Name: KEY Official Class: _____ Date: _____

Teacher: _____ Period: _____ Class: _____

Table I Practice

Directions: Answer the following questions in complete sentences using your knowledge of Chemistry.

1. What type of reaction does a positive ΔH value represent?

   endothermic

2. What happens in terms of heat energy to a reaction with a positive ΔH?

   heat is ABSORBED by reactants

3. What type of reaction does a negative ΔH value represent?

   exothermic

4. What happens in terms of heat energy to a reaction with a negative ΔH?

   heat is RELEASED as a product

5. If you reverse a reaction, what happens to the value of ΔH? What happens to the sign?

   The value of ΔH is the same. The SIGN switches

6. If you double the concentration of the reactants and products, what happens to the value of ΔH? What happens to the sign?

   The VALUE doubles, the SIGN stays the same

7. If you half the concentration of the reactants and products, what happens to the value of ΔH? What happens to the sign?

   The value is cut in half the SIGN remains the same

8. If you reverse the reaction, what happens to the sign of ΔH? What happens to the value?

   The value stays the same, the SIGN switches

9. If a given reaction is exothermic, will heat be found on the reactants side of the equation or the products side?

   product b/c it is released

10. If a given reaction is endothermic, will heat be found on the reactants side of the equation or the products side?

    reactant b/c it is absorbed

11. If the ΔH for a given forward reaction is positive, will the reverse reaction be endothermic or exothermic? Explain.

    ΔH → + = endo

    reverse = −ΔH = exothermic

12. If a given reaction is endothermic, what will be the sign for ΔH for the reverse reaction? Explain.

    reverse = −ΔH sign switches when rxn is reversed

13. If the reverse reaction is endothermic, what is the sign of ΔH of the forward reaction? Explain.

    forward: −ΔH - when rxn reverses, the sign switches

14. If the original equation has a ΔH value of 50.0 kj, what is the ΔH of the same reaction if you reverse it and double the concentration on reactants and products. Explain.

    ΔH = −100.0 kJ reverse rxn = change sign
    double amount = double value

15. If the original equation has a ΔH value of 50.0 kj, what is the ΔH of the same reaction if you reverse it and half the concentration on reactants and products. Explain

    ΔH −25.0 kJ reverse rxn = change sign
    1/2 amount = 1/2 value

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Directions: Using Table I, determine the heat of reaction and whether the reaction is endothermic or exothermic

Reaction	ΔH (kJ/mol)	Endothermic or Exothermic (how do you know?)
$CH_{4(g)} + 2O_{2(g)} \rightarrow CO_{2(g)} + 2H_2O_{(l)}$	-890.4	Exothermic b/c – ΔH means heat is released
$2H_{2(g)} + O_{2(g)} \rightarrow 2H_2O_{(g)}$	-483.6	Exo - ΔH means heat released
$N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)}$	-91.8	Exo - ΔH means heat released.
★ $4NH_{3(g)} \rightarrow 2N_{2(g)} + 6H_{2(g)}$ doubled & reversed	+183.6	Endo + ΔH means heat absorbed
★ $CO_{(g)} + \frac{1}{2}O_{2(g)} \rightarrow CO_{2(g)}$ halfed	-278.0	Exo -ΔH heat released.
★ $4NO_{(g)} \rightarrow 2N_{2(g)} + 2O_{2(g)}$ reversed & doubled	-365.2	Exo -ΔH heat released.

YOU HAVE TO LOOK AT TABLE I - that is "normal"

Directions: Rewrite the equation with the heat written in the proper location. Determine if the reaction is endothermic or exothermic. Explain your reasoning.

1. $H_{2(g)} + I_{2(g)} \rightarrow 2HI_{(g)}$ $H_{2(g)} + I_{2(g)} + 53.0\ kJ \rightarrow 2HI_{(g)}$ Exothermic or Endothermic:

   - **Explanation:** Endothermic because ΔH is ~~positive (heat added)~~; If heat is absorbed ~~it is endothermic~~.

2. $2C_{(s)} + H_{2(g)} \rightarrow C_2H_{2(g)}$ $(\Delta H = +227.4\ kJ)$ Exothermic or Endothermic:

   - **Explanation:** $2C_{(s)} + H_{2(g)} + 227.4\ kJ \rightarrow C_2H_{2(g)}$

   positive ΔH means it is a reactant - rxn matches Table I exactly - no modifications needed.

3. $C_2H_{2(g)} \rightarrow 2C_{(s)} + H_{2(g)}$ $(\Delta H = -227.4\ kJ)$ Exothermic or Endothermic:

   - **Explanation:** $C_2H_{2(g)} \rightarrow 2C_{(s)} + H_{2(g)} + 227.4\ kJ$

The rxn is reversed from Table I so ΔH's sign gets switched. A -ΔH value is written as a product w/o minus sign - placement tells reader it is released - exothermic.

4. $2CO_{(g)} + O_2 \rightarrow 2CO_{2(g)}$ $\Delta H = -566.0\ kJ$ Exothermic or Endothermic:

   - **Explanation:** $2CO_{(g)} + O_2 \rightarrow 2CO_{2(g)} + 566.0\ kJ$

-ΔH values are written as products (after the arrow) - NEVER put a (–) in a rxn. energy as a product means it is released - so exothermic

5. $4H_2O_{(l)} \rightarrow 4H_{2(g)} + 2O_{2(g)}$ $\Delta H = +1143.2\ kJ$ Exothermic or Endothermic:

   reversed & doubled

   - **Explanation:** $4H_2O_{(l)} + 1143.2\ kJ \rightarrow 4H_{2(g)} + 2O_{2(g)}$

This was doubled & reversed. +ΔH values are written as reactants to show heat absorbed = endothermic