Chapter 16 Problem 27 †

Given
$m = 350\ g = 0.350\ kg$
$\Delta T = 15\ K$
$\Delta Q = 2.52\ kJ = 2520\ J$

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

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

b) Find the specific heat of the metal.

Since

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

then

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

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

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