

LONE STAR COLLEGE
UNIVERSITY PARK
SCIENCE DEPARTMENT

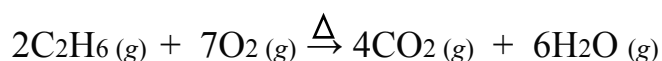
CHEM1405 – 4th Partial Test

Name: _____

Due Date: Dec 7th, 2018 11:59PM

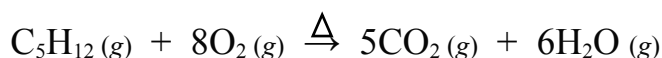
Please answer the following problems on separate sheets. To receive total or partial credit you should show your work **clearly and organized**. Submit all pages as one PDF file in D2L using the following file name format “ID number – Last Name – Take-Home 4th test”. **Please verify that the file has all the pages and that they are legible.** None file will be accepted after the due date.

- 1) Use the balanced chemical equation to complete the table (**show your work for each one, without work no credit**) (12 points)

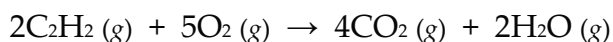


C ₂ H ₆	O ₂	CO ₂	H ₂ O
_____ mol	_____ mol	3.2 mol	_____ mol
_____ mol	2.8 mol	_____ mol	_____ mol

- 2) Pentane gas, C₅H₁₂, reacts with oxygen to produce carbon dioxide and water. (**show your work for each part, without work no credit**) (12 points)



- How many moles of C₅H₁₂ must react to produce 4.00 mol of water?
 - How many grams of CO₂ are produced from 32.0 g of O₂?
 - How many grams of CO₂ are formed if 44.5 g of C₅H₁₂ is mixed with 108 g of O₂?
- 3) The gaseous hydrocarbon acetylene, C₂H₂, used in welders' torches, burns according to the following equation: (**show your work for each part, without work no credit**) (8 points)



- What is the theoretical yield, in grams, of CO₂, if 22.0 g of C₂H₂ completely reacts?
- If the actual yield in part (a) is 64.0 g of CO₂, what is the percent yield of CO₂ for the reaction?

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- 4) The equation for the reaction of nitrogen and oxygen to form nitrogen oxide is written as: **(show your work for each part, without work no credit)** (8 points)



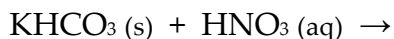
- How many kilojoules are required to form 3.00 g of NO?
- What is the complete equation (including heat) for the decomposition of NO?
- How many gr of NO was produced if 348 kilojoules were released in the synthesis of NO?

- 5) Complete the following table: (9 points)

(show your work for each part, without work no credit)

pH	[H ₃ O ⁺]	pOH	[OH ⁻]
	1.23 X 10 ⁻⁴ M		
		9.62	
6.98			

- 6) What is the pH and pOH of a solution prepared by dissolving 1.00 g of Ca(OH)₂ in water to make 875 mL of solution? **(show your work for each part, without work no credit)** (6 points)
- 7) Complete and balance each of the following. Then identify the conjugate acid–base pairs in each. (6 points)



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- 8) One of the most acidic lakes in the United States is Little Echo Pond in the Adirondacks in New York. Recently, this lake had a pH of 4.2, well below the recommended pH of 6.5. (**show your work for each part, without work no credit**) (8 points)
- a) What are the $[\text{H}_3\text{O}^+]$ and $[\text{OH}^-]$ of Little Echo Pond?
 - b) One way to raise the pH of an acidic lake (and restore aquatic life) is to add limestone (CaCO_3). How many grams of CaCO_3 are needed to neutralize 1.0 kL of the acidic water from the lake if the acid is sulfuric acid?
- 9) A solution of 0.205 M NaOH is used to 20.0 mL of a H_2SO_4 solution. If 45.6 mL of the NaOH solution is required to reach the endpoint, what is the molarity of the H_2SO_4 solution? (8 points)
- 10) The daily output of stomach acid (gastric juice) is 1000 mL to 2000 mL. Prior to a meal, stomach acid (HCl) typically has a pH of 1.42. (13 points)
- a) What is the $[\text{H}_3\text{O}^+]$ of stomach acid?
 - b) One chewable tablet of the antacid Maalox contains 600. mg of CaCO_3 . Write the neutralization equation, and calculate the milliliters of stomach acid neutralized by two tablets of Maalox.