**Chapter 6, Solution 31.**

$$i_s(t) = \begin{cases} 30tmA, & 0 < t < 1 \\ 30mA, & 1 < t < 3 \\ -75 + 15t, & 3 < t < 5 \end{cases}$$

$$C_{eq} = 4 + 6 = 10\mu F$$

$$v = \frac{1}{C_{eq}} \int_o^t i\,dt + v(0)$$

For $0 < t < 1$,

$$v = \frac{10^{-3}}{10x10^{-6}} \int_o^t 30t\,dt + 0 = 1.5t^2\ kV$$

For $1 < t < 3$,

$$v = \frac{10^3}{10} \int_1^t 20dt + v(1) = [3(t-1) + 1.5]kV$$

$$= [3t - 1.5]kV$$

For $3 < t < 5$,

$$v = \frac{10^3}{10} \int_3^t 15(t-5)dt + v(3)$$

$$= \left[1.5\frac{t^2}{2} - 7.5t\right]\Big|_3^t + 7.5kV = [0.75t^2 - 7.5t + 23.25]kV$$

$$\boldsymbol{v(t) = \begin{cases} 1.5t^2 kV, & 0 < t < 1s \\ [3t - 1.5]kV, & 1 < t < 3s \\ [0.75t^2 - 7.5t + 23.25]kV, & 3 < t < 5s \end{cases}}$$

$$i_1 = C_1 \frac{dv}{dt} = 6x10^{-6} \frac{dv}{dt}$$

$$\boldsymbol{i_1 = \begin{cases} 18tmA, & 0 < t < 1s \\ 18mA, & 1 < t < 3s \\ [9t - 45]mA, & 3 < t < 5s \end{cases}}$$

$$i_2 = C_2 \frac{dv}{dt} = 4x10^{-6} \frac{dv}{dt}$$

$$\boldsymbol{i_2 = \begin{cases} 12tmA, & 0 < t < 1s \\ 12mA, & 1 < t < 3s \\ [6t - 30]mA, & 3 < t < 5s \end{cases}}$$