

Name \_\_\_\_\_

Date \_\_\_\_\_

Due Date \_\_\_\_\_

Mark \_\_\_\_\_/22

**Correct and Hand in Again by** \_\_\_\_\_**Chemistry 11****Hand In Assignment # 9 – Energy in Chemical Reactions**

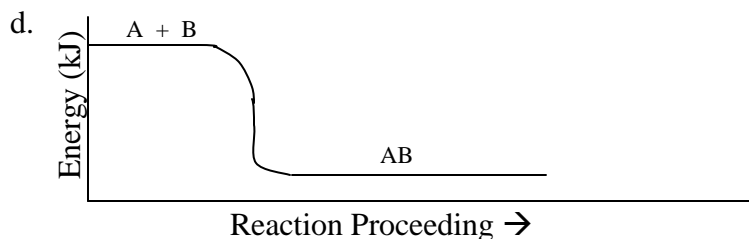
This Assignment will be marked and you are allowed to do one set of corrections.

1. State whether each of the following are *exothermic* or *endothermic*. (7 marks)

a.  $\text{H} + \text{Cl} \rightarrow \text{HCl} + 432 \text{ kJ}$  Answer \_\_\_\_\_

b.  $12\text{CO}_2 + 11\text{H}_2\text{O} \rightarrow \text{C}_{12}\text{H}_{22}\text{O}_{11} + 12 \text{O}_2 \quad \Delta\text{H} = 5638 \text{ kJ}$  Answer \_\_\_\_\_

c.  $\text{H}_2\text{O}_{(s)} \rightarrow \text{H}_2\text{O}_{(l)}$  Answer \_\_\_\_\_



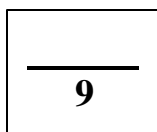
Answer \_\_\_\_\_

e.  $\text{C} + \text{D} \rightarrow \text{CD} \quad \Delta\text{H} = -65.7 \text{ kJ}$  Answer \_\_\_\_\_

f.  $\text{E} + \text{F} + 437 \text{ kJ} \rightarrow \text{G} + \text{H}$  Answer \_\_\_\_\_

g.  $\text{H}_2\text{O}_{(g)} \rightarrow \text{H}_2\text{O}_{(l)}$  Answer \_\_\_\_\_

2. Draw an “Energy” vs. “Reaction Proceeding” graph for the reaction:  
 $\text{CO}_2 \rightarrow \text{C} + \text{O}_2 \quad \Delta\text{H} = 393 \text{ kJ/mol}$ . Label  $\Delta\text{H}$  on your graph. (2 marks)



3. In an **endothermic** reaction, the surroundings get (*warmer/cooler*) (1mark) \_\_\_\_\_.

4. Define **enthalpy** (1 mark)

5. Given the equation:  $\text{HCl} + 432 \text{ kJ} \rightarrow \text{H} + \text{Cl}$

How much heat is absorbed when 5.5 moles of HCl is decomposed into its atoms? (1 mark)

Answer \_\_\_\_\_

6. Given the equation:  $\text{C}_{12}\text{H}_{22}\text{O}_{11} + 12\text{O}_2 \rightarrow 12\text{CO}_2 + 11\text{H}_2\text{O} + 5638 \text{ kJ}$

a. How much heat is released during the formation of one mole of  $\text{CO}_2$ ? (1 mark)

Answer \_\_\_\_\_

b. How much heat is released during the formation of 2.2 moles of  $\text{H}_2\text{O}$ ? (2 marks)

Answer \_\_\_\_\_

c. If 9.0 moles of  $\text{O}_2$  are consumed, how much heat is released? (2 marks)

Answer \_\_\_\_\_

7. Calculate the amount of heat (in Joules) required to warm 400.0 g of water from  $10^\circ\text{C}$  to  $35^\circ\text{C}$ . (Heat Capacity (C) for  $\text{H}_2\text{O}$  is  $4180 \text{ J/kg} \cdot ^\circ\text{C}$ ) (2 marks)

Answer \_\_\_\_\_

8. 17.556 kJ of heat are added to a 300.0 gram sample of water initially at  $5^\circ\text{C}$ . Calculate the final temperature of the water sample. Be careful with units! (3 marks)

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Answer \_\_\_\_\_