

1. Convert 22 °C to the following units: (4 pts)

$$^{\circ}\text{C} = \frac{^{\circ}\text{F} - 32}{1.8}$$

a. Fahrenheit:

$$^{\circ}\text{F} = 1.8(^{\circ}\text{C}) + 32 = 1.8(22) + 32 = 71.6 \text{ }^{\circ}\text{F}$$

b. Kelvin:

$$\text{K} = 22 + 273 = 295 \text{ K}$$

2. A pool containing 2.5×10^8 g of water cools from 25.0 °C to 17.0 °C. What is the heat loss in kilocalories? (3 pts) $Q = m \times S \times \Delta T$ (specific heat of water = 1.00 cal/g °C)

$$Q = (2.5 \times 10^8 \text{ g})(1.00 \text{ cal/g}^{\circ}\text{C})(8.0 \text{ }^{\circ}\text{C}) = 2.0 \times 10^9 \text{ cal}$$

$$2.0 \times 10^9 \text{ cal} \times 1 \text{ kcal}/1000 \text{ cal} = 2.0 \times 10^6 \text{ kcal}$$

3. A 10.0g sample of mercury absorbs 110 cal as it is heated from 25 °C to its boiling point at 356 °C. It then requires an additional 697 cal to vaporize. How much energy is released as the mercury vapor cools from 356 °C to 25 °C? (3 pts)

