76. Consider the object of mass m_1 falling through a distance h. The loss of its mechanical energy is $\Delta E = m_1 gh$. This amount of energy is then used to heat up the temperature of water of mass m_2: $\Delta E = m_1 gh = Q = m_2 c\Delta T$. Thus, the maximum possible rise in water temperature is

$$\begin{aligned}
\Delta T &= \frac{m_1 gh}{m_2 c} \\
&= \frac{(6.00\,\mathrm{kg})\left(9.8\,\mathrm{m/s^2}\right)(50.0\,\mathrm{m})}{(0.600\,\mathrm{kg})\left(4190\,\mathrm{J/kg\cdot C^\circ}\right)} \\
&= 1.17\ \mathrm{C^\circ}\ .
\end{aligned}$$