Use: $q_{sys} = -q_{cal}$ **AND** $q = mc\Delta T$ **OR** $q = C\Delta T$ **OR** $q = n\Delta H$

1. A 1.23 g sample of ethyne, C_2H_2, undergoes complete combustion in a calorimeter resulting in a temperature increase of 9.50 °C. The heat capacity of the calorimeter is 6.49 kJ/°C. Calculate the molar heat of combustion for ethyne. *(-1306 kJ/mol)*

2. A 1.53 g sample of sucrose, $C_{12}H_{22}O_{11(s)}$, undergoes combustion with excess oxygen gas in a calorimeter causing a temperature change from 25.00°C to 27.88°C. The heat capacity of the calorimeter is 8.57 kJ/°C. Calculate the molar heat of combustion for sucrose. *(-5523 kJ/mol)*

3. In order to obtain calibration data for a calorimeter, three 2.50 g samples of methanol, CH_3OH, were burned. The average temperature increase was 4.23°C was recorded. The molar heat of combustion of methanol is -726 kJ/mol. Calculate the heat capacity of the bomb calorimeter. *(13.4 kJ/°C)*

4. A very cold piece of silver with a mass of 78.41 g is added to a simple calorimeter that contains 150.0 g of water. The temperature of the calorimeter water changes from 19.73°C to 16.11°C. What was the initial temperature of the silver? (c_{Ag} = 0.240 J/g°•C) *(-105°C)*

5. A new ceramic material underwent for use as an insulator. Part of the analysis involved determining its specific heat capacity. A 20.00 g sample was heated to 200.00°C and added to a simple calorimeter with a heat capacity of 1.46 kJ/°C. The temperature in the calorimeter changed from 24.87°C to 27.15°C. Calculate the specific heat of the ceramic material. *(0.963 J/g.°C)*

6. A volume of 50.0 mL of 0.50 mol/L hydrochloric acid at 22.5°C was mixed with 50.0 mL of 0.50 mol/L sodium hydroxide solution also at 22.5°C in a simple calorimeter. The highest temperature reached after mixing was 26.0°C. Calculate the molar heat of reaction for sodium hydroxide. *(-58.6 kJ/mol)*

Text: p. 664 # 1.b)
p. 665 #'s 2.b), 3, & 4