

34. (a) For path 1, we have

$$\begin{aligned}\oint_1 \vec{E} \cdot d\vec{s} &= -\frac{d\vec{\Phi}_{B1}}{dt} = \frac{d}{dt}(B_1 A_1) = A_1 \frac{dB_1}{dt} = \pi r_1^2 \frac{dB_1}{dt} = \pi(0.200\text{m})^2 (-8.50 \times 10^{-3} \text{T/s}) \\ &= -1.07 \times 10^{-3} \text{V}\end{aligned}$$

(b) For path 2, the result is

$$\oint_2 \vec{E} \cdot d\vec{s} = -\frac{d\vec{\Phi}_{B2}}{dt} = \pi r_2^2 \frac{dB_2}{dt} = \pi(0.300\text{m})^2 (-8.50 \times 10^{-3} \text{T/s}) = -2.40 \times 10^{-3} \text{V}$$

(c) For path 3, we have

$$\oint_3 \vec{E} \cdot d\vec{s} = \oint_1 \vec{E} \cdot d\vec{s} - \oint_2 \vec{E} \cdot d\vec{s} = -1.07 \times 10^{-3} \text{V} - (-2.4 \times 10^{-3} \text{V}) = 1.33 \times 10^{-3} \text{V}$$