

2. The induced emf is

$$\begin{aligned}\mathcal{E} &= -\frac{d\Phi_B}{dt} = -\frac{d(BA)}{dt} = -A\frac{dB}{dt} \\ &= -A\frac{d}{dt}(\mu_0 in) = -A\mu_0 n\frac{d}{dt}(i_0 \sin \omega t) \\ &= -A\mu_0 n i_0 \omega \cos \omega t .\end{aligned}$$