

# HW1\_after Heat of combustion and unit conversion

**Due** Sep 5 at 12:59pm

**Points** 11

**Questions** 7


**Available** Aug 30 at 11am - Sep 5 at 12:59pm

**Time Limit** None

**Allowed Attempts** 3

This quiz was locked Sep 5 at 12:59pm.

## Attempt History

	Attempt	Time	Score
LATEST	<a href="https://canvas.okstate.edu/courses/137119/quizzes/349078/history?version=1">Attempt 1</a>  ( <a href="https://canvas.okstate.edu/courses/137119/quizzes/349078/history?version=1">https://canvas.okstate.edu/courses/137119/quizzes/349078/history?version=1</a> )	1,324 minutes	11 out of 11

Correct answers are hidden.

Score for this attempt: **11** out of 11

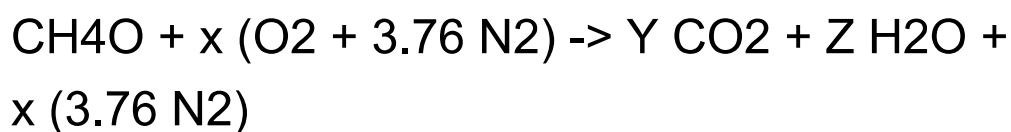
Submitted Sep 4 at 1:37pm

This attempt took 1,324 minutes.

### Question 1

1 / 1 pts

What is the value of x for the following stoichiometric chemical reaction?



### Question 2

1 / 1 pts

What composition below represents air?  
Assume that air is composed of 21 vol% of  
Oxygen and 79 Vol% of Nitrogen.

☒ 1.2 O<sub>2</sub> + 4.51 N<sub>2</sub>

☐ 10 O<sub>2</sub> + 36.7 N<sub>2</sub>

☐ 0.21 O<sub>2</sub> + 3.76 N<sub>2</sub>

☐ 2 O<sub>2</sub> + 3.76 N<sub>2</sub>

### Question 3

1 / 1 pts

Calculate the heat of combustion of heptane (C<sub>7</sub>H<sub>16</sub>) burning in air in kJ/mole. Round your answer to the first decimal place and do not include any units.

Use the following values:

- Specific heat: CO<sub>2</sub> = 54.3 J/mole-K, H<sub>2</sub>O = 41.3 J/mole-K, N<sub>2</sub> = 32.7 J/mole-K.
- Heat of formation: C<sub>7</sub>H<sub>16</sub> = -187.8 kJ/mole, CO<sub>2</sub> = -393.5 kJ/mole, H<sub>2</sub>O = -241.8 kJ/mole

4,501.1

**Question 4****1 / 1 pts**

Calculate the enthalpy of propane in kJ/mole at 1000K assuming a representative specific heat value of 128.7 J/mole-K from 298 K to 1000K. The heat of formation of propane is -103.8 kJ/mole. Write down your answer rounded to the first decimal place without units.

**Question 5****1 / 1 pts**

Using the Ideal Gas Law, calculate the mass (g) of ethylene ( $\text{C}_2\text{H}_4$ ) given the following conditions.

Write down your answer rounded to the first decimal place without units.

$P = 1 \text{ atm} = 101325 \text{ Pa} = 1.01325 \text{ bar} = 14.7 \text{ psi}$

$V = 25 \text{ L}$

$R = 8.314 \text{ J/mol-K}$

$$T = 303 \text{ K}$$

**Question 6****5 / 5 pts**

Assuming that 10 g of a fuel is stoichiometrically reacting with 2 g of air. What is HRR [kW] when 148 g/s of fuel is burned?

Round your answer to the first decimal place and do not include any units.

**Question 7****1 / 1 pts**

C<sub>4</sub>H<sub>10</sub> is burning in air. Assuming stoichiometric combustion, calculate the amount of heat (kJ) generated per g of O<sub>2</sub> reacted. Write down your answer rounded to the first decimal place without units.

- Heat of formation: C<sub>4</sub>H<sub>10</sub> = -124.7 kJ/mole, CO<sub>2</sub> = -393.5 kJ/mole, H<sub>2</sub>O = -241.8 kJ/mole

12.8

Quiz Score: **11** out of 11