Name _____ **Heats of Reaction using Table I**

Use Reference Table I to answer the following questions.

____ 1) Given the balanced equation representing a reaction: $H_2 \rightarrow H + H$

What occurs during this reaction?

1) Energy is absorbed as bonds are formed.
2) Energy is absorbed as bonds are broken.
3) Energy is released as bonds are formed.
4) Energy is released as bonds are broken.

____ 2) Given the equation: $I + I \rightarrow I_2 + 35$ kJ
This equation shows that the formation of an iodine molecule is an

1) exothermic process in which energy is absorbed
2) exothermic process in which energy is released
3) endothermic process in which energy is absorbed
4) endothermic process in which energy is released

____ 3) For which compound is the process of dissolving in water exothermic?

1) NaCl
2) NaOH
3) NH_4Cl
4) NH_4NO_3

____ 4) Which balanced equation represents an endothermic reaction?

1) $C(s) + O_2(g) \rightarrow CO_2(g)$
2) $CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(\ell)$
3) $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$
4) $N_2(g) + O_2(g) \rightarrow 2NO(g)$

____ 5) In what type of reaction do the products of the reaction always possess more potential energy than the reactants?

1) endothermic
2) exothermic
3) spontaneous
4) redox

____ 6) According to Reference Table I, which compound is formed from its elements during an exothermic reaction?

1) HI(g)
2) $CO_2(g)$
3) NO(g)
4) $NO_2(g)$

____ 7) Given the balanced equation representing a reaction:

$CH_4(g) + 2O_2(g) \rightarrow 2H_2O(g) + CO_2(g) +$ heat

Which statement is true about energy in this reaction?

1) The reaction is exothermic because it releases heat.
2) The reaction is exothermic because it absorbs heat.
3) The reaction is endothermic because it releases heat.
4) The reaction is endothermic because it absorbs heat.

____ 8) Given the reaction:

$A + B \leftrightarrow C + D +$ heat

Which statement best describes this reaction?

1) The forward reaction is exothermic, and the reverse reaction is always exothermic.
2) The forward reaction is exothermic, and the reverse reaction is always endothermic.
3) The forward reaction is exothermic, and the reverse reaction can be either exothermic or endothermic.
4) The forward reaction is endothermic, and the reverse reaction can be either endothermic or exothermic.

____ 9) Which expression represents the heat of reaction for a chemical change in terms of potential energy, *PE*?

1) $(PE_{products}) + (PE_{reactants})$
2) $(PE_{products}) - (PE_{reactants})$
3) $(PE_{products}) \times (PE_{reactants})$
4) $(PE_{products}) \div (PE_{reactants})$

____ 10) Given the balanced equation representing a reaction at 101.3 kPa and 298 K:

$$N_2(g) + 3H_2(g) \rightarrow 2NH_3(g) + 91.8 \text{ kJ}$$

Which statement is true about this reaction?

1) It is exothermic and $\triangle$H *equals –91.8 kJ.*
2) It is exothermic and ΔH *equals +91.8 kJ.*
3) It is endothermic and ΔH *equals –91.8 kJ.*
4) It is endothermic and ΔH *equals +91.8 kJ.*

____ 11) Which reaction releases the greatest amount of energy per 2 moles of product?

1) $2CO(g) + O_2(g) \rightarrow 2CO_2(g)$
2) $4Al(s) + 3O_2(g) \rightarrow 2Al_2O_3(s)$
3) $2H_2(g) + O_2(g) \rightarrow 2H_2O(g)$
4) $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$

____ 12) Given the balanced equation:

$4Fe(s) + 3O_2(g) \rightarrow 2Fe2O_3(s) + 1640$ kJ

Which phrase best describes this reaction?

1) endothermic with$\Delta H = +1640$ kJ
2) endothermic with $\Delta H = -1640$ kJ
3) exothermic with $\Delta H = +1640$ kJ
4) exothermic with $\Delta H = -1640$ kJ

____ 13) Given the reaction:

$2 H_2(g) + O_2(g) \rightarrow 2 H_2O(\ell) + 571.6$ kJ

What is the approximate ΔH for the formation of 1 mole of $H_2O(\ell)$?

1) –285.8 kJ
2) +285.8 kJ
3) –571.6 kJ
4) +571.6 kJ

____ 14) According to Reference Table I, when 2 moles of $H_2O(g)$ are formed from its elements,

1) 484 kJ of heat is absorbed
2) 484 kJ of heat is released
3) 242 kJ of heat is absorbed
4) 242 kJ of heat is released

____ 15) Given the reaction:

$CH_4(g) + 2 O_2(g) \rightarrow 2 H_2O(g) + CO_2(g)$

What is the overall result when $CH_4(g)$ burns according to this reaction?

1) Energy is absorbed and ΔH is negative.
2) Energy is absorbed and ΔH is positive.
3) Energy is released and ΔH is negative.
4) Energy is released and ΔH is positive.