1. Voltages Across Capacitors

For the circuits given below, calculate the voltage across the capacitors. For parts (a) and (b) only, also calculate the charge and energy stored in each capacitor. Let $C_1 = 1 \mu F$, $C_2 = 3 \mu F$, $V_s = 1 V$, and $I_s = 2 mA$.

(a) \[
\begin{array}{c}
\text{\textcolor{red}{+}} \overline{V_s} \quad \quad C_1
\end{array}
\]

(b) \[
\begin{array}{c}
\text{\textcolor{red}{+}} \overline{V_s} \quad \quad C_1 \quad \quad C_2
\end{array}
\]

2. Current Sources And Capacitors

For the circuits given below, give an expression for $v_{out}(t)$ in terms of $I_s$, $C_1$, $C_2$, and $t$. Assume that all capacitors are initially uncharged, i.e. the initial voltage across each capacitor is 0 V.

(a) \[
\begin{array}{c}
I_s \quad \quad \text{+} \quad \quad C_1 \quad \quad v_{out} \quad \quad \text{-}
\end{array}
\]

(b) \[
\begin{array}{c}
I_s \quad \quad \text{+} \quad \quad C_1 \quad \quad C_2 \quad \quad v_{out} \quad \quad \text{-}
\end{array}
\]
3. Practice: Series And Parallel Capacitors

Derive $C_{eq}$ for the following circuits.

(a) \[ C_1 \quad C_2 \]

(b) \[ C_1 \quad C_2 \]

(c) \[ C_1 \quad C_2 \quad C_3 \]