Thermal Stoichiometry

Apprentice Difficulty Level

Question 1

Consider the thermochemical equation for methane combustion:
$CH_4 + 2\ O_2 \Longrightarrow CO_2 + 2\ H_2O + 890\ kJ$
The reaction of ...

a. ... 1.0 mole of CH_4 will release _____ kJ of energy.

b. ... 4.0 mole of CH_4 will release _____ kJ of energy.

c. ... _____ mole of CH_4 will release 445 kJ of energy.

d. ... 32 grams of CH_4 will release _____ kJ of energy.

e. ... 27 mole of CH_4 will release _____ kJ of energy.

Question 2

Consider the thermochemical equation for methane combustion:
$CH_4 + 2\ O_2 \Longrightarrow CO_2 + 2\ H_2O + 890\ kJ$
The reaction of ...

a. ... 1.0 mole of CH_4 will release _____ kJ of energy.

b. ... 3.0 mole of CH_4 will release _____ kJ of energy.

c. ... _____ mole of CH_4 will release 1780 kJ of energy.

d. ... 8.0 grams of CH_4 will release _____ kJ of energy.

e. ... 21 mole of CH_4 will release _____ kJ of energy.

Question 3

Consider the thermochemical equation for methane combustion:
$CH_4 + 2\ O_2 \Longrightarrow CO_2 + 2\ H_2O + 890\ kJ$
The reaction of ...

a. ... 2.0 mole of CH_4 will release _____ kJ of energy.

b. ... 3.0 mole of CH_4 will release _____ kJ of energy.

c. ... _____ mole of CH_4 will release 890 kJ of energy.

d. ... 48 grams of CH_4 will release _____ kJ of energy.

e. ... 19 mole of CH_4 will release _____ kJ of energy.

Question 4

Consider the thermochemical equation for methane combustion:
$CH_4 + 2\ O_2 \Longrightarrow CO_2 + 2\ H_2O + 890\ kJ$
The reaction of ...

a. ... 1.0 mole of CH_4 will release _____ kJ of energy.

b. ... 2.5 mole of CH_4 will release _____ kJ of energy.

c. ... _____ mole of CH_4 will release 445 kJ of energy.

d. ... 16 grams of CH_4 will release _____ kJ of energy.

e. ... 35 mole of CH_4 will release _____ kJ of energy.

Master Difficulty Level

Question 5

Consider the thermochemical equation for propane combustion:

$$C_3H_8 + 5\ O_2 \ ==>\ 3\ CO_2 + 4\ H_2O + 2200\ kJ$$

Fill in the table showing the mass-mole-energy relationships for this reaction.

	grams C_3H_8	mol C_3H_8 reacted	mol O_2 reacted	Heat (kJ) Released
a.	44.0	1.00		
b.	22.0	0.500		
c.		2.00		
d.			4.50	
e.				11 000

Question 6

Consider the thermochemical equation for propane combustion:

$$C_3H_8 + 5\ O_2 \ ==>\ 3\ CO_2 + 4\ H_2O + 2200\ kJ$$

Fill in the table showing the mass-mole-energy relationships for this reaction.

	grams C_3H_8	mol C_3H_8 reacted	mol O_2 reacted	Heat (kJ) Released
a.	44.0	1.00		
b.	11.0	0.250		
c.		3.00		
d.			3.50	
e.				1100

Question 7

Consider the thermochemical equation for propane combustion:

$$C_3H_8 + 5\ O_2 \ ==>\ 3\ CO_2 + 4\ H_2O + 2200\ kJ$$

Fill in the table showing the mass-mole-energy relationships for this reaction.

	grams C_3H_8	mol C_3H_8 reacted	mol O_2 reacted	Heat (kJ) Released
a.	44.0	1.00		
b.	88.0	2.00		
c.		6.00		
d.			1.50	
e.				6600

Question 8

Consider the thermochemical equation for propane combustion:

$$C_3H_8 + 5\ O_2 \ \Longrightarrow\ 3\ CO_2 + 4\ H_2O + 2200\ kJ$$

Fill in the table showing the mass-mole-energy relationships for this reaction.

	grams C_3H_8	mol C_3H_8 reacted	mol O_2 reacted	Heat (kJ) Released
a.	44.0	1.00		
b.	66.0	1.50		
c.		5.0		
d.			12.5	
e.				8800

Question 9

Consider the thermochemical equation for propane combustion:

$$C_3H_8 + 5\ O_2 \ \Longrightarrow\ 3\ CO_2 + 4\ H_2O + 2200\ kJ$$

Fill in the table showing the mass-mole-energy relationships for this reaction.

	grams C_3H_8	mol C_3H_8 reacted	mol O_2 reacted	Heat (kJ) Released
a.	44.0	1.00		
b.	66.0	1.50		
c.		5.0		
d.			12.5	
e.				550

Question 10

Consider the thermochemical equation for propane combustion:

$$C_3H_8 + 5\ O_2 \ \Longrightarrow\ 3\ CO_2 + 4\ H_2O + 2200\ kJ$$

Fill in the table showing the mass-mole-energy relationships for this reaction.

	grams C_3H_8	mol C_3H_8 reacted	mol O_2 reacted	Heat (kJ) Released
a.	44.0	1.00		
b.	110.0	2.50		
c.		4.0		
d.			25.0	
e.				44 000

Wizard Difficulty Level

Question 11

Consider the thermochemical equation for propane combustion:

$$2\ C_4H_{10} + 13\ O_2 \ ==>\ 8\ CO_2 + 10\ H_2O + 5750\ kJ$$

Fill in the table showing the mass-mole-energy relationships for this reaction.

	grams C_4H_{10}	mol C_4H_{10} reacted	mol O_2 reacted	Heat (kJ) Released
a.	11.6	0.200		
b.	174	3.00		
c.		2.50		
d.			6.92	
e.				14 500

Question 12

Consider the thermochemical equation for propane combustion:

$$2\ C_4H_{10} + 13\ O_2 \ ==>\ 8\ CO_2 + 10\ H_2O + 5750\ kJ$$

Fill in the table showing the mass-mole-energy relationships for this reaction.

	grams C_4H_{10}	mol C_4H_{10} reacted	mol O_2 reacted	Heat (kJ) Released
a.	23.2	0.400		
b.	87.0	1.50		
c.		5.00		
d.			9.21	
e.				16 700

Question 13

Consider the thermochemical equation for propane combustion:

$$2\ C_4H_{10} + 13\ O_2 \ ==>\ 8\ CO_2 + 10\ H_2O + 5750\ kJ$$

Fill in the table showing the mass-mole-energy relationships for this reaction.

	grams C_4H_{10}	mol C_4H_{10} reacted	mol O_2 reacted	Heat (kJ) Released
a.	29.0	0.500		
b.	145	2.50		
c.		6.00		
d.			14.2	
e.				8210

Question 14

Consider the thermochemical equation for propane combustion:

$$2\ C_4H_{10} + 13\ O_2 \ \Longrightarrow\ 8\ CO_2 + 10\ H_2O + 5750\ kJ$$

Fill in the table showing the mass-mole-energy relationships for this reaction.

	grams C_4H_{10}	mol C_4H_{10} reacted	mol O_2 reacted	Heat (kJ) Released
a.	34.8	0.60		
b.	174	3.00		
c.		8.00		
d.			17.4	
e.				9780

Question 15

Consider the thermochemical equation for propane combustion:

$$2\ C_4H_{10} + 13\ O_2 \ \Longrightarrow\ 8\ CO_2 + 10\ H_2O + 5750\ kJ$$

Fill in the table showing the mass-mole-energy relationships for this reaction.

	grams C_4H_{10}	mol C_4H_{10} reacted	mol O_2 reacted	Heat (kJ) Released
a.	43.5	0.750		
b.	203	3.50		
c.		11.0		
d.			19.1	
e.				6850

Question 16

Consider the thermochemical equation for propane combustion:

$$2\ C_4H_{10} + 13\ O_2 \ ==>\ 8\ CO_2 + 10\ H_2O + 5750\ kJ$$

Fill in the table showing the mass-mole-energy relationships for this reaction.

	grams C_4H_{10}	mol C_4H_{10} reacted	mol O_2 reacted	Heat (kJ) Released
a.	174	3.0		
b.	34.8	0.600		
c.		12.0		
d.			21.8	
e.				16 900