Thermochem OBJWS Ch 14 Sec.1-3, 5 & Ch 15 Sec 2

1. How does the enthalpy of the products of a reaction system compare with the enthalpy of the reactants when the system is

   a. exothermic? _____

   b. endothermic? _____

2. On what basis are the enthalpy of formation and the enthalpy of combustion defined?

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3. What factors affect the value of ΔH in a reaction system?

   _____

   _____

4. Describe a calorimeter. What information can it give?

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5. What is entropy? Would entropy increase or decrease for changes in state in which the reactant in a gas or liquid and the product is a solid? _____

6. How does the increase in temperature affect the entropy of a system?

7. What combination of ΔH and ΔS values always produces a negative free-energy change?

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8. Explain the relationship between temperature and the tendency for reactions to occur spontaneously.

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9. How much energy is needed to raise the temperature of a 55 g sample of aluminum from 22.4°C to 94.6°C? The specific heat of aluminum is 0.897 J(g•K).

10. If 3.5 kJ of energy are added to a 28.2 g sample of iron at 20°C, what is the final temperature of the iron in kelvins? The specific heat of iron is 0.449 J(g•K).

11. For each equation listed below, determine the ΔH and type of reaction (endothermic or exothermic).

   a. $CH_4(g) + 2O_2(g)$ ----> $CO_2(g) + 2H_2O(l) + 890.31$ kJ

      _____

   b. $CaCO_3(s) + 176$ kJ ----> $CaO(s) + CO_2(g)$

      _____

12. Rewrite each equation below with the ΔH value included with either the reactants or the products, and identify the reaction as endothermic or exothermic.

   a. $Mg(s) + O_2(g)$ ----> $MgO(s)$; $\Delta H^0 = -1200$ kJ

   b. $I_2(s)$ -----$I_2(g)$ $\Delta H^0 = +62.4$ KJ

13. What are the factors affecting reaction rates? There are 4.