J99T.3—Ice Making Machine

Problem

In a large thermally insulated room 100g of water is initially at room temperature, $T_r = 27^{\circ}$ C and at atmospheric pressure. An ice making machine, initially at 27°C, is also in the room. What is the minimum amount of work by the machine needed to transform all the water into ice at 0°C and atmospheric pressure?

Useful constants:

Specific heat of water c = 4.2 kJ/kgK

Heat of fusion $\lambda = 330 \text{ kJ/kg}$