ALBERTA CHEMISTRY 30 · UNIT A · 10 QUESTIONS

Thermochemistry — Practice Test

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

1 **An electric heater transfers 25.1 kJ of energy to 500.0 g of water in a calorimeter. The increase in the temperature of the water, in °C, is _____.**

ANSWER _____

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2 **Slaked lime is produced by the following reaction.**
$CaO(s) + H_2O(l) \rightarrow Ca(OH)_2(s)$
The molar enthalpy of formation for CaO(s): -635.1 kJ/mol, for $H_2O(l)$: -285.8 kJ/mol, and for $Ca(OH)_2(s)$: -986.1 kJ/mol. The enthalpy change for the reaction is

A -1907.0 kJ

B +65.2 kJ

C -65.2 kJ

D -351.0 kJ

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3 **Use the following equations to answer this question.**

I $S(s) + O_2(g) \rightarrow SO_2(g)$ $\Delta H = -296.8$ kJ
II $2\ SO_2(g) + O_2(g) \rightarrow 2\ SO_3(g)$ $\Delta H = -197.8$ kJ

The enthalpy change for the reaction $2\ S(s) + 3\ O_2(g) \rightarrow 2\ SO_3(g)$, in kJ, is ____.

ANSWER

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4 **Breaking a chemical bond i energy, and forming a chemical bond ii energy. The row that correctly completes the statement is**

A i: releases ii: absorbs

B i: absorbs ii: releases

C i: absorbs ii: absorbs

D i: releases ii: releases

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5 **The molar enthalpy of combustion for $H_2(g)$: -286 kJ/mol, for $CH_4(g)$: -890 kJ/mol, for $C_3H_8(g)$: -2044 kJ/mol, and for $C_2H_5OH(l)$: -1367 kJ/mol. Their molar masses are 2.02, 16.05, 44.11, and 46.08 g/mol, respectively. The fuel that releases the greatest amount of energy per gram when burned completely is**

A $H_2(g)$

B $CH_4(g)$

C $C_3H_8(g)$

D $C_2H_5OH(l)$

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6 **Use the following equations to answer this question.**

I $C_2H_4(g) + 3\ O_2(g) \rightarrow 2\ CO_2(g) + 2\ H_2O(l) \quad \Delta H = -1411.2\ kJ$

II $C(s) + O_2(g) \rightarrow CO_2(g) \quad \Delta H = -393.5\ kJ$

III $H_2(g) + \frac{1}{2}O_2(g) \rightarrow H_2O(l) \quad \Delta H = -285.8\ kJ$

The molar enthalpy of formation of ethene, $C_2H_4(g)$, is

A -1358.6 kJ/mol

B -52.6 kJ/mol

C +52.6 kJ/mol

D +1358.6 kJ/mol

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7 **The decomposition of calcium carbonate is represented by the following equation.**

$CaCO_3(s) \rightarrow CaO(s) + CO_2(g) \quad \Delta H = +178.3\ kJ$

The molar enthalpy of formation for CaO(s): -635.1 kJ/mol, and for $CO_2(g)$: -393.5 kJ/mol. The molar enthalpy of formation of $CaCO_3(s)$, in kJ/mol, is ____.

ANSWER _____

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8 **A student experimentally determines the molar enthalpy of combustion of methanol to be -650 kJ/mol. The accepted value is -726 kJ/mol. The percent error in the student's value is**

A 76.0%

B 10.5%

C 11.7%

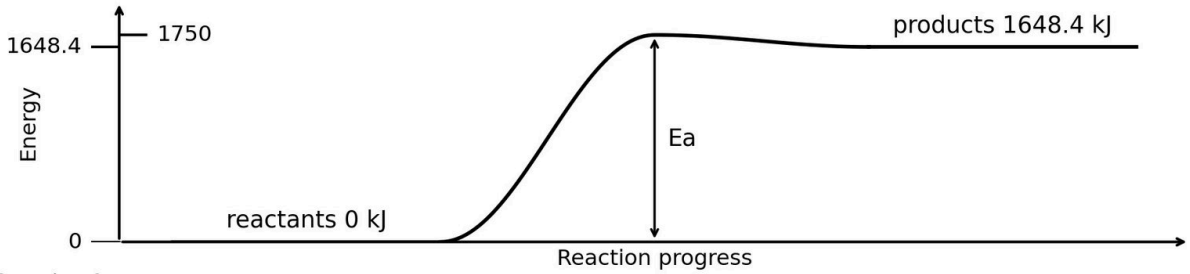
D 89.5%

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9 **The diagram shows the potential energy profile for the reaction**

$2\ Fe_2O_3(s) \rightarrow 4\ Fe(s) + 3\ O_2(g)$

The enthalpy change and the classification of the reaction are shown in row



Question 9

The diagram shows the potential energy profile for the reaction

$2\ Fe_2O_3(s) \rightarrow 4\ Fe(s) + 3\ O_2(g)$

The enthalpy change and the classification of the reaction are shown in row

A) Enthalpy change: $+1648.4$ kJ; Classification: endothermic

B) Enthalpy change: -1648.4 kJ; Classification: exothermic

C) Enthalpy change: $+1648.4$ kJ; Classification: exothermic

D) Enthalpy change: -1648.4 kJ; Classification: endothermic

A Enthalpy change: +1648.4 kJ; Classification: endothermic

B Enthalpy change: -1648.4 kJ; Classification: exothermic

C Enthalpy change: +1648.4 kJ; Classification: exothermic

D Enthalpy change: -1648.4 kJ; Classification: endothermic

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10 **Ammonia is produced industrially by the following reaction.**

$N_2(g) + 3\ H_2(g) \rightarrow 2\ NH_3(g) \quad \Delta H = -91.8$ kJ

The energy released when 14.0 g of nitrogen gas reacts completely is

A 183.6 kJ

B 91.8 kJ

C 23.0 kJ

D 45.9 kJ

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ANSWER KEY

1.	12.0	**5.**	A	**9.**	A
2.	C	**6.**	C	**10.**	D
3.	-791.4	**7.**	-1206.9		
4.	B	**8.**	B		

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