Chemistry 122

Heat Calculations

1. Calculate the quantity of heat required to warm 1.25 L of water from 22.0 ^{o}C to 98.0 ^{o}C in an electric kettle.
2. Assuming a volumetric heat capacity the same as pure water, calculate the heat that must be released from a soft drink in a 2.00L container when the soft drink is cooled from 22.0 ^{o}C to 10.0 ^{o}C.
3. What mass of aluminum in a car engine will absorb 1.00 MJ of heat when the temperature rises from 22.0 ^{o}C to 102 ^{o}C after the car has started?
4. Assume the liquid coolant in a car engine has a volumetric heat capacity of 3.88 kJ/(L^{o}C). Determine the volume of coolant that will absorb 1.00 MJ of heat during a temperature rise from 22.0 ^{o}C to 102 ^{o}C.
5. In a laboratory experiment, 2.00 kJ of heat flowed to a 100.0 g sample of a liquid solvent, causing a temperature increase from 15.40 ^{o}C to 21.37 ^{o}C. Calculate the specific heat capacity of the liquid.
6. A human body loses about 360 kJ of heat every hour. Assuming that an average human body is equivalent to about 60.0 kg of water, what temperature decrease would this heat transfer cause? (Of course, this heat is replaced by body metabolism.)