33.72. Model: Assume negligible resistance in the circuit.
Visualize: Energy is conserved. The maximum voltage on the right capacitor will occur when all of the energy from the left capacitor is transferred to the right one.
Solve: **(a)** The voltage is calculated as follows:

$$\tfrac{1}{2}C_1\Delta V_{C1}^2 = \tfrac{1}{2}C_2\Delta V_{C2}^2 \Rightarrow \Delta V_{C2} = \sqrt{\frac{C_1}{C_2}}\Delta V_{C1} = \sqrt{\frac{300}{1200}}(100\text{ V}) = 50\text{ V}$$

(b) Closing S_1 causes the charge and current of the left LC circuit to oscillate with period T_L. After one-quarter of a period, the 300 μF capacitor is completely discharged and the current through the inductor is maximum. At that instant we'll open S_1 and close S_2. Then the right LC circuit will start to oscillate with period T_R and the inductor current will charge the 1200 μF capacitor. The capacitor will be fully charged after one-quarter of a period, so we will open S_2 at that time to keep the charge on the 1200 μF capacitor. The periods are

$$T_L = \frac{2\pi}{\omega_L} = 2\pi\sqrt{LC_1} = 2\pi\sqrt{(5.3\text{ H})(300\times10^{-6}\text{ F})} = 0.25\text{ s} \Rightarrow \tfrac{1}{4}T_L = 0.0625\text{ s}$$

$$T_R = \frac{2\pi}{\omega_R} = 2\pi\sqrt{LC_2} = 2\pi\sqrt{(5.3\text{ H})(1200\times10^{-6}\text{ F})} = 0.50\text{ s} \Rightarrow \tfrac{1}{4}T_R = 0.1250\text{ s}$$

So the procedure is to close S_1 at $t = 0$ s, open S_1 and close S_2 at $t = 0.0625$ s, then open S_2 at $t = 0/1250$ s.