

46. (a)  $\tau = RC = (1.40 \times 10^6 \Omega)(1.80 \times 10^{-6} \text{ F}) = 2.52 \text{ s}.$

(b)  $q_o = \mathcal{E}C = (12.0 \text{ V})(1.80 \mu\text{ F}) = 21.6 \mu\text{C}.$

(c) The time  $t$  satisfies  $q = q_o(1 - e^{-t/RC})$ , or

$$t = RC \ln \left( \frac{q_o}{q_o - q} \right) = (2.52 \text{ s}) \ln \left( \frac{21.6 \mu\text{C}}{21.6 \mu\text{C} - 16.0 \mu\text{C}} \right) = 3.40 \text{ s} .$$