PRACTICE: HEAT

Try these practice questions.

- ☞ If you do not get the correct answer then try again.
- ☞ If you still don't get the correct answer then check the posted solutions for help.
- ☞ If you do get the correct answer then check the posted solutions for presentation.

1. Calculate the quantity of heat required to raise the temperature of 6.0 mL of water from 25 °C to 75 °C.

   [answer 1.3 kJ]

2. Ethylene glycol is used as a coolant in car radiators. The 50% ethylene glycol solution commonly used has a specific heat capacity of 3.5 J g^{-1} $°C^{-1}$. Calculate the change in temperature that occurs when 4.0 kg of this solution absorbs 250 kJ of thermal energy.

   [answer 18 °C]

3. An 87-g piece of copper is heated to 99.6 °C. The hot copper is transferred to an insulated vessel containing 103.2 mL of water at 21.6 °C. After a couple minutes, the temperature of the copper and water is 27.2 °C.

   (a) Calculate the quantity of heat transferred to the water, q_{H20}.

   [answer 2.4 kJ]

   (b) If we assume that the system (copper and water) is isolated then the total heat transfer in the system must be zero (an isolated system cannot lose or gain energy). The heat transfer for the water (q_{H20}) and the heat transfer for the copper (q_{Cu}) must add up to zero.

   $$\text{i.e.,} \quad q_{H20} + q_{Cu} = 0$$

   $$\text{Therefore,} \quad q_{Cu} = -q_{H2O}$$

   What is the heat transfer for the copper? (A negative quantity of heat means thermal energy was lost from the substance.)

   [answer –2.4 kJ]

   (c) Use your answer from (b) to calculate the specific heat capacity of copper.

   [answer 0.38 J g^{-1} $°C^{-1}$]