

34. The magnetic field B can be expressed as

$$B(t) = B_0 + B_1 \sin(\omega t + \phi_0) ,$$

where $B_0 = (30.0 \text{ T} + 29.6 \text{ T})/2 = 29.8 \text{ T}$ and $B_1 = (30.0 \text{ T} - 29.6 \text{ T})/2 = 0.200 \text{ T}$. Then from Eq. 31-27

$$E = \frac{1}{2} \left(\frac{dB}{dt} \right) r = \frac{r}{2} \frac{d}{dt} [B_0 + B_1 \sin(\omega t + \phi_0)] = \frac{1}{2} B_1 \omega r \cos(\omega t + \phi_0) .$$

We note that $\omega = 2\pi f$ and that the factor in front of the cosine is the maximum value of the field. Consequently,

$$E_{\max} = \frac{1}{2} B_1 (2\pi f) r = \frac{1}{2} (0.200 \text{ T}) (2\pi) (15 \text{ Hz}) (1.6 \times 10^{-2} \text{ m}) = 0.15 \text{ V/m} .$$