Chapter 6, Solution 65.

(a) $w_5 = \frac{1}{2}L_1 i_1^2 = \frac{1}{2}x5x(4)^2 = \mathbf{40\ J}$

$w_{20} = \frac{1}{2}(20)(-2)^2 = \mathbf{40\ J}$

(b) $w = w_5 + w_{20} = \mathbf{80\ J}$

(c) $i_1 = \frac{1}{L_1}\int_0^t -50e^{-200t}dt + i_1(0) = \frac{1}{5}\left(\frac{1}{200}\right)\left(50e^{-200t}x10^{-3}\right)\Big|_0^t + 4$

$= \mathbf{[5x10^{-5}(e^{-200t} - 1) + 4]\ A}$

$i_2 = \frac{1}{L_2}\int_0^t -50e^{-200t}dt + i_2(0) = \frac{1}{20}\left(\frac{1}{200}\right)\left(50e^{-200t}x10^{-3}\right)\Big|_0^t - 2$

$= \mathbf{[1.25x10^{-5}\ (e^{-200t} - 1) - 2]\ A}$

(d) $i = i_1 + i_2 = \mathbf{[6.25x10^{-5}\ (e^{-200t} - 1) + 2]\ A}$