

② counterclockwise

$$\textcircled{5} \mathcal{E} = -\frac{\Delta\Phi}{\Delta t} \quad \Phi = BA \cos\theta \quad A = \pi r^2$$

$$\mathcal{E} = -\frac{(B\pi r^2 \cos 90^\circ - B\pi r^2 \cos 0)}{\Delta t} = \frac{(1.5 \text{ T})\pi(0.06 \text{ m})^2}{.2 \text{ s}} = \underline{.085 \text{ V}}$$

$$\textcircled{11} \text{ (a)} \mathcal{E} = -\frac{\Delta\Phi}{\Delta t} \quad \Phi = BA \cos\theta \quad A = \pi r^2$$

$$= \frac{-\pi r^2(\Delta B)}{\Delta t} = \frac{-\pi(.06 \text{ m})^2(-0.45 \text{ T} - 0.52 \text{ T})}{.180 \text{ s}} = \underline{0.061 \text{ V}}$$

(b) clockwise

$$\textcircled{12} \text{ (a)} \mathcal{E} = Blv = (0.800 \text{ T})(0.12 \text{ m})(.15 \text{ ms}^{-1}) = \underline{0.0144 \text{ V}}$$

$$\text{ (b)} \mathcal{E} = \frac{\Delta V}{\Delta x} = \frac{0.0144 \text{ V}}{.12 \text{ m}} = \underline{0.120 \text{ Vm}^{-1} \text{ up}}$$

$$\textcircled{14} \text{ (a)} \mathcal{E} = Blv$$

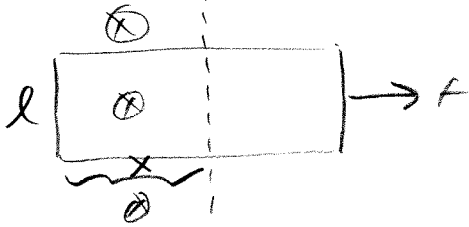
$$v = \frac{\mathcal{E}}{Bl} = \frac{.120 \text{ V}}{(.9 \text{ T})(.132 \text{ m})} = \underline{1.0 \text{ ms}^{-1}}$$

$$\text{ (b)} \mathcal{E} = \frac{\Delta V}{\Delta x} = \frac{.120 \text{ V}}{.132 \text{ m}} = \underline{0.91 \text{ Vm}^{-1} \text{ up}}$$

$$(15) F = BIl \sin \theta$$

$$\mathcal{E} = -\frac{d\Phi}{dt} \quad \Phi = BA \cos \theta$$

Area changes as loop is moved



$$A = lx \quad (x=0 \text{ when loop is removed})$$

$$\mathcal{E} = -\frac{B l \Delta x}{\Delta t} \quad \text{but} \quad v = \frac{\Delta x}{\Delta t}$$

$$\mathcal{E} = -Blv$$

$$V = IR$$

$$I = \frac{V}{R} = \frac{-Blv}{R}$$

$$F = B \left( \frac{-Blv}{R} \right) l$$

$$= -\frac{B^2 l^2 v}{R} = \frac{-(.550 \text{ T})^2 (.350 \text{ m})^2 (3.40 \text{ m s}^{-1})}{.230 \Omega}$$

$$\underline{F = 0.548 \text{ N left}}$$