

51. Taking the time derivative of both sides of Eq. 31-43, we obtain

$$\begin{aligned}\frac{di}{dt} &= \frac{d}{dt} \left[\frac{\mathcal{E}}{R} \left(1 - e^{-Rt/\tau_L} \right) \right] = \frac{\mathcal{E}}{L} e^{-RT/L} \\ &= \left(\frac{45.0 \text{ V}}{50.0 \times 10^{-3} \text{ H}} \right) e^{-(180 \text{ } \Omega)(1.20 \times 10^{-3} \text{ s})/50.0 \times 10^{-3} \text{ H}} = 12.0 \text{ A/s} .\end{aligned}$$