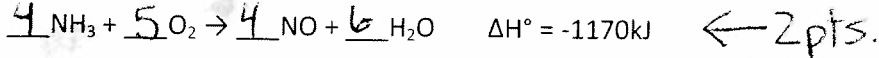


Thermochemical Equations RETAKE Quiz

Directions: For the following questions, you will use either the reaction equation ratios or $\Delta H = mc\Delta T$. **SHOW ALL YOUR WORK!! BOX YOUR ANSWERS!!** On the first line (before the question), label the reaction as exothermic or endothermic. On the second line, write whether the equation/system released or absorbed heat.

1. exothermic releases How much heat will be transferred when 14.9 g of ammonia reacts with excess O₂ according to the following equation?



14.9 g NH ₃	1 mol NH ₃	-1170 kJ	=	-17433
	17 g NH ₃	4 mol NH ₃		68

} - 2 pts.

-256.4 kJ ← 2 pts.

2. endothermic absorbs The specific heat of silver is 0.24 J/g°C. How much heat in joules must be added to a silver block of mass 20.16 g to raise its temperature by 16.00 °C?

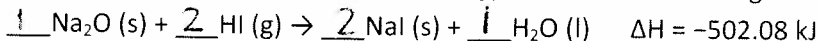
q = ?
 m = 20.16 g
 C = 0.24 J/g°C
 ΔT = 16.00 °C

$$q = mc\Delta T$$

$$q = (20.16)(0.24)(16)$$

77.41 J ← 2 pts.

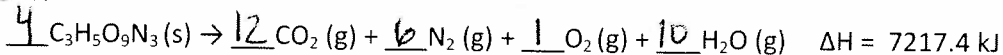
3. exothermic releases Calculate the energy released when 24.8 g Na₂O reacts in the following reaction:



24.8 g Na ₂ O	1 mol Na ₂ O	-502.08 kJ	=	
	61.9696 g Na ₂ O	1 mol Na ₂ O		

-200.93 kJ

4. endothermic absorbs The following equation shows the reaction that occurs when nitroglycerine explodes:



How much energy will be given off by detonating exactly 1 pound (454 grams) of nitroglycerine?

454 g C ₃ H ₅ O ₉ N ₃	1 mol (Nitro)	7217.4 kJ	=	
	226.983 g (Nitro)	4 mol (Nitro)		

3608.97 kJ

5. endothermic absorbs An 2.016 kg sample of platinum metal increases in temperature from 16 °C to 20 °C when 20.16 joules of heat are added. What is the specific heat of platinum?

q = 20.16
 m = 2.016 kg = 2016 g
 C = ?
 ΔT = 20 °C - 16 °C = 4 °C

$$C = \frac{q}{m\Delta T}$$

$$C = \frac{20.16}{(2016)(4)}$$

C = 0.0025 J/g°C

2x3 = 36.033
 1x5 = 5.04
 2x9 = 143.91
 1x3 = 42

6. endothermic absorbs The specific heat of water is $4.184 \text{ J/g}^\circ\text{C}$. A bowl containing $26.262 \text{ g H}_2\text{O}$ is heated from 21.00°C and 5.125 joules of heat is released. What was the final temperature?

$$q = 5.125 \text{ J}$$

$$m = 26.262 \text{ g}$$

$$c = 4.184 \text{ J/g}^\circ\text{C}$$

$$\Delta T = ?$$

$$(T_i = 21^\circ\text{C})$$

$$T_f = 21.466^\circ\text{C}$$

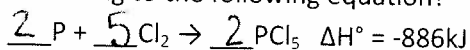
$$\Delta T = \frac{q}{mc}$$

$$\Delta T = \frac{5.125}{(26.262)(4.184)}$$

$$(26.262)(4.184)$$

$$\Delta T = 0.466$$

7. exothermic releases How much heat will be released when 2016 mg of Chlorine gas reacts with excess phosphorous according to the following equation?



2016 mg Cl_2	1 g	1 mol Cl_2	-886 kJ	$= -1786176$
	1000 mg	70.90 g Cl_2	5 mol Cl_2	354500

$$= \boxed{-5.04 \text{ kJ}}$$

8. endothermic absorbs Copper has a specific heat of $0.385 \text{ J/(g}^\circ\text{C)}$. A piece of copper absorbs 5000 J of energy and undergoes a temperature change from 100°C to 200°C . What is the mass of the piece of copper?

$$q = 5000 \text{ J}$$

$$m = ?$$

$$c = 0.385 \text{ J/g}^\circ\text{C}$$

$$\Delta T = 200^\circ\text{C} - 100^\circ\text{C} = 100^\circ\text{C}$$

$$m = \frac{q}{c\Delta T}$$

$$m = \frac{5000 \text{ J}}{(0.385)(100)}$$

$$(0.385)(100)$$

$$m = 129.87 \text{ g}$$

9. endothermic absorbs A 40 g sample of water absorbs 500 Joules of energy. How much did the water temperature change? The specific heat of water is $4.18 \text{ J/(g}^\circ\text{C)}$.

$$q = 500 \text{ J}$$

$$m = 40 \text{ g}$$

$$c = 4.18 \text{ J/g}^\circ\text{C}$$

$$\Delta T = ?$$

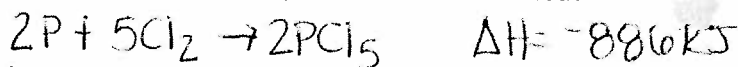
$$\Delta T = \frac{q}{mc}$$

$$\Delta T = \frac{500 \text{ J}}{(40)(4.18)}$$

$$(40)(4.18)$$

$$\Delta T = 2.99^\circ\text{C}$$

10. exothermic releases Excess Phosphorous reacts with Chlorine gas. How much heat, in kilojoules, will be released when 2016 g of phosphorous pentachloride is created?



2016 g PCl_5	1 mol PCl_5	-886 kJ	$= -1786176$
	208.24 g PCl_5	2 mol PCl_5	416.4776

$$= \boxed{-4288.768 \text{ kJ}}$$

$$P = 30.9738$$

$$Cl_5 = 177.267$$