Chapter 6, Solution 41.

$$i = \frac{1}{L}\int_0^t v\,dt + C = \left(\frac{1}{2}\right)\int_o^t 20\left(1 - e^{-2t}\right)dt + C$$

$$= 10\left(t + \frac{1}{2}e^{-2t}\right)\Big|_o^t + C = 10t + 5e^{-2t} - 4.7A$$

Note, we get C = –4.7 from the initial condition for i needing to be 0.3 A.

We can check our results be solving for v = Ldi/dt.

$v = 2(10 - 10e^{-2t})V$ which is what we started with.

At t = l s, $i = 10 + 5e^{-2} - 4.7 = 10 + 0.6767 - 4.7 =$ **5.977 A**

$w = \frac{1}{2}L\,i^2 =$ **35.72J**