Chemistry 115 Name key

Dr. Cary Willard

Quiz 6a (20 points) October 21, 2010

All work must be shown to receive credit. NA = 6.022 x 1023/mol

Pentane gas, C5H12, reacts with oxygen gas to produce water and carbon dioxide according to the following reaction:

C5H12(g) + 8 O2(g) 🡪 5 CO2(g) + 6 H2O(g) + 3535 kJ

1. (4 points) Is this an endothermic or exothermic reaction?

 exothermic

1. (4 points) How many moles of carbon dioxide will be formed from the reaction of 52.3 moles of pentane?

$$?mol CO\_{2}=52.3 mol C\_{5}H\_{12}×\frac{5 mol CO\_{2}}{1 mol C\_{5}H\_{12}}=262 mol CO\_{2}$$

1. (4 points) How many molecules of O2 are required to form 625 molecules of carbon dioxide?

$$?molec O\_{2}=625 molec CO\_{2}×\frac{8 molec O\_{2}}{5 molec CO\_{2}}=1000 molec O\_{2}$$

1. (4 points) How many moles of carbon dioxide are produced when a sample of pentane is burned to form 30.5 grams of water?

$$?mol CO\_{2}=30.5 g H\_{2}O×\frac{1 mol H\_{2}O}{18.02 g H\_{2}O}×\frac{5 mol CO\_{2}}{6 mol H\_{2}O}=1.41 mol CO\_{2}$$

1. (4 points) How much energy is produced when 32.5 grams of pentane are burned?

$$?kJ=32.5 g C\_{5}H\_{12}×\frac{1 mol C\_{5}H\_{12}}{72.2 g C\_{5}H\_{12}}×\frac{3535 kJ}{1 mol C\_{5}H\_{12}}=1590 kJ energy $$

Chemistry 115 Name key

Dr. Cary Willard

Quiz 6b (20 points) October 21, 2010

All work must be shown to receive credit. NA = 6.022 x 1023/mol

Pentane gas, C5H12, reacts with oxygen gas to produce water and carbon dioxide according to the following reaction:

C5H12(g) + 8 O2(g) 🡪 5 CO2(g) + 6 H2O(g) + 3535 kJ

1. (4 points) Is this an endothermic or exothermic reaction?

exothermic

1. (4 points) How many moles of carbon dioxide will be formed from the reaction of 64.7 moles of pentane?

$$?mol CO\_{2}=64.7 mol C\_{5}H\_{12}×\frac{5 mol CO\_{2}}{1 mol C\_{5}H\_{12}}=324 mol CO\_{2}$$

1. (4 points) How many molecules of O2 are required to form 475 molecules of carbon dioxide?

$$?molec O\_{2}=475 molec CO\_{2}×\frac{8 molec O\_{2}}{5 molec CO\_{2}}=760 molec O\_{2}$$

1. (4 points) How many moles of carbon dioxide are produced when a sample of pentane is burned to form 41.8 grams of water?

$$?mol CO\_{2}=41.8 g H\_{2}O×\frac{1 mol H\_{2}O}{18.02 g H\_{2}O}×\frac{5 mol CO\_{2}}{6 mol H\_{2}O}=1.93 mol CO\_{2}$$

1. (4 points) How much energy is produced when 83.4 grams of pentane are burned?

$$?kJ=83.4 g C\_{5}H\_{12}×\frac{1 mol C\_{5}H\_{12}}{72.2 g C\_{5}H\_{12}}×\frac{3535 kJ}{1 mol C\_{5}H\_{12}}=4080 kJ energy $$

Chemistry 115 Name key

Dr. Cary Willard

Quiz 6c (20 points) October 26, 2010

All work must be shown to receive credit. NA = 6.022 x 1023/mol

Acetylene, C2H2, reacts with oxygen gas to produce water and carbon dioxide according to the following reaction:

2 C2H2(g) + 5 O2(g) 🡪 4 CO2(g) + 2 H2O(g) + 1605 kJ

1. (4 points) Is this an endothermic or exothermic reaction?

 exothermic

1. (4 points) How many moles of acetylene are required to form 4.85 moles of carbon dioxide?

$$?mol C\_{2}H\_{2}=4.85 mol CO\_{2} ×\frac{2 mol C\_{2}H\_{2}}{4 mol CO\_{2}}=2.42 mol C\_{2}H\_{2}$$

1. (4 points) How many molecules of oxygen gas are required to react with 428 molecules of acetylene?

$$?molec O\_{2}=428 molec C\_{2}H\_{2}×\frac{5 molec O\_{2}}{2 molec C\_{2}H\_{2}}=1070 molec O\_{2}$$

1. (4 points) How many grams of water will be produced when 73.2 moles of oxygen react with excess acetylene?

$$?g H\_{2}O=73.2 mol O\_{2} ×\frac{2 mol H\_{2}O}{5 mol O\_{2}}×\frac{18.02 g H\_{2}O}{1 mol H\_{2}O}=527 g H\_{2}O$$

1. (4 points) How much energy is produced when 31.2 grams of acetylene are burned?

$$?kJ=31.2 g C\_{2}H\_{2}×\frac{1 mol C\_{2}H\_{2}}{26.03 g C\_{2}H\_{2}}×\frac{1605 kJ}{2 mol C\_{2}H\_{2}}=956 kJ energy $$

Chemistry 115 Name key

Dr. Cary Willard

Quiz 6d (20 points) October 26, 2010

All work must be shown to receive credit. NA = 6.022 x 1023/mol

Acetylene, C2H2, reacts with oxygen gas to produce water and carbon dioxide according to the following reaction:

2 C2H2(g) + 5 O2(g) 🡪 4 CO2(g) + 2 H2O(g) + 1605 kJ

1. (4 points) Is this an endothermic or exothermic reaction?

 exothermic

1. (4 points) How many moles of acetylene are required to form 6.41 moles of carbon dioxide?

$$?mol C\_{2}H\_{2}=6.41 mol CO\_{2} ×\frac{2 mol C\_{2}H\_{2}}{4 mol CO\_{2}}=3.20 mol C\_{2}H\_{2}$$

1. (4 points) How many molecules of oxygen gas are required to react with 846 molecules of acetylene?

$$?molec O\_{2}=846 molec C\_{2}H\_{2}×\frac{5 molec O\_{2}}{2 molec C\_{2}H\_{2}}=2120 molec O\_{2}$$

1. (4 points) How many grams of water will be produced when 35.4 moles of oxygen react with excess acetylene?

$$?g H\_{2}O=35.4 mol O\_{2} ×\frac{2 mol H\_{2}O}{5 mol O\_{2}}×\frac{18.02 g H\_{2}O}{1 mol H\_{2}O}=255 g H\_{2}O$$

1. (4 points) How much energy is produced when 9.35 grams of acetylene are burned?

$$?kJ=9.35 g C\_{2}H\_{2}×\frac{1 mol C\_{2}H\_{2}}{26.03 g C\_{2}H\_{2}}×\frac{1605 kJ}{2 mol C\_{2}H\_{2}}=288 kJ energy $$