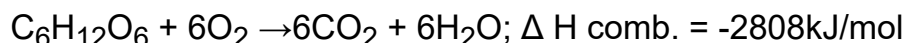


 Section Self-Check

 Thermochemical Equations

 Score: **0%** (0 out of 5 correct)

1. How much heat is evolved when 27.0 g of glucose is burned according to this equation?



- A. ☐ 136 kJ
 B. ☐ 280 kJ
 C. ☒ 421 kJ
 D. ☐ 421 J

Feedback: Convert grams of glucose to moles of glucose. Multiply this value by the enthalpy of combustion.

2. Calculate the amount of heat absorbed by 10.0 grams of ice at -15.0°C as it is converted to liquid water at 50.0°C . The specific heat of $\text{H}_2\text{O}(\text{s}) = 2.09 \text{ J/(g } ^\circ\text{C)}$. The specific heat of $\text{H}_2\text{O}(\text{l}) = 4.18 \text{ J/(g } ^\circ\text{C)}$. The molar enthalpy (heat) of fusion is 6.01 kJ/mol .

- A. ☒ 5.73 kJ
 B. ☐ 0.676 kJ
 C. ☐ 0.170 kJ
 D. ☐ 2.83 kJ

Feedback: Part I increasing the temperature of ice from -15.0°C to 0.0°C . Heat 1 = mass x specific heat x temperature change Heat 1 = $2.09 \text{ J/(g}^\circ\text{C)} \times 10.0 \text{ g} \times (0.0^\circ\text{C} - (-15.0^\circ\text{C})) = 313.5 \text{ J}$ Part II changing solid water to liquid water. Temperature does not change. Heat 2 = $10.0 \text{ g} / 18.015 \text{ g/mol} \times 6.01 \text{ kJ/mol} = 3330 \text{ J}$ Part III increasing the temperature of water from 0.0°C to 50.0°C . Heat 3 = $c \times m \times \Delta t$ Heat 3 = $4.18 \text{ J/(g}^\circ\text{C)} \times 10.0 \text{ g} \times (50.0^\circ\text{C} - 0.0^\circ\text{C}) = 2090 \text{ J}$ Total heat = heat 1 + heat 2 + heat 3 = $313.5 \text{ J} + 3330 \text{ J} + 2090 \text{ J} = 5730 \text{ J} = 5.73 \text{ kJ}$

3. A fuel is found to release 3280 kJ of heat when 0.600 moles of the fuel is burned. Which of the fuels listed in the table is the most likely to be this fuel?

Substance	Formula	$\Delta H_{\text{comb}}^{\circ}$ (kJ/mol)
Sucrose (table sugar)	$\text{C}_{12}\text{H}_{22}\text{O}_{11}(\text{s})$	-5644
Octane (a component of gasoline)	$\text{C}_8\text{H}_{18}(\text{l})$	-5471
Glucose (a simple sugar found in fruit)	$\text{C}_6\text{H}_{12}\text{O}_6(\text{s})$	-2808
Propane (a gaseous fuel)	$\text{C}_3\text{H}_8(\text{g})$	-2219
Methane (a gaseous fuel)	$\text{CH}_4(\text{g})$	-891

- A. ☐ sucrose
 B. ☒ octane
 C. ☐ propane
 D. ☐ methane

Feedback: Multiplying 0.6 by -5471 kJ/mol gives 3280 kJ

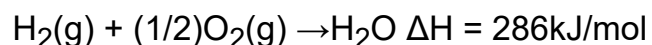
4. Spraying ethanol on your hand makes your hand feel cool. How much heat is absorbed in turning 3.00 grams of ethanol from a liquid to a vapor?

Substance	Formula	$\Delta H_{\text{vap}}^{\circ}$ (kJ/mol)	$\Delta H_{\text{fus}}^{\circ}$ (kJ/mol)
Water	H_2O	40.7	6.01
Ethanol	$\text{C}_2\text{H}_5\text{OH}$	38.6	4.94
Methanol	CH_3OH	35.2	3.22
Acetic acid	CH_3COOH	23.4	11.7
Ammonia	NH_3	23.3	5.66

- A. ☐ 115.8 kJ
 B. ☐ 1.19 kJ
 C. ☐ 0.321 kJ
 D. ☒ 2.51 kJ

Feedback: 3.00 g ethanol = 0.0651 mol ethanol. $0.0651 \times 38.6 \text{ kJ/mol} = 2.51 \text{ kJ}$ absorbed.

5. A hydrogen balloon containing 0.250 moles of hydrogen gas explodes in the presence of oxygen such that all the hydrogen reacts. How much heat is released?



- A. ☐ 143 kJ
 B. ☐ 286 kJ

C. ☒ 71.5 kJ

D. ☐ 0.25 kJ

Feedback: $0.250 \text{ mol} \times 286 \text{ kJ/mol} = 71.5 \text{ kJ}$

Retake Test

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