45. During charging, the charge on the positive plate of the capacitor is given by

$$q = C\mathcal{E}(1 - e^{-t/\tau}) \ ,$$

where C is the capacitance, $\mathcal{E}$ is applied emf, and $\tau = RC$ is the capacitive time constant. The equilibrium charge is $q_{\rm eq} = C\mathcal{E}$. We require $q = 0.99 q_{\rm eq} = 0.99 C\mathcal{E}$, so

$$0.99 = 1 - e^{-t/\tau} \ .$$

Thus,

$$e^{-t/\tau} = 0.01 \ .$$

Taking the natural logarithm of both sides, we obtain $t/\tau = -\ln 0.01 = 4.6$ and $t = 4.6\tau$.