(52) $Q = Q_{(ice)}_{-10\to 0} + Q_{(ice\to water)} + Q_{(water)}_{0\to T}$

$Q = C_{ice} m \Delta T + m L_f + C_w m \Delta T$

$4.11 \times 10^6 J = \left(2.00 \times 10^3 \frac{J}{kg\,^\circ C}\right) 10.0\,kg\,[0-(-10^\circ C)]$

$+ (10.00\,kg)(33.5 \times 10^4 J/kg) + 4186 \frac{J}{kg\,^\circ C}\, 10\,kg\,(T$

$4.11 \times 10^6 = 2.07 \times 10^5 + 33.5 \times 10^5 + 41860\,T$

$41860\,T = 5.6 \times 10^5 \Rightarrow T = 13^\circ C.$

(50) $Q = c m \Delta T \Rightarrow \Delta T = \frac{Q}{cm} = \frac{Q}{c\rho V} = \frac{Q}{c\rho AL}$

Contracts according to: $\Delta L = \alpha L \Delta T$

$\Delta L = \alpha L \frac{Q}{c\rho AL} = \frac{\alpha Q}{c\rho A}$

Stress is given by $F = YA \frac{\Delta L}{L}$

$= YA \frac{\alpha Q}{LC\rho A} = \frac{\alpha Q Y}{CL\rho}$

$F = \frac{(12 \times 10^{-6}\,^\circ C^{-1})(3300\,J)(2.0 \times 10^{11}\,N/m^2)}{(452\,\frac{J}{kg\,^\circ C})(2.0\,m)(7860\,kg/m^3)} = 1.1 \times 10^3$

(73) $\%\,RH = \frac{\text{partial pressure}}{\text{Saturation Vapor pressure}} \times 100$

$= \frac{\text{Due point Vapor pressure}}{S.V.P} \times 100$

$= \frac{1400\,Pa}{4200\,Pa} \times 100 = 33\%$