58. (a) In the process described in the problem, no charge is gained or lost. Thus, $q =$ constant. Hence,

$$q = C_1V_1 = C_2V_2 \implies V_2 = V_1\frac{C_1}{C_2} = (200)\left(\frac{150}{10}\right) = 3000 \text{ V} .$$

(b) Eq. 28-36, with $\tau = RC$, describes not only the discharging of q but also of V. Thus,

$$V = V_0e^{-t/\tau} \implies t = RC \ln\left(\frac{V_0}{V}\right) = \left(300 \times 10^9\,\Omega\right)\left(10 \times 10^{-12}\,\text{F}\right)\ln\left(\frac{3000}{100}\right)$$

which yields $t = 10$ s. This is a longer time than most people are inclined to wait before going on to their next task (such as handling the sensitive electronic equipment).

(c) We solve $V = V_0e^{-t/RC}$ for R with the new values $V_0 = 1400$ V and $t = 0.30$ s. Thus,

$$R = \frac{t}{C\ \ln(V_0/V)} = \frac{0.30\,\text{s}}{(10 \times 10^{-12}\,\text{F})\ \ln(1400/100)} = 1.1 \times 10^{10}\ \Omega .$$