

QUIZ: II: THERMODYNAMICS

SCH4U_20018 - 2019_V1

NAME: _____

Multiple Choice (7)

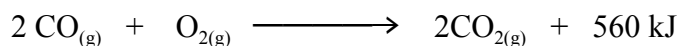
1. Which one of the following compounds would be expected to have the highest crystal lattice energy?

- A. CaSe B. Na₂Se C. CaTe D. Na₂Te

2. What is the correct equation for the lattice enthalpy of magnesium chloride?

- A. $\text{Mg}^{+2}_{(g)} + 2\text{Cl}^{-1}_{(g)} \longrightarrow \text{MgCl}_{2(s)}$
B. $\text{Mg}_{(s)} + \text{Cl}_{2(g)} \longrightarrow \text{MgCl}_{2(s)}$
C. $\text{Mg}^{+2}_{(g)} + 2\text{Cl}^{-1}_{(g)} \longrightarrow \text{MgCl}_{2(g)}$
D. $\text{Mg}_{(s)} + 2\text{Cl}_{(g)} \longrightarrow \text{MgCl}_{2(s)}$

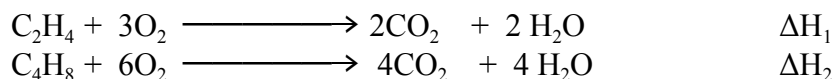
3. Consider the following equation for the combustion of hydrogen:



How much energy is released when 14.0 g of carbon monoxide are completely combusted?

- A. 1120 kJ B. 560 kJ C. 280 kJ D. 140 kJ

4. The enthalpies of combustion of ethene, C₂H₄, and butene, C₄H₈, are represented below as ΔH₁ and ΔH₂:



What is the value for the enthalpy of the reaction of C₂H₄ to form C₄H₈?

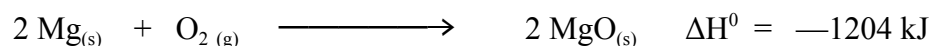


- A. $\Delta\text{H} = \Delta\text{H}_1 - \Delta\text{H}_2$
B. $\Delta\text{H} = \Delta\text{H}_1 + \Delta\text{H}_2$
C. $\Delta\text{H} = 2\Delta\text{H}_1 - \Delta\text{H}_2$
D. $\Delta\text{H} = 2\Delta\text{H}_1 + \Delta\text{H}_2$

5. Why does the temperature of boiling water remain constant even though heat is supplied at a constant rate?

- A. Heat is lost to the surroundings.
B. The heat is used to overcome the intermolecular forces of attraction between water molecules.
C. Heat is also taken in by the container.
D. The heat is used to break the covalent bonds in the water molecules.

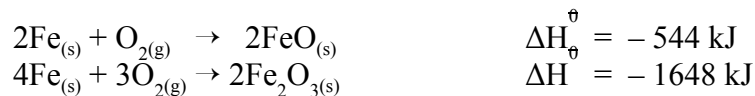
6. The following equation shows the formation of magnesium oxide from magnesium metal.



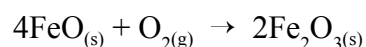
Which statement is correct for this reaction?

- A. 1204 kJ of energy are released for every mol of magnesium reacted.
- B. 602 kJ of energy are absorbed for every mol of magnesium oxide formed.
- C. 602 kJ of energy are released for every mol of oxygen gas reacted.
- D. 1204 kJ of energy are released for every two mol of magnesium oxide formed.

7. Consider the two reactions involving iron and oxygen.



What is the enthalpy change, in kJ, for the reaction below?



- A. $-1648 - 2(-544)$
- B. $-544 - (-1648)$
- C. $-1648 - 544$
- D. $-1648 - 2(544)$

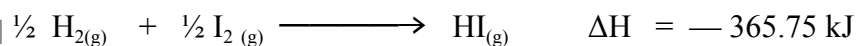
Multiple Choice Answers

1	2	3	4	5	6	7

PROBLEMS (23)

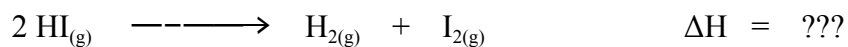
In order to receive full credit, the method used and the steps involved in arriving at your answer must be shown clearly. It is possible to receive partial credit but, without your supporting work, you may receive little credit. You must pay particular attention to significant figures and to units.

1.(a) Calculate the energy released when 1.00 kg of HI is produced from its elements, given the following thermochemical equation: 3



energy: _____

(b) Use the above equation to determine the enthalpy change for the following reaction: 2

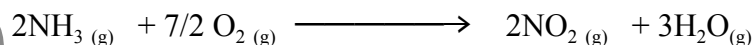


energy: _____

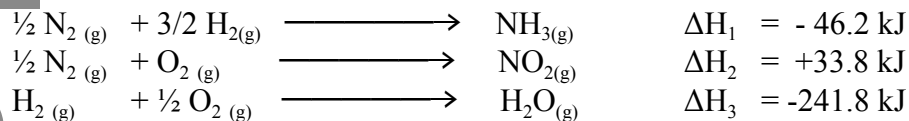
2. (a) Define the term standard molar enthalpy change of formation, ΔH_f^0 . 2

b. Write a thermochemical equation for the enthalpy of formation of nitroglycerine, $\text{C}_3\text{H}_5(\text{NO}_3)_3(l)$, $\Delta H_f^0 = -1452 \text{ kJ mol}^{-1}$. 2

3. Ammonia can be combusted according to the following equation: 4

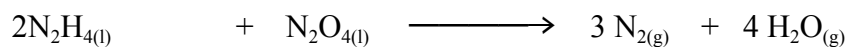


Show how the following three equations can be rearranged and added to determine the heat of reaction for the combustion of ammonia, hence calculate the enthalpy for the above reaction.



enthalpy: _____

4. The oxidation of hydrazine, N_2H_4 , by dinitrogen tetroxide, N_2O_4 , has been used in rocket propulsion:



(i) Use the following standard enthalpy changes of formation to calculate the enthalpy change for the above reaction. 4

Compound	ΔH_f° (kJ mol ⁻¹)
$\text{N}_2\text{H}_{4(l)}$	50.63
$\text{N}_2\text{O}_{4(l)}$	9.16
$\text{H}_2\text{O}_{(g)}$	-241.8

enthalpy change: _____

ii. State why the value for the ΔH_f° for $\text{N}_{2(g)}$ is not given above 1

(iii) Explain what information may be obtained from your calculation to part (4) (i), about the bonds made and the bonds broken in the reaction. 1

5. a. Define the term standard molar enthalpy of combustion.

2

b. Write a thermochemical equation for the enthalpy of combustion of ethanol,
 $\text{C}_2\text{H}_5\text{OH}_{(l)}$, $\Delta H_c^\circ = -1380 \text{ kJ mol}^{-1}$.

2

savitapall.com

savitapall.com