Specific Heat Capacity – Worksheet 1

1. In kJ, how much heat is required to raise the temperature of 1.23 kg of water from 23.6 °C to 84.9 °C? (317 kJ)
2. How much heat is needed to warm up 3.6 kg of hydrogen gas from 12.0 °C to 48.0 °C?
3. How much heat is released when a 260.0 g plate of copper cools from 5.30×10^2 K to 20.0 °C? (-24.0 kJ)
4. 3.4 kJ of heat is added to a 1.4 kg rod of uranium. What is the change in temperature the rod undergoes?
5. 24 000 J of heat is released when 640 g of silver drops in temperature. If the silver was initially at -10.0 °C, what is the final temperature of the silver? (-170 °C)
6. A mass of gold, initially at 540.0 °C, experiences a drop in temperature of 12.0 °C when 82.0 J of heat is released. What is the mass of the gold in grams?
7. 5.00×10^2 J of heat produces a temperature increase of 8.77 K in a 95 g sample of an unknown substance. What is the specific heat capacity? What is the substance? (6.00×10^2 J/kg°C)
8. What is the difference between the amount of heat required to show an increase of 25.0 K thermometer containing 2.00 g of mercury and a thermometer made of the same mass of methyl alcohol? Be sure to take the larger number and subtract the smaller number.
9. How many grams of mercury must be in a thermometer to show the same temperature increase as the methyl alcohol thermometer in #8 (if it received the same amount of energy)? (35.7 g)
10. A 15.75-g piece of iron absorbs 1086.75 joules of heat energy, and its temperature changes from 25°C to 175°C. Calculate the specific heat capacity of iron.
11. How many joules of heat are needed to raise the temperature of 10.0 g of aluminum from 22°C to 55°C, if the specific heat of aluminum is 0.90 J/g°C?
12. To what temperature will a 50.0 g piece of glass raise if it absorbs 5275 joules of heat and its specific heat capacity is 0.50 J/g°C? The initial temperature of the glass is 20.0°C.
13. Calculate the heat capacity of a piece of wood if 1500.0 g of the wood absorbs 6.75×10^4 joules of heat, and its temperature changes from 32°C to 57°C.
14. 100.0 mL of 4.0°C water is heated until its temperature is 37°C. If the specific heat of water is 4.18 J/g°C, calculate the amount of heat energy needed to cause this rise in temperature.
15. Assuming that Coca Cola has the same specific heat as water (4.18 J/goC), calculate the amount of heat in kJ transferred when one can (about 350g) is cooled from 25°C to 3°C .
16. Mercury (Hg) is the only metal that exists as a liquid at room temperature. Hg as a specific heat capacity of 0.140J/g°C. How many kilojoules of energy are required to increase 75.0kg of Hg from 23.0 to 52.0°C?
17. 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 33.0g block by 5.20°C?