Chemistry 11 Chemical Reactions Review Assignment

Name: ______________________________ Date: ____________ Block: _____

If you want to earn full marks on each question, then you must show all of your mental steps wherever possible.

1. Balance the following reaction equations, taking care to show your balancing steps.
   a) \[ \text{C}_8\text{H}_{16} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} \]
   b) \[ \text{Al} + \text{CuS} \rightarrow \text{Al}_2\text{S}_3 + \text{Cu} \]
   c) \[ \text{Si}_4\text{H}_{10} + \text{O}_2 \rightarrow \text{SiO}_2 + \text{H}_2\text{O} \]
   d) \[ \text{NaPb} + \text{C}_2\text{H}_5\text{Cl} \rightarrow \text{Pb(C}_2\text{H}_5)_4 + \text{Pb} + \text{NaCl} \]
   e) \[ \text{LiAlH}_4 + \text{BF}_3 \rightarrow \text{LiF} + \text{AlF}_3 + \text{B}_2\text{H}_6 \]
   f) \[ \text{C}_{15}\text{H}_{31}\text{NH} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{N}_2 \]

2. Complete, balance and classify the following chemical reaction equations:
   a) \[ \text{N}_2 + \text{H}_2 \rightarrow \]
b) \[ \text{CaO} \rightarrow \]

Type: ____________________________

c) \[ \text{Mg} + \text{CuSO}_4 \rightarrow \]

Type: ____________________________

d) \[ \text{H}_3\text{PO}_4 + \text{KOH} \rightarrow \]

Type: ____________________________

e) \[ \text{Fe(NO}_3)_3 \text{ (aq)} + \text{MgS (aq)} \rightarrow \]

Type: ____________________________

f) \[ \text{C}_{11}\text{H}_{21}\text{SH} + \text{O}_2 \rightarrow \]

Type: ____________________________

3. Sodium sulfide and zinc nitrate solutions react when mixed. The product containing the sulfide group forms a precipitate. Write the balanced reaction equation and include the phases.
4. Carefully define the following terms:

a) *Acid*  
_______________________________________________________________________________

b) *Base*  
_______________________________________________________________________________

c) *Salt*  
_______________________________________________________________________________

d) *Activation Energy*  
_______________________________________________________________________________

_______________________________________________________________________________

e) *Enthalpy*  
_______________________________________________________________________________

f) *Exothermic Reaction*  
_______________________________________________________________________________

_______________________________________________________________________________

5. Consider the reaction: \[ 2 \text{Al(s)} + \text{Fe}_2\text{O}_3(s) \rightarrow 2 \text{Fe(s)} + \text{Al}_2\text{O}_3(s) \quad \Delta H = -848 \text{kJ/mol}. \]

a) Rewrite the reaction with the energy term as a reactant or product (whichever is appropriate).

b) Complete and fully label the following *enthalpy* versus *reaction progress* diagram.

6. What does the change in enthalpy, $\Delta H$, represent? Explain.
7. Clearly explain why an endothermic reaction absorbs energy from the surroundings (describe the energy changes in your answer).

____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

8. Why is the enthalpy change for an exothermic reaction always negative? You may refer to the potential energy (enthalpy) graph but be sure to answer using words.

____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

9. The combustion of organic molecules that contain sulfur produces this gas: _______
What problem in the environment does this gas create? __________________________

____________________________________________________________________________________
____________________________________________________________________________________

Just for fun! Complete the crossword puzzle to review vocabulary.

Across
1  HO Fah INC I reminds us that these elements are _______ molecules. (8)
7  Speeds up a chemical reaction without being consumed. (8)
8  The part of the universe immediately outside of a system. (12)
9  Sulfur is an _______ molecule. (9)
10  The chemicals whose bonds must be broken for a reaction to occur. (9)
11  A part of the universe being studied where something can enter or leave. (10)

Down
2  An experimentally observed law that states what is unchanged in a special set of circumstances. (15)
3  The chemicals whose bonds form as a chemical reaction occurs. (8)
4  Phosphorus is a _______ molecule. (10)
5  A part of the universe being studied where nothing can enter or leave. (12)
6  Dissolved in water (7)