

Thermodynamics Homework 3

DIRECTIONS: Use $q = (m)(\Delta T)(C_p)$ to solve the following problems. Show all work and units. Check your sig. figs.

- 1) How much energy must be absorbed by 20.0 g of water to increase its temperature from 283.0 °C to 303.0 °C? (C_p of H₂O = 4.184 J/g °C)
- 2) When 15.0 g of steam drops in temperature from 275.0 °C to 250.0 °C, how much heat energy is released? (C_p of H₂O = 4.184 J/g °C)
- 3.) How much energy is required to heat 120.0 g of water from 2.0 °C to 24.0 °C? (C_p of H₂O = 4.184 J/g °C)
- 4) How much heat (in J) is given out when 85.0 g of lead cools from 200.0 °C to 10.0 °C? (C_p of Pb = 0.129 J/g °C)
- 5) If it takes 41.72 joules to heat a piece of gold weighing 18.69 g from 10.0 °C to 27.0 °C, what is the specific heat of the gold?
- 6) A certain mass of water was heated with 41,840 Joules, raising its temperature from 22.0 °C to 28.5 °C. Find the mass of the water, in grams. (C_p of H₂O = 4.184 J/g °C)
- 7) How many joules of heat are needed to change 50.0 grams of ice at -15.0 °C to steam at 120.0 °C? (C_p of H₂O = 4.184 J/g °C)
- 8) Calculate the number of joules given off when 32.0 grams of steam cools from 110.0 °C to ice at -40.0 °C. (C_p of H₂O = 4.184 J/g °C)
- 9) The specific heat of ethanol is 2.46 J/g °C. Find the heat required to raise the temperature of 193 g of ethanol from 19 °C to 35 °C.
- 10) When a 120 g sample of aluminum (Al) absorbs 9612 J of energy, its temperature increases from 25 °C to 115 °C. Find the specific heat of aluminum.