

Chapter 16 Problem 25 †

Given

$$m = 350 \text{ g} = 0.350 \text{ kg}$$

$$\Delta T = 15 \text{ K}$$

$$\Delta Q = 2.52 \text{ kJ} = 2520 \text{ J}$$

Solution

a) Find the heat capacity of the wrench.

Heat capacity, C , can be found from

$$\Delta Q = C\Delta T$$

Solving for C gives

$$C = \frac{\Delta Q}{\Delta T} = \frac{2520 \text{ J}}{15 \text{ K}} = 168 \text{ J/K}$$

b) Find the specific heat of the metal.

Since

$$\Delta Q = mc\Delta T$$

then

$$c = \frac{\Delta Q}{m\Delta T}$$

$$c = \frac{2520 \text{ J}}{(0.350 \text{ kg})(15 \text{ K})} = 480 \text{ J/kgK}$$

Notice that this is the same as taking the heat capacity and dividing by the mass of the wrench.

†Problem from Essential University Physics, Wolfson