

**Data**

$c = 3.00 \times 10^8$  m/s  
 $\mu_0 = 4\pi \times 10^{-7}$  T·m/A  
area of a rectangle =  $ab$   
 $\cos 37.0^\circ = 0.80$

$\epsilon_0 = 8.85 \times 10^{-12}$  C<sup>2</sup>/N·m<sup>2</sup>  
area of a circle =  $\pi r^2$   
 $\cos 53.0^\circ = 0.60$

**Equations**

$$\epsilon_{\text{IN}} = -N \frac{\Delta \phi_B}{\Delta t}$$

$$\phi_B = AB \cos \theta$$

$$B = \mu_0 \left( \frac{N}{L} \right) I$$

$$\epsilon_{\text{IN}} = NAB\omega \sin \omega t$$

$$N\phi_B = LI$$

$$N\phi_B = MI_p$$

$$PE_B = \frac{1}{2} LI^2$$

$$\mu_E = \frac{1}{2} \epsilon_0 E^2$$

$$\mu_B = \frac{1}{2} \frac{B^2}{\mu_0}$$

$$c = \frac{1}{\sqrt{\mu_0 \epsilon_0}} = \lambda f = \frac{\lambda}{T}$$

$$E = cB$$

$$S_{\text{AV}} = \frac{1}{2} c \epsilon_0 E_o^2 = c \epsilon_0 E_{\text{RMS}}^2$$

$$f_{\text{obs}} = f_{\text{source}} \left( 1 \pm \frac{v_{\text{rel}}}{c} \right)$$

$$S = S_o \cos^2 \theta$$

$$\theta_{\text{incidence}} = \theta_{\text{reflection}}$$

$$\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i}$$

$$f = \pm \frac{R}{2}$$

$$m = \frac{h_i}{h_o} = -\frac{d_i}{d_o}$$

Transformers

$$\frac{N_P}{N_S} = \frac{V_P}{V_S}$$

Circuits

$$P = IV = \frac{V^2}{R} = I^2 R$$

$$V = IR$$