Thermodynamics Practice Problems

Be sure to show all work and the answer with the appropriate unit. Complete on a separate sheet of paper.

1. The temperature of 335 g of water changed from 24.5 degrees C to 26.4 degree C. How much heat did this sample absorb? (Cp for water = 4.18 J/g°C)
2. How much heat in kilojoules has to be removed from 225 g of water to lower its temperature from 25.0 degrees C to 10.0 degrees C? (1000 J = 1 kJ)
3. How much heat is required to bring 1.0 kg of water from 25 degree C to 99 degree C? (1000 g = 1 kg)
4. How much heat is required to boil 78 g of water at 100 degrees Celsius?
5. A calorimeter has a specific heat capacity of 1265 J/g°C. A reaction causes the temperature of the 50.0 g calorimeter to change from 22.34 °C to 25.12 °C. How many kilojoules of heat were released in this process?
6. What is the specific heat of silicon (in J/g°C) if it takes 192 J to raise the temperature of 45.0 g of Si by 6.0°C?
7. Assuming that Coca Cola has the same specific heat as water (4.18 J/g°C), calculate the amount of heat in kJ transferred when one can (about 350 g) is cooled from 25°C to 3°C.
8. Calculate the amount of heat needed to melt 35.0 g of ice at 0 ºC. Express your answer in kilojoules.
9. What is the temperature in Kelvin of 560 degrees Celsius?
10. What is the specific heat (in J/g°C) of lead if it takes 96 J to raise the temperature of a 75 g block by 10°C?
11. Titanium metal is used as a structural material in many high-tech applications such as jet engines. What is the specific heat of titanium (in J/g°C) if it takes 89.7 J to raise the temperature of a 33.0 g block by 52.0 °C?
12. How many joules are needed to completely melt 25 g of ice at 0oC?
13. What is the temperature in Celsius of an object at 700 K?
14. Mercury is the only metal that exists as a liquid at room temperature. Hg as a specific heat capacity of 0.140 J/g°C. How many kilojoules of energy are required to increase 75.0 kg of Hg from 23.0 to 52°C?
15. An insulated cup contains 75.0 g of water at 24.00°C. A 26.00 g sample of metal at 82.25°C is added. The final temperature of the water and metal is 28.34°C. What is the specific heat of the metal?