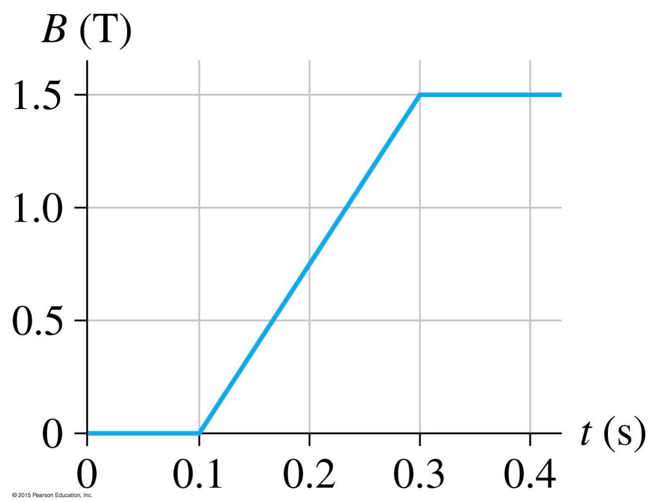
A 100-turn, 2.0-cm-diameter circular coil is at rest in the horizontal plane. A uniform magnetic field 60° away from vertical increases from 0.50 T to 1.50 T in 0.60 s. What is the induced emf in the coil?

A 5.0-cm-diameter loop of wire has resistance 1.2 Ω. A nearby solenoid generates a uniform magnetic field along the axis of the loop that varies with time as shown below. Graph the magnitude of the current in the loop over the same time interval.



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$$\varepsilon = N\frac{\Delta\Phi}{\Delta t}$$

$$= N\frac{\Delta(BA\cos\theta)}{\Delta t}$$

$$= N\frac{\Delta B}{\Delta t}A\cos\theta$$

$$= (100)\frac{(1.50-0.50)}{0.60}(\pi \times 0.01^2)\cos 60°$$

$$= \boxed{0.0262\ V}$$

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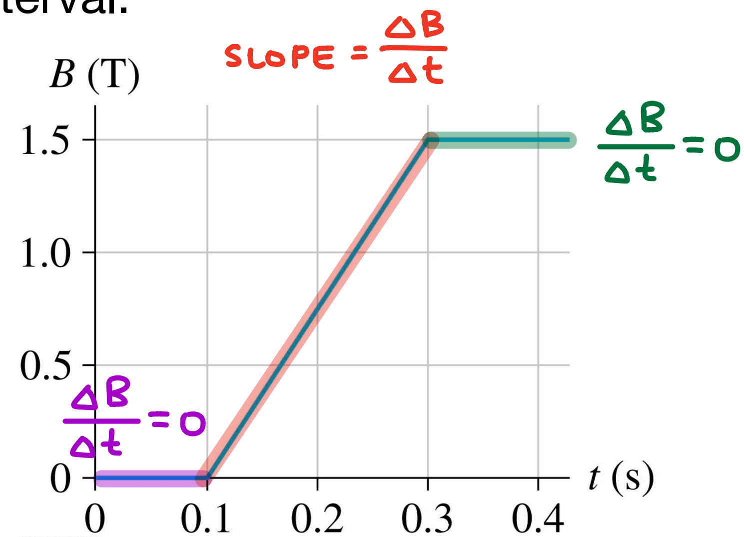

$$\frac{\Delta B}{\Delta t} = \frac{1.5 - 0}{0.3 - 0.1} = 7.5 \frac{T}{s}$$

$$\mathcal{E} = N\frac{\Delta \Phi}{\Delta t} = \frac{\Delta B}{\Delta t} A$$

$$= (7.5)(\pi \cdot 0.025^2)$$

$$= 0.0147 \text{ V}$$

$$I = \frac{V}{R} = \frac{0.0147}{1.2} = 0.0123 \text{ A}$$