81. We do not employ energy conservation since, in reaching equilibrium, some energy is dissipated either as heat or radio waves. Charge is conserved; therefore, if $Q = C_1 V_{\text{bat}} = 24\,\mu\text{C}$, and q_1 and q_3 are the charges on C_1 and C_3 after the switch is thrown to the right (and equilibrium is reached), then

$$Q = q_1 + q_3 \quad .$$

We reduce the series pair C_2 and C_3 to $C' = 4/3\ \mu\text{F}$ which has charge $q' = q_3$ and the same voltage that we find across C_1. Therefore,

$$\begin{aligned} V_1 &= V' \\ \frac{q_1}{C_1} &= \frac{q_3}{C'} \end{aligned}$$

which leads to $q_1 = 1.5q_3$. Hence,

$$Q = (1.5q_3) + q_3$$

leads to $q_3 = 9.6\,\mu\text{C}$.