Calorimetry

Name: _

1) How many Joules of heat is released to your body when you drink a cup of hot tea which contains 200. g of water at a temperature of 65 °C and it cools to body temperature (37 °C)?

2) On a cold winter day with a temperature of 4 $^{\circ}$ C, you pick up a penny from the ground and put in your pocket. If the penny has a mass of 1.85 grams, how much heat will it absorb from you body as it warms to your body temperature of 37 $^{\circ}$ C (the specific heat of copper is 0.385 J/g $^{\circ}$ C)?

3) A swimming pool measures 6.0 m x 12.0 m and has a uniform depth of 3.0 m. The pool is full of water at a uniform temperature of 20 °C. Given that a cubic meter (m³) of water has a mass of 103 kg, How much heat energy must be released by the pool's heater to raise the water temperature to $25 \,^{\circ}$ C?

4) A 60.0 g piece of steel is placed inside a cup with 192 g of hot water at 50 °C. The steel metal piece, initially at 25 °C is heated to the temperature of the water, which cools to 49 °C with the heat transfer. The amount of heat absorbed by the steel is 67.2 J. What is the specific heat of the steel?

5) 25 g of ice at 0 °C is placed in a calorimeter with water at 45 °C. The water when mixed together reach a final temperature of 31.8 °C. Knowing that whatever heat is lost by the water is gained by the ice, what mass of water was in the cup?

Calorimetry

2) A 1000 g pot of water is heated from 19 $^{\rm o}{\rm C}$ to 101 $^{\rm o}{\rm C}$. How much heat was absorbed by the water?

3) The specific heat of copper is 0.385 J/g °C. How many grams of copper are cooled from 35 °C to 17 °C when 825 J of energy are removed?

4) Mercury is a metal that is very easy to heat up. A certain mercury thermometer contains 4.5 grams of mercury. As the mercury in the thermometer heats from 14 °C to 72 °C, it absorbs 36.5 J of energy. What is the specific heat of mercury?

5) A hot cup of coffee releases 43.6 kJ of energy to your body. If a 60 kg person has a body temperature of 37.0 $^{\circ}$ C, to what temperature will the person's body rise? (Assume the specific heat of a person is 3.50 J/g $^{\circ}$ C)