Chemistry: Heat Problems

Solve each of the following problems. Use correct units, and show your work for full credit.

1. The specific heat of ethanol is 2.46 J/g°C. Find the heat energy required to raise the temperature of 193 g of ethanol from 19°C to 35°C.

2. When a 120 g sample of aluminum absorbs 9612 J of heat energy, its temperature increases from 25°C to 115°C. Find the specific heat of aluminum. Include the correct unit.

3. The specific heat of lead is 0.129 J/g°C. Find the amount of heat released when 2.4 mol of lead are cooled from 37.2°C to 22.5°C.

4. How many kJ of energy are needed to raise the temperature of 165 mol of water from 10.55°C to 47.32°C?

5. A 150 g sample of water (initially at 45.0°C) is mixed with a 200 g sample of water (initially at 84.0°C). Find the final temperature of the system.

6. A 25 g sample of iron (initially at 800.00°C) is dropped into 200 g of water (initially at 30.00°C). The final temperature of the system is 40.22°C. Find the specific heat of iron.

7. A 440 g sample of mercury (specific heat = 0.14 J/g°C, initial temperature of 22.00°C) is placed into 134 g of water (initial temperature of 35.00°C). Find the final temperature of the system.

Answers: 1. + 7600 J  4. 456.5 kJ  7. 33.71°C 
2. 0.89 J/g°C  5. 67.3°C 
3. – 943 J  6. 0.45 J/g°C