14.39 Determine the initial and final values of the voltage $v_o(t)$ in the network in Fig. P14.39.

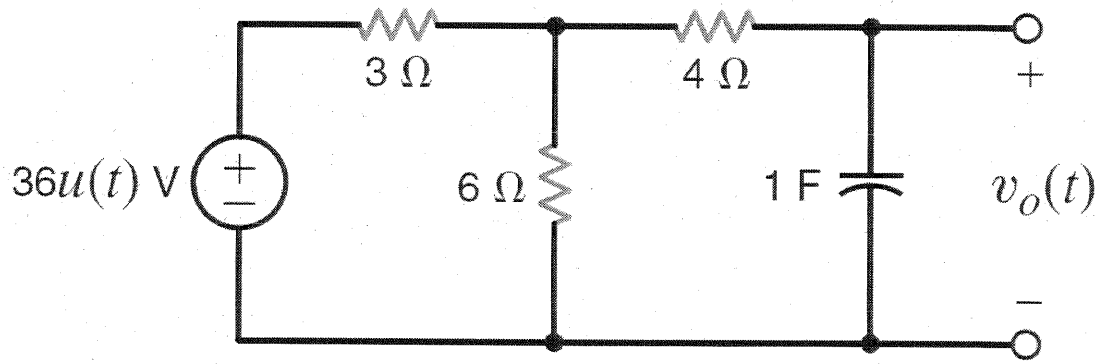
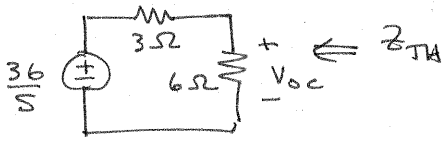


Figure P14.39

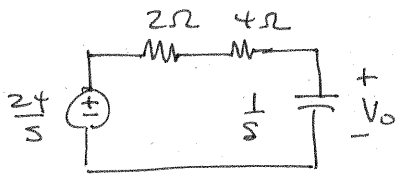
SOLUTION: Use Thevenin's



$\Leftarrow Z_{TH}$

$V_{oc} = \frac{6}{9}\left(\frac{36}{s}\right) = \frac{24}{s}$ V

$Z_{TH} = 3(6)/9 = 2\Omega$



$V_o = \frac{24}{s}\left[\frac{1/s}{6+1/s}\right] = \frac{24}{s(6s+1)}$

$\lim_{t\to 0} v_o(t) = \lim_{s\to\infty} sV_o(s) = \frac{24}{6(\infty)} = 0$ $\quad\boxed{v_o(0) \to 0\text{V}}$

$\lim_{t\to\infty} v_o(t) = \lim_{s\to 0} sV_o(s) = \frac{24}{1} = 24\text{V}$ $\quad\boxed{v_o(\infty) \to 24\text{V}}$