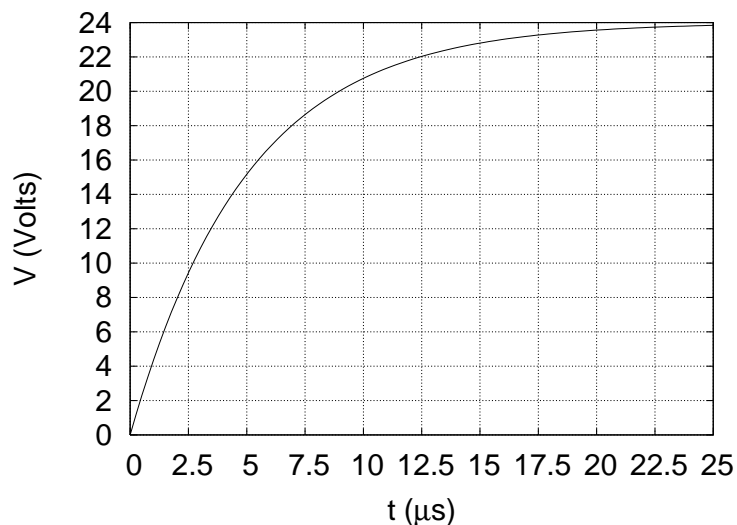3. (20 pts.) A 24V battery with negligible internal resistance is connected in series with a $40\,k\Omega$ resistor, an unknown inductor, and an open switch. The switch is closed at time $t = 0$. The voltage as a function of time across one of the circuit elements is shown in the following figure. (Note that the horizontal scale is in microseconds.)

a. (5 pts.) Across which circuit element is the voltage in the figure being measured? Explain your reasoning. No credit will be given for an answer without correct reasoning.

b. (15 pts.) What is the inductance of the inductor? You may assume the internal resistance of the inductor is zero. (Recall that $t_{1/2} = \tau \ln 2$.)