**Quiz 8A**

# Directions: Answer each of the following questions. Be sure to use complete sentences where appropriate. For full credit be sure to show all of your work. Where appropriate answers should be boxed for clarity, written to the correct number of significant figures, and, include the proper units.

1. Consider the combustion of acetone (C3H6O), the main ingredient in nail polish remover (16 points):

C3H6O (l) + 4 O2 (g) → 3 CO2 (g) + 3 H2O (g) + 1790 kJ

* 1. If 0.457 moles of acetone react with excess oxygen gas, how many moles of water can be formed?

$$0.457 mol C\_{3}H\_{6}O×\frac{3 mol H\_{2}O}{1 mol C\_{3}H\_{6}O}=1.371 mol H\_{2}O ≈1.37 mol H\_{2}O$$

* 1. If 4.511 × 1025 molecules of carbon dioxide are produced, how many moles of oxygen gas reacted?

$$4.511×10^{25} molecules CO\_{2}×\frac{1 mol CO\_{2}}{6.022×10^{23} molecules CO\_{2}}×\frac{4 mol O\_{2}}{3 mol O\_{2}}=99.87822429 mol O\_{2}≈99.88 mol O\_{2}$$

* 1. If 1.88 g of acetone reacts with excess oxygen gas, how many grams of carbon dioxide can be formed?

$$1.88 g C\_{3}H\_{6}O×\frac{1 mol C\_{3}H\_{6}O }{58.080 g C\_{3}H\_{6}O}×\frac{3 mol CO\_{2}}{1 mol C\_{3}H\_{6}O}×\frac{44.009 g CO\_{2}}{1 mol CO\_{2}}=4.27360124 g CO\_{2}≈4.27 g CO\_{2}$$

* 1. If 3.892 g of carbon dioxide is actually formed from the reaction of 1.88 g of acetone, what is the percent yield?

$$\%yield=\frac{m\_{actual}}{m\_{theoretical}}×100=\frac{3.892 g }{4.27 g}×100=91.0707336\%≈91.1\%$$

* 1. If 562 kJ of heat energy are released, how many moles of water are also produced?
		1. $kJ×\frac{3 mol H\_{2}O }{1790 kJ}=0.941899441 mol H\_{2}O ≈0.942 mol H\_{2}O$
1. Describe the test used to confirm the presence of carbon dioxide gas (3 points).

As the bubbles are being produced, take a burning split and put it into the test tube, if the flame is extinguished that indicates the present of carbon dioxide gas.

1. Is this week’s experiment qualitative or quantitative (1 point)? \_\_\_\_\_qualitative\_\_\_\_\_\_\_\_\_\_\_