45. (a) We use the result of part (a) in Sample Problem 32-3:

$$B = \frac{\mu_0 \varepsilon_0 r}{2} \frac{dE}{dt} \qquad \text{(for } r \leq R\text{)} \ ,$$

where $r = 0.80R$ and

$$\frac{dE}{dt} = \frac{d}{dt}\left(\frac{V}{d}\right) = \frac{1}{d}\frac{d}{dt}\left(V_0 e^{-t/\tau}\right) = -\frac{V_0}{\tau d} e^{-t/\tau} \ .$$

Here $V_0 = 100\,\text{V}$. Thus

$$\begin{aligned} B(t) &= \left(\frac{\mu_0 \varepsilon_0 r}{2}\right)\left(-\frac{V_0}{\tau d} e^{-t/\tau}\right) = -\frac{\mu_0 \varepsilon_0 V_0 r}{2\tau d}\, e^{-t/\tau} \\ &= -\frac{\left(4\pi \times 10^{-7}\,\text{T}\cdot\text{m/A}\right)\left(8.85 \times 10^{-12}\,\frac{\text{C}^2}{\text{N}\cdot\text{m}^2}\right)(100\,\text{V})(0.80)(16\,\text{mm})}{2(12 \times 10^{-3}\,\text{s})(5.0\,\text{mm})}\, e^{-t/12\,\text{ms}} \\ &= -(1.2 \times 10^{-13}\,\text{T})\, e^{-t/12\,\text{ms}} \ . \end{aligned}$$

The minus sign here is insignificant.

(b) At time $t = 3\tau$, $B(t) = -(1.2 \times 10^{-13}\,\text{T})e^{-3\tau/\tau} = -5.9 \times 10^{-15}\,\text{T}$.