CW2HWST-2)

There are three possible outcomes: the water stays liquid, the water is partially turned to gas, and the water all becomes gas.

First, assume $T_f < 100^oC$

$$m_W c_W \Delta T_W + m_{Cu} c_{Cu} \Delta T_{Cu} + m_{Al} c_{Al} \Delta T_{Al} = 0$$

$$m_W c_W (T_f - T_{Wi}) + m_{Cu} c_{Cu} (T_f - T_{Cui}) + m_{Al} c_{Al} (T_f - T_{Ali}) = 0$$

$$(m_W c_W + m_{Cu} c_{Cu} + m_{Al} c_{Al}) T_f = m_W c_W T_{Wi} + m_{Cu} c_{Cu} T_{Cui} + m_{Al} c_{Al} T_{Ali}$$

$$T_f = \frac{m_W c_W T_{Wi} + m_{Cu} c_{Cu} T_{Cui} + m_{Al} c_{Al} T_{Ali}}{m_W c_W + m_{Cu} c_{Cu} + m_{Al} c_{Al}} = \frac{400(4.81)20 + 300(1.46)125 + 100(0.89)20}{400(4.81) + 300(1.46) + 100(0.89)}$$

$$= 38.8^oC$$

Since this result is consistent with the assumption, we'll accept it as correct.