45. Starting with zero current at $t = 0$ (the moment the switch is closed) the current in the circuit increases according to

$$i = \frac{\mathcal{E}}{R}\left(1 - e^{-t/\tau_L}\right) \ ,$$

where $\tau_L = L/R$ is the inductive time constant and $\mathcal{E}$ is the battery emf. To calculate the time at which $i = 0.9990\mathcal{E}/R$, we solve for t:

$$0.9990\frac{\mathcal{E}}{R} = \frac{\mathcal{E}}{R}\left(1 - e^{-t/\tau_L}\right) \quad \Longrightarrow \quad \ln(0.0010) = -(t/\tau) \quad \Longrightarrow \quad t = 6.91\tau_L \ .$$