[tex153] Cooling down? Heating up?

A vessel with insulating walls of negligible heat capacity has two compartments. The first compartment contains 1kg of ice and 1kg of water coexisting at 0°C. The second compartment contains 5kg of ice at −20°C. Now we open the wall between the compartments and wait until thermal equilibrium has been reached. What are the final temperature, the final masses of ice and water, and the change in entropy?
In a modified experiment the first compartment again contains 1kg of ice and 1kg of water coexisting at 0°C but the second compartment contains 5kg of water at +20°C. What are the final temperature, the final masses of ice and water, and the change in entropy?
Specific heats of water and ice: $c_w = 4180\text{J/kgK}$, $c_i = 2090\text{J/kgK}$.
Latent heat of melting: $L_m = 3.34 \times 10^5\text{J/kg}$.

Solution: