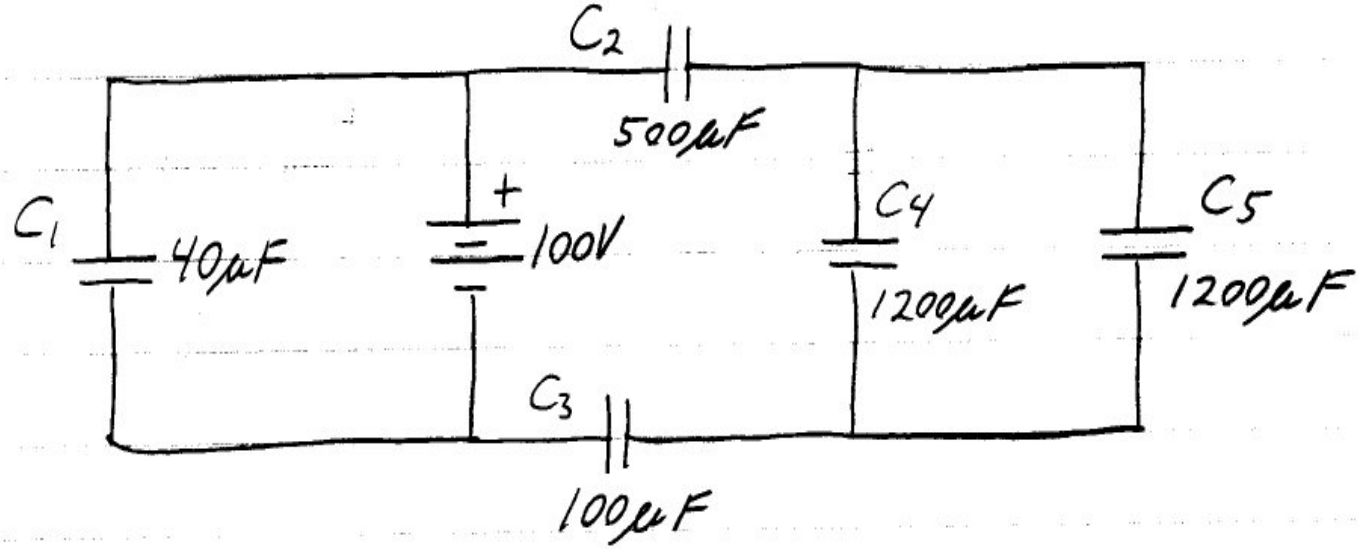
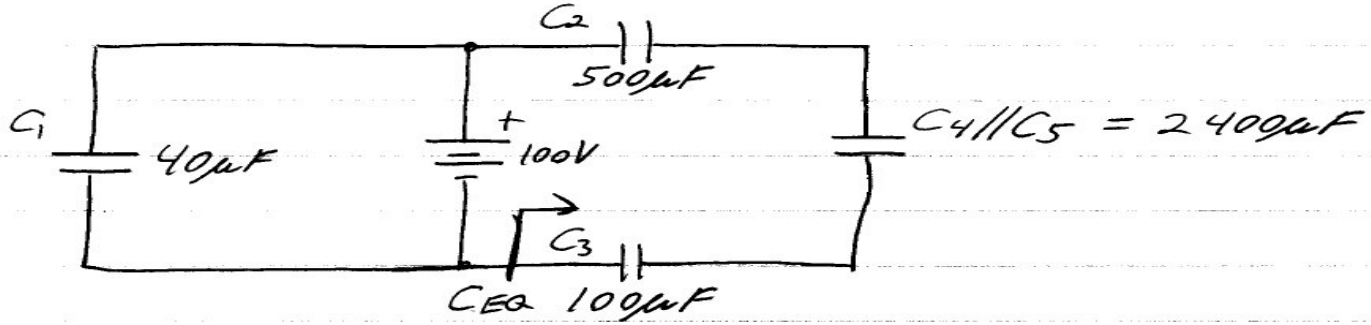
CHARGE & VOLTAGE

(EXAMPLE 2) FIND THE VOLTAGE ACROSS & CHARGE ON EACH CAPACITOR:



REDRAW:



USE $Q = CV$:

FOR $C_1 \rightarrow Q_1 = (40\mu F)(100V) = \boxed{4mC}$

$Q_2 = Q_3 = (Q_4 + Q_5)$

$$C_{EQ} = \frac{1}{\frac{1}{500\mu F} + \frac{1}{100\mu F} + \frac{1}{2400\mu F}} = \underline{80.54\mu F}$$

FOR $C_{EQ} \rightarrow Q_{CEQ} = (80.54\mu F)(100V) = \underline{8.054mC}$

$\therefore Q_2 = \boxed{8.054mC}$

$V_2 = Q_2/C_2 = \frac{8.054mC}{500\mu F} = \boxed{16.11V}$

$Q_3 = \boxed{8.054mC}$

$V_3 = Q_3/C_3 = \frac{8.054mC}{100\mu F} = \boxed{80.54V}$

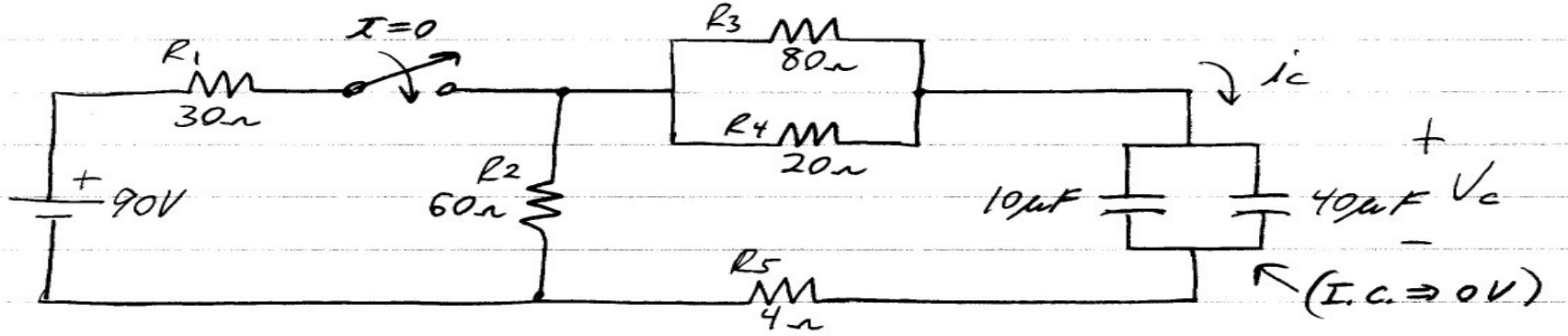
KVL ✓

$(Q_4 + Q_5) = 8.054mC$

$\therefore V_4 = V_5 = \frac{8.054mC}{2400\mu F} = \boxed{3.36V}$

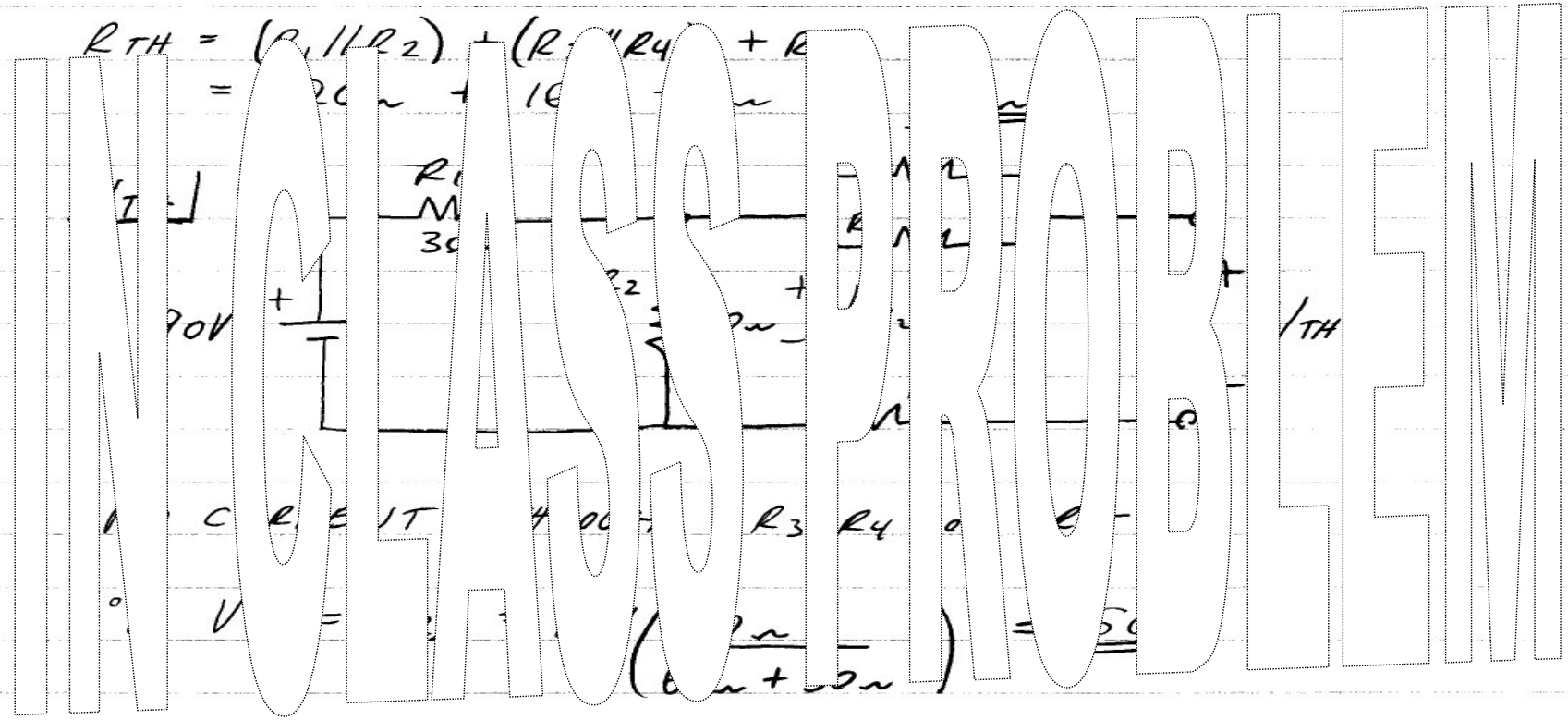
$Q_4 = Q_5 = (1200\mu F)(3.36V) = \boxed{4.027mC}$

(EXAMPLE 3) Find V_c + Q at $t = 1ms$ + $t = 1$ hour:



THÉVENIN EQUIVALENT SEEN BY $C_{EQ} = 50\mu F$:
(FOR $t \geq 0$)

$R_{TH} = (R_1 // R_2) + (R_3 // R_4 + R$
$= 20\Omega + 10\Omega + \Omega \cong$



$V_{TH} = \left(\frac{\Omega}{\Omega + \Omega}\right) =$

IN CLASS PROBLEM

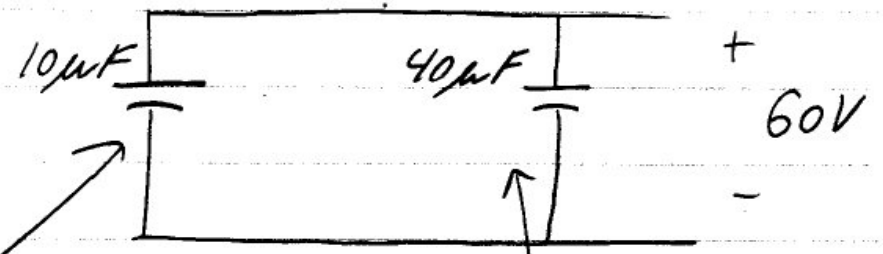
IN CLASS PROBLEM

IN CLASS PROBLEM

IN CLASS PROBLEM

@ $t = 1$ hour $\quad V_c(t)\Big|_{t >> \tau} = 60V$

WE HAVE:



$Q = CV$

$= (10\mu F)(60V)$

$\boxed{Q = 600\mu C}$

$Q = CV$

$= (40\mu F)(60V)$

$\boxed{Q = 2.4mC}$