

**Name:** [5 pts]

1) You are in a mountain and decide to make some tea for yourself. So you take  $m = 0.50$  kg of snow with temperature  $T = -10^\circ\text{C}$ , and put it in your pot. Your camping stove provides a power of  $P = 0.30$  kW. The latent heat for fusion of water is  $L_f = 340$  kJ/kg, and the specific heat of the snow/ice and water are  $c_i = 2.1$  kJ/(kg K) and  $c_w = 4.2$  kJ/(kg K), respectively.

**a)** How long you have to wait to get boiling water? [7 pts]

**b)** After you made the tea and pour it to your thermos, you want to drop a small piece of ice, with temperature  $T = -10^\circ\text{C}$ , to lower the tea temperature quickly, from  $T_h = 90^\circ\text{C}$  to  $T_l = 60^\circ\text{C}$ . Estimate the mass of the ice you need. [7 pts]