28. (a) The water (of mass m) releases energy in two steps, first by lowering its temperature from 20°C to 0°C, and then by freezing into ice. Thus the total energy transferred from the water to the surroundings is

$$Q = c_w m\Delta T + L_F m = (4190\,\text{J/kg}\cdot\text{K})(125\,\text{kg})(20°\text{C}) + (333\,\text{kJ/kg})(125\,\text{kg}) = 5.2\times10^7\,\text{J}.$$

(b) Before all the water freezes, the lowest temperature possible is 0°C, below which the water must have already turned into ice.