Thermochemistry and Thermodynamics Worksheet 1

1. State whether each statement is true or false and if false, give the reasoning.

(A) If an exothermic reaction takes place in water, heat is absorbed from the water and the temperature of the water increases.

(B) The heat capacity of a bomb calorimeter is the product of the specific heat of the bomb and its mass.

(C) Hess' Law is valid because the thermodynamic quantity, enthalpy, only depends upon the initial and final state of the reaction.

(D) Combustion reactions are usually endothermic.

(E) When an endothermic reaction takes place, q_{rxn} is negative.

(F) Fusion and sublimation are reverse reactions.

2. Given the following information: $C_2H_{4(g)} + 3\ O_{2(g)}$ -----> $2\ CO_{2(g)} + 2\ H_2O_{(g)}$

If $\Delta H_f\ C_2H_{4(g))} = 52.3$ kJ/mol Formula mass $H_2O = 18.02$

$\Delta H_f\ CO_{2(g)} = -393.5$ kJ/mol

$\Delta H_f\ H_2O_{(g)} = -241.8$ kJ/mol

(A) What is ΔH of the reaction?

(B) How much heat would be evolved when 220.56 g $H_2O_{(g)}$ were produced?

(C) How many moles of $C_2H_{4(g)}$ would be required to produce 400.0 kJ of heat?

(D) If the molar volume of $C_2H_{4(g)}$ is 22.4 l/mol, how many liters of C_2H_4 are required in part (C)?

*The "molar volume" of a gas is simply the volume occupied by one mole of the gas.