

Answer on question #53231, Physics / Molecular Physics — Thermodynamics

Question 5 grams of ice at 0 degree Celsius is mixed with 10 grams of water at 50 degree Celsius. What is the resultant temperature ?

Solution The equation of heat conservation is

$$m_{ice}C_{melting} + m_{ice}\theta c_{water} = m_{water}c_{water}(t_0 - \theta)$$

where θ is resulting temperature of mixture, $C_{melting}$ is specific heat of melting ice and c_{water} is specific heat capacity of water and t_0 is initial temperature of water. Hence

$$\theta = \frac{m_{water}c_{water}t_0 - m_{ice}C_{melting}}{c_{water}(m_{ice} + m_{water})}$$
$$\theta \approx 7.1^\circ C,$$