

26.46

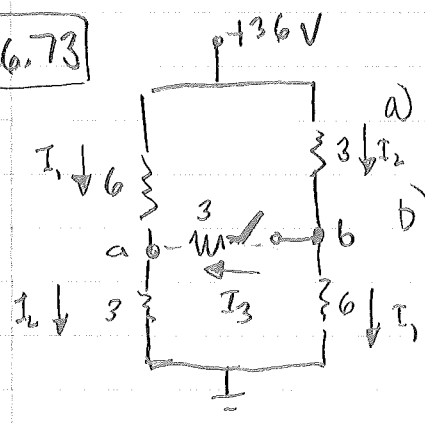
$RC = 175 \times 12 \times 10^{-6} \text{ sec.} = 0.0021 \text{ sec.} = \tau.$

a) $Q = Q_0 e^{-t/RC}$ so $\frac{Q}{Q_0} = \frac{1}{2} = e^{-t/RC}$

$\ln \frac{1}{2} = -\frac{t}{RC}$ $t = 0.001455 = 1.45 \text{ ms}$

b) Since $U = \frac{1}{2} \frac{Q^2}{C} = \frac{1}{2} \frac{Q_0^2}{C} e^{-2t/RC}$ $\frac{U}{U_0} = \frac{1}{2} = e^{-2t/RC}$ $t = 0.725 \text{ ms}$

26.73



a) Open switch $V_a = \frac{3}{9} \times 36 = 12V$ $V_b = \frac{6}{9} \times 36 = 24V.$

b) Assign I_1 & I_2 , by symmetry, as shown. Then $I_3 = I_2 - I_1$ (Jct. b)

Then use Volt loop law

$36 - 6I_1 - 3I_2 = 0$ & $36 - 6I_1 + 3I_3 - 6I_1 = 0$

$36 - 12I_1 + 3I_2 - 3I_1 = 0$

$36 - 15I_1 + 3I_2 = 0$

$72 - 21I_1 = 0$

$I_1 = 24/7 \text{ A.}$

$I_2: 36 - 6 \cdot \frac{24}{7} - 3I_2 = 0$

$\frac{252}{7} - \frac{144}{7} - 3I_2 = 0$ $I_2 = \frac{36}{7}$ Total $I = I_1 + I_2 = \frac{60}{7}$

c) $R_{eff} = \frac{V}{I} = \frac{36.7}{60} = 4.2 \Omega.$

$I_3 = I_2 - I_1 = \frac{12}{7}$

26.69

a) Loop law left loop. cw start at a.

$+20V + 18\Omega \cdot 5A + 12\Omega \cdot 5A + 16V + X = 0$ $X = -186V$ (Top)

(b) for 8Ω R, $I = 16V/R = 2A$ up. $\therefore I_{200} = 5 - 2 = 3A$, up.

(c) Loop law for right loop

$200 - \frac{1R}{2} + 16 - 186 = 0$

$IR = 60V$ $I = 3A$ $R = 20\Omega.$

