Friday Worksheet **Name: …….**

Calorimetry worksheet 5

1) A bomb calorimeter containing 100.0 mL of water at 25.0^{o}C was calibrated using 0.460 grams of ethanol. Upon the complete combustion of the ethanol in pure oxygen the temperature of the water rose to 60.0^{o}C.
Calculate the calibration factor of the calorimeter.

2) 0.460 mL of liquid hexane was fully combusted in the same bomb calorimeter as in (1) above where the initial temperature for the water was 25.0^{o}C.
a) Write a thermochemical equation for the combustion of hexane if the molar heat of combustion of hexane is 4158kJ/mol

b) Given that the density of pure hexane is 0.659 g/mL at 25.0^{o}C

c) How many mol of hexane were combusted?

d) How much energy was released in the combustion process?

e) What was the final temperature of the water in the bomb calorimeter?

f) A student calibrated another calorimeter which contained 100.0 mL of water at 25.0^{o}C. During calibration, it was found that 87.7% of the energy supplied to the calorimeter was used to heat the 100.0 mL of water within the calorimeter. The remaining energy heated other components of the equipment. In this calorimeter 0.460 grams of ethanol were fully combusted.

i. From the combustion process, how much energy was available to heat the water?

ii. Determine what temperature rise the student would have measured.