Skill Practice 53

First Law Practice

Name: _____

Date: _____

Hour: _____

For some of the following problems, you will need to use a table of ΔH_f values.

1. Using ΔH_f values calculate the enthalpy change for the following reaction.

$$2\ CH_3OH\ (l)\ +\ 3\ O_2\ (g)\ \rightarrow\ 2\ CO_2\ (g)\ +\ 4\ H_2O\ (l)$$

-1453 kJ

2. Using ΔH_f values calculate the enthalpy change for the decomposition of <u>one mole</u> of SO_3 (g) into SO_2 (g) and O_2 (g).

99.2 kJ

3. Calculate the enthalpy change in kilojoules when 54.7g of $MgCO_3$ decomposes according to the following equation: $MgCO_3\ (s)\ \rightarrow\ MgO\ (s)\ +\ CO_2\ (g)$

76.1 kJ

4. Which of the following reactions are exothermic?

A) $C_2H_2\ (g)\ +\ 2\ H_2\ (g)\ \rightarrow\ C_2H_6\ (g)$

B) $CS_2\ (l)\ +\ 3\ O_2\ (g)\ \rightarrow\ CO_2\ (g)\ +\ 2\ SO_2\ (g)$

C) $N_2\ (g)\ +\ O_2\ (g)\ \rightarrow\ 2\ NO\ (g)$

5. Calculate the enthalpy for the following reaction: $4\ NH_3\ (g) + 5\ O_2\ (g) \rightarrow 4\ NO\ (g) + 6\ H_2O\ (g)$. You may only use the following information:

$$N_2\ (g)\ +\ O_2\ (g)\ \rightarrow\ 2\ NO\ (g);\ \Delta H_f = 180.6\ kJ$$
$$N_2\ (g)\ +\ 3\ H_2\ (g)\ \rightarrow\ 2\ NH_3\ (g);\ \Delta H_f = -91.8\ kJ$$
$$2\ H_2\ (g)\ +\ O_2\ (g)\ \rightarrow\ 2\ H_2O\ (g);\ \Delta H_f = -483.7\ kJ$$

-918.3 kJ