P #31b

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b) For C_{12} and C_3 in series: $Q_{12} = Q_3 = Q_{eq}$

$C_{eq} = 2.0\,\mu F$
$V_{eq} = 12.0\,V$

$Q_{eq} = C_{eq} \cdot V_{eq}$
$= (2.0\,\mu F)(12.0\,V) = 24.0\,\mu C$ so $\boxed{Q_3 = 24\,\mu C}$

Now for C_3: $Q_3 = 24\,\mu C$, $C_3 = 3.0\,\mu F$ $\quad C_3 = \frac{Q_3}{V_3}$ so $3\,\mu F = \frac{24\,\mu C}{V_3}$

$\boxed{V_3 = 8.0\,V}$

For C_1 & C_2 in parallel $\quad V_{12} = V_1 = V_2$

$C_{12} = 6.0\,\mu F$
$Q_{12} = 24.0\,\mu C$ (from above)

$C_{12} = \frac{Q_{12}}{V_{12}}$ so $6\,\mu F = \frac{24\,\mu C}{V_{12}}$

$\boxed{V_1 = V_2 = 4.0\,V}$

For C_1: $V_1 = 4.0\,V$, $C_1 = 4.0\,\mu F$

$Q_1 = V_1 \cdot C_1$
$= (4.0\,V)(4.0\,\mu F)$

$\boxed{Q_1 = 16\,\mu C}$

For C_2: $V_2 = 4.0\,V$, $C_2 = 2.0\,\mu F$

$Q_2 = V_2 \cdot C_2$
$= (4.0\,V)(2.0\,\mu F)$

$\boxed{Q_2 = 8\,\mu C}$