

Flux + Faraday's Law

$$\begin{aligned}\textcircled{1} \quad \Phi &= BA \\ &= (0.5) \left[\pi \left(\frac{0.15}{2} \right)^2 \right]\end{aligned}$$

$$\Phi = \boxed{0.0088 \text{ Wb}}$$

$$\begin{aligned}\textcircled{2} \quad V &= -N \frac{\Delta \Phi}{\Delta t} \\ &= -2 \left[\frac{+38 - (-50)}{0.42} \right]\end{aligned}$$

$$V = \boxed{-419 \text{ V}}$$

$$\begin{aligned}\textcircled{3} \quad \Phi_{\text{initial}} &= BA \\ &= (1.1) \left[\pi \left(\frac{0.096}{2} \right)^2 \right]\end{aligned}$$

$$\Phi_{\text{initial}} = 0.00796 \text{ Wb}$$

$$\Phi_{\text{final}} = 0$$

$$\begin{aligned}V &= -N \frac{\Delta \Phi}{\Delta t} \\ &= -1 \left(\frac{0 - 0.00796}{0.15} \right)\end{aligned}$$

$$V = \boxed{0.053 \text{ V}}$$

$$\textcircled{4} \quad \Phi_{\text{initial}} = BA$$

$$= (1.5) \left[\pi \left(\frac{0.12}{2} \right)^2 \right]$$

$$\Phi_{\text{initial}} = 0.01696 \text{ wb}$$

$$\Phi_{\text{final}} = 0$$

$$V = -N \frac{d\Phi}{dt}$$

$$= -1 \left(0 - \frac{0.01696}{0.2} \right)$$

$$V = \boxed{0.085 \text{ V}}$$

$$\textcircled{5} \quad \Phi_{\text{initial}} = BA$$

$$= (0.63) \left[\pi \left(\frac{0.102}{2} \right)^2 \right]$$

$$\Phi_{\text{initial}} = 0.00515 \text{ wb}$$

$$\Phi_{\text{final}} = BA$$

$$= (-0.25) \left[\pi \left(\frac{0.102}{2} \right)^2 \right]$$

$$\Phi_{\text{final}} = -0.00204 \text{ wb}$$

(continued)

⑤ (continued)

$$V = -N \frac{d\Phi}{dt}$$
$$= -1 \left(\frac{-0.00204 - 0.00515}{0.15} \right)$$

$$V = \boxed{0.048 \text{ V}}$$

⑥ a) $\Phi = BA \cos \phi$

$$= (0.5) \left[\pi \left(\frac{0.15}{2} \right)^2 \right] \cos 0$$

$$\Phi = \boxed{0.0088 \text{ wb}}$$

b) $\Phi = BA \cos \phi$

$$= (0.5) \left[\pi \left(\frac{0.15}{2} \right)^2 \right] \cos 55$$

$$\Phi = \boxed{0.0051 \text{ wb}}$$

$$\textcircled{a} \quad \Phi_{\text{initial}} = BA$$
$$= (0.52) \left[\pi (0.12)^2 \right]$$

$$\Phi_{\text{initial}} = 0.00588 \text{ wb}$$

$$\Phi_{\text{final}} = BA$$
$$= (-0.45) \left[\pi (0.12)^2 \right]$$

$$\Phi_{\text{final}} = -0.00509 \text{ wb}$$

$$V = -N \frac{\Delta \Phi}{\Delta t}$$

$$= -1 \left(\frac{-0.00509 - 0.00588}{180 \times 10^{-3}} \right)$$

$$V = \boxed{0.061 \text{ V}}$$