Specific Heat and Heat Exchange Problems

1. How much heat is required to raise 80.0 g of aluminum from 12°C to 46°? [2.4 k J]

2. How much heat is required to raise 30.0 kg of iron from 40.0 °C to 180.0°C ? [1860 kJ]

3. How much heat must mercury lose so 290 g cools from 116°C to 31°C? [-3.4 kJ]

4. What temperature results when 500.0 J of heat are added to 50.0 g of silver at an initial temperature of 25 °C? [67°C]

5. What mass of copper at a temperature of 15°C must be used so 300.0 J of heat will cause it to warm to 35 °C? [39 g]

6. To warm 250 g of glycerine from 21°C to 46°Crequuired 3625 J of heat. Calculate the specific heat of glycerine. [0.58 J/g°C]

7. Two hundred grams of turpentine was heated from 20.0°C to 55.0°C by the cooling of 147 g of water from 75.0°C to 55.0°C. What is the specific heat of turpentine?

[1.76 J/g°C]

8. How much water at 25°C must be added to 15 kg of water at 10 °C so that the mixture becomes 20°C? [30 kg]

9. If 70.0 g of water at 95°C was mixed with 59 g of water at 25°C, what is the final temperature of the mixture? [63 °C]

10. What mass of copper at 90°C must be added to 200 g of water at 10°C so the final temperature of the mixture is 20°C? [300 g]

11. What mass of aluminum at 150°C must be added to 7.0 kg of water initially at 15°C if both materials end up at 30°C? [4.1kg]

12. When 200 g of mercury at 100°C was mixed with some water at 20°C, the final temperature reached 25°C. Calculate the mass of the water. [100 g]

13. A metallic object with a mass of 60.0 g and an initial temperature of 75°Cwas placed into 20.0 g of water initially at 10.0°C. The water stabilized at 25°C. Find the specific heat capacity of the metal and determine what metal this might be.

[c=0.42 J/g°C]

14. To make a candle, 75 g of liquid wax (c=2.10 J/g°C) at 95°C was poured into a 40.0 g iron mould at 20.0°C. What is the final temperature of the wax? [87°C]

15. A 155 g piece of nickel initially at a temperature of 100.0°C was poured into 80.0 g of glycol antifreeze (c=2.20 J/g°C) at 11°C. If the final temperature of the resulting was 40.0°C, calculate the specific heat capacity of nickel. [0.55 J/g°C]