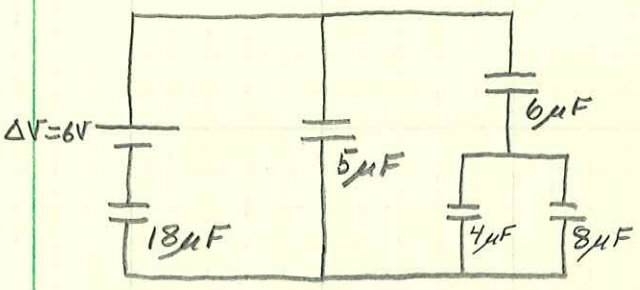


Find – ΔV across each C

– q on each C

Known – Values for all C's

– ΔV_{batt}

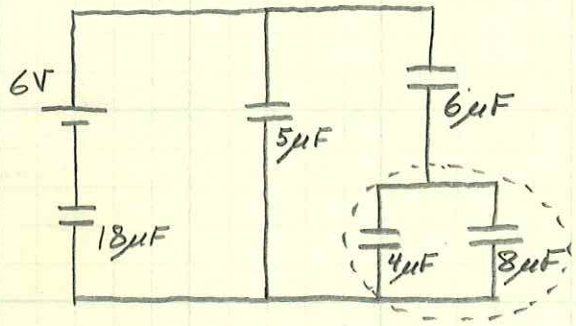
– series → $C_{eq} = \frac{C_1 C_2}{C_1 + C_2}$

parallel → $C_{eq} = C_1 + C_2$

– $q = C\Delta V$ or $\Delta V = \frac{q}{C}$

First, we need to find the equivalent capacitance of the whole circuit. I'll do it in steps, redrawing the new circuit after each step.

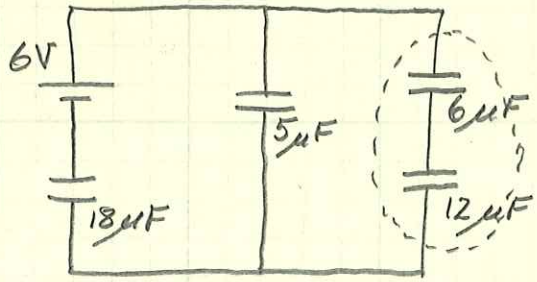
(1)



$C_1 = 4\mu F + 8\mu F$

$= 12\mu F$

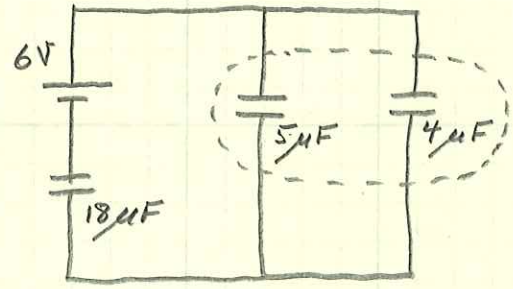
(2)



$C_2 = \frac{(6\mu F)(12\mu F)}{6\mu F + 12\mu F}$

$= 4\mu F$

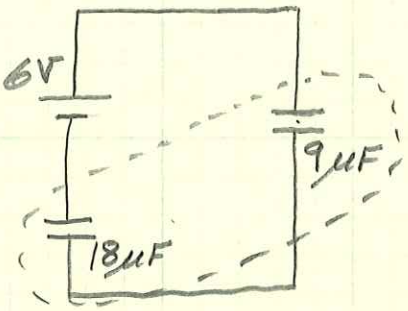
(3)



$C_3 = 5\mu F + 4\mu F$

$= 9\mu F$

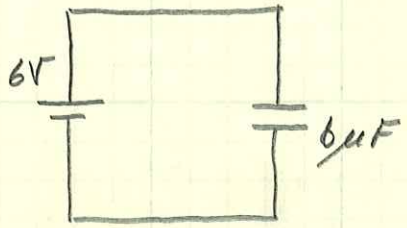
④



$$C_{eq} = \frac{(18\mu F)(9\mu F)}{18\mu F + 9\mu F}$$

$$= 6\mu F$$

⑤



$$\Rightarrow q_{eq} = (6\mu F)(6V)$$
$$= \underline{36\mu C}$$

Looking at circuit ④, C_{18} and C_3 are in series, so

$q_{18} = q_3 = q_{eq}$

$$\Rightarrow q_{18} = \underline{\underline{36\mu C}}$$

$$\Delta V_{18} = \frac{36\mu C}{18\mu F} = \underline{\underline{2V}}$$

$$(\Delta V_3 = 6V - 2V = 4V)$$

Looking at circuit ③, we now know ΔV across the $5\mu F$ capacitor (and the $4\mu F$ equivalent capacitor, C_2)

$$\Rightarrow q_5 = (5\mu F)(4V) = \underline{\underline{20\mu C}}$$

$$\Delta V_5 = \underline{\underline{4V}}$$

$$(q_2 = (4\mu F)(4V) = 16\mu C)$$

Looking at circuit ②, we now know that

$q_2 = q_6 = q_{12}$

$$\Rightarrow \quad q_6 = \underline{16\,\mu C}$$

$$\Delta V_6 = \frac{16\,\mu C}{6\,\mu F} = \underline{2.67\,V}$$

$$(\Delta V_{12} = 4\,V - 2.67\,V = 1.33\,V)$$

Finally, looking at circuit ①, we know the ΔV across the 4μF and 8μF capacitors

$$\Rightarrow \quad q_4 = (4\,\mu F)(1.33\,V) = \underline{5.33\,\mu C}$$

$$\Delta V_4 = \underline{1.33\,V}$$

$$q_8 = (8\,\mu F)(1.33\,V) = \underline{10.67\,\mu C}$$

$$\Delta V_8 = \underline{1.33\,V}$$

Summarizing

$\Delta V_{batt} = 6.0\,V$	$q_{eq} = 36.0\,\mu C$
$\Delta V_{18} = 2.0\,V$	$q_{18} = 36.0\,\mu C$
$\Delta V_5 = 4.0\,V$	$q_5 = 20.0\,\mu C$
$\Delta V_6 = 2.7\,V$	$q_6 = 16.0\,\mu C$
$\Delta V_4 = 1.3\,V$	$q_4 = 5.3\,\mu C$
$\Delta V_8 = 1.3\,V$	$q_8 = 10.7\,\mu C$