Energy and Combustion

Name_____

1) One way to understand energy involved in breaking chemical bonds is to use an analogy, such as the process of pulling apart two magnets.

a) How is pulling apart magnets similar to breaking chemical bonds?

b) Does pulling apart magnets require energy or release energy?

c) How is the energy involved in pulling apart magnets analogous to the energy involved in breaking chemical bonds?

d) Think about holding two magnets close to each other. You let go, and they snap together. How is this similar to energy involved making chemical bonds?

2) Identify the following reactions as exothermic or endothermic:

a) a chemical reaction where the reactants contain more energy than the products.

b) a chemical reaction where the products contain more energy than the reactants.

c) C_2H_4 ---> 2 C + 2 H_2 + 52.3 kJ

d) 2 HgO + 181 kJ ---> 2 Hg + O_2

e) Br_2 + Cl_2 + 29.4 kJ ---> 2 BrCl ΔH = 29.4 kJ

f) BCl_3 + 3 H_2O ---> H_3BO_3 + 3 HCl ΔH = - 112 kJ

g) a chemical reaction that gets hot

h) a chemical reaction that gets cold

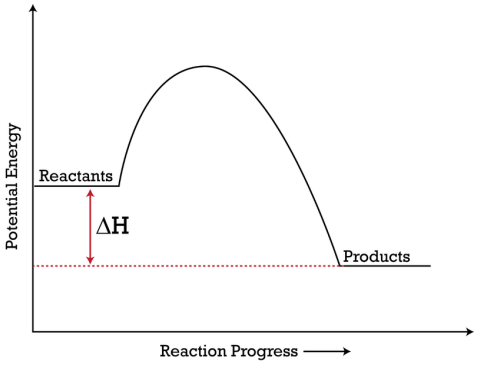
3) An energy diagram can often be used to show the energy involved in the chemical reaction. Look at the energy diagram to the right.

a) Do the reactants or the products have more potential energy?

b) What type of reaction would this be?

c) What would be the sign of the ΔH?

d) What does the bump represent?



4) Think about one of the fuel sources you used in your lab.

a) Was energy released or absorbed by the combustion of the fuel?

b) Was energy released or absorbed by the water in the can?

c) How is the quantity of energy released by combustion of the fuel related to the energy involved in heating the water?

5) Balance the following combustion reactions:

a) ___ CH_4 (g) + ___ O_2 (g) → ___ CO_2 (g) + ___ H_2O (g)

b) ___ C_7H_{16} (g) + ___ O_2 (g) → ___ CO_2 (g) + ___ H_2O (g)

c) ___ C_6H_{12} (g) + ___ O_2 (g) → ___ CO_2 (g) + ___ H_2O (g)

d) ___ C_8H_{18} (g) + ___ O_2 (g) → ___ CO_2 (g) + ___ H_2O (g)

e) ___ C_6H_6 (g) + ___ O_2 (g) → ___ CO_2 (g) + ___ H_2O (g)

6) Write out and then balance these combustion reactions:

a) combustion of pentane

b) combustion of decane

c) combustion of ethane