**Chapter 6, Solution 44.**

A 100-mH inductor is connected in parallel with a 2-kΩ resistor. The current through the inductor is $i(t) = 50e^{-400t}$ mA. (a) Find the voltage $v_L$ across the inductor. (b) Find the voltage $v_R$ across the resistor. (c) Is $v_R(t) + v_L(t) = 0$? (d) Calculate the energy in the inductor at t=0.

**Solution**

(a) $$v_L = L\frac{di}{dt} = 100x10^{-3}(-400)x50x10^{-3}e^{-400t} = \underline{-2e^{-400t}\ \text{V}}$$

(b) Since R and L are in parallel, $v_R = v_L = \underline{-2e^{-400t}\ \text{V}}$

(c) **No**

(d) $$w = \frac{1}{2}Li^2 = 0.5x100x10^{-3}(0.05)^2 = \mathbf{125\ \mu J}.$$