Chapter 7, Solution 23.

Since the 2 Ω resistor, 1/3 H inductor, and the (3+1) Ω resistor are in parallel, they always have the same voltage.

$$-i = \frac{10}{2} + \frac{10}{3+1} = 7.5 \quad \longrightarrow \quad i(0) = -7.5$$

The Thevenin resistance R_{th} at the inductor's terminals is

$$R_{th} = 2 \,||\, (3+1) = \frac{4}{3}, \qquad \tau = \frac{L}{R_{th}} = \frac{1/3}{4/3} = \frac{1}{4}$$

$$i(t) = i(0)e^{-t/\tau} = -7.5e^{-4t}, \quad t > 0$$

$$v_L = v_o = L\frac{di}{dt} = -7.5(-4)(1/3)e^{-4t}$$

$$v_o = \mathbf{10e^{-4t}\ V}, \quad \mathbf{t > 0}$$

$$v_x = \frac{1}{3+1}v_L = \mathbf{2.5e^{-4t}\ V}, \quad \mathbf{t > 0}$$