EMPIRICAL FORMULA WORKSHEET

Name _____ Date _____ Period _____

1. What is the empirical formula for a compound which contains 0.0134 g of iron, 0.00769 g of sulfur and 0.0115 g of oxygen?

Fe: $0.0134\text{g} \mid \frac{1\text{mol}}{55.85\text{g Fe}} = \frac{2.40\times10^{-4}}{2.40\times10^{-4}} = 1$ $0.0115\text{g O} \mid \frac{1\text{mol}}{16.00\text{g O}} = \frac{7.19\times10^{-4}}{2.40\times10^{-4}} = 3$

S: $0.00769\text{g} \mid \frac{1\text{mol}}{32.07\text{g S}} = \frac{2.40\times10^{-4}}{2.40\times10^{-4}} = 1$ $FeSO_3$

2. Find the empirical formula for a compound which contains 32.8% chromium and 67.2% chlorine.

Cr: $32.8\text{g} \mid \frac{1\text{mol}}{52.00\text{g Cr}} = \frac{0.6308}{0.6308}$ Cl: $67.2\text{g} \mid \frac{1\text{mol}}{35.45\text{g Cl}} = \frac{1.89}{0.6308}$

$CrCl_3$

3. NAME the compound which contains 0.463 g Tl (#81), 0.0544 g of carbon, 0.00685 g of hydrogen and 0.0725 g oxygen by finding its empirical formula.

Tl: $0.463\text{g} \mid \frac{1\text{mol}}{204.38\text{g Tl}} = \frac{0.00227}{0.00227}$ O: $0.0725\text{g O} \mid \frac{1\text{mol}}{16.00\text{g O}} = \frac{0.00453}{0.00227}$

C: $0.0544\text{g C} \mid \frac{1\text{mol}}{12.01\text{g C}} = \frac{0.00453}{0.00227}$ $TlC_2H_3O_2$

H: $0.00685\text{g H} \mid \frac{1\text{mol}}{1.01\text{g H}} = \frac{0.00678}{0.00227}$ Thallium carboxylic acid

4. What is the empirical formula for a compound which contains 67.1% zinc and the rest is oxygen? $100 - 67.1 = 32.9\%\ O$

Zn: $67.1\text{g} \mid \frac{1\text{mol}}{65.39\text{g Zn}} = \frac{1.026}{1.026} = 1$ ZnO_2

O: $32.9\text{g} \mid \frac{1\text{mol}}{16.00\text{g O}} = \frac{2.056}{1.026} = 2$

5. Barry Um has a sample of a compound which weighs 200 grams and contains only carbon, hydrogen, oxygen and nitrogen. By analysis, he finds that it contains 97.56 grams of carbon, 4.878 g of hydrogen, 52.03 g of oxygen and 45.53 g of nitrogen. Find its empirical formula.

C: $97.56\text{g} \mid \frac{1\text{mol C}}{12.01\text{g C}} = \frac{8.123}{3.250} = 2.5^{\times2}$ O: $52.03 \mid \frac{1\text{mol}}{16.00\text{g O}} = \frac{3.252}{3.250} = 1^{\times2}$ $C_5H_3O_2N_2$

H: $4.878\text{g} \mid \frac{1\text{mol}}{1.01\text{g H}} = \frac{4.830}{3.250} = 1.5^{\times2}$ N: $45.53\text{g} \mid \frac{1\text{mol}}{14.01\text{g N}} = \frac{3.250}{3.250} = 1^{\times2}$

6. The characteristic odor of pineapple is due to ethyl butyrate, an organic compound which contains only carbon, hydrogen and oxygen. If a sample of ethyl butyrate is known to contain 0.62069 g of carbon, 0.103448 g of hydrogen and 0.275862 g of oxygen, what is the empirical formula for ethyl butyrate?

C: $\frac{0.62069\text{g}}{12.01\text{g C}} \Big| \frac{1\text{mol}}{} = \frac{0.05168}{0.01724} = 3$

H: $\frac{0.103448\text{g}}{1.01\text{g H}} \Big| \frac{1\text{mol}}{} = \frac{0.10242}{0.01724} = 6$

O: $\frac{0.275862\text{g}}{16.00\text{g O}} \Big| \frac{1\text{mol}}{} = \frac{0.01724}{0.01724} = 1$

C_3H_6O

7. 300 grams of a compound which contains only carbon, hydrogen and oxygen is analyzed and found to contain the exact same percentage of carbon as it has oxygen. The percentage of hydrogen is known to be 5.98823%. Find the empirical formula of the compound.

$100 - 5.98823 = \frac{94.01}{2} = 47\%\text{ C and } 47\%\text{ O}$

C: $\frac{47.00\text{g}}{12.01\text{g C}} \Big| \frac{1\text{mol}}{} = \frac{3.913}{2.938} = 1.33 \times 3$

H: $\frac{5.98823\text{g}}{1.01\text{g H}} \Big| \frac{1\text{mol}}{} = \frac{5.929}{2.938} = 2 \times 3$

O: $\frac{47.00\text{g}}{16.00\text{g O}} \Big| \frac{1\text{mol}}{} = \frac{2.938}{2.938} = 1 \times 3$

$C_4H_6O_3$

8. 200.00 grams of an organic compound is known to contain 83.884 grams of carbon, 10.486 grams of hydrogen, 18.640 grams of oxygen and the rest is nitrogen. What is the empirical formula of the compound? $200 - (83.884 + 10.486 + 18.640) = 86.99$

C: $\frac{83.884\text{g}}{12.01\text{g C}} \Big| \frac{1\text{mol}}{} = \frac{6.985}{1.165} = 6 \times 3$

N: $\frac{86.99\text{g}}{14.01\text{g N}} \Big| \frac{1\text{mol}}{} = \frac{6.209}{1.165} = 5.33 \times 3$

H: $\frac{10.486\text{g}}{1.01\text{g H}} \Big| \frac{1\text{mol}}{} = \frac{10.382}{1.165} = 9 \times 3$

O: $\frac{18.640\text{g}}{16.00\text{g O}} \Big| \frac{1\text{mol}}{} = \frac{1.165}{1.165} = 1 \times 3$

$C_{18}H_{27}O_3N_{16}$

9. 300 grams of an organic sample which contains only carbon, hydrogen and oxygen is analyzed and found to contain 145.946 grams of carbon, 24.3243 grams of hydrogen and the rest is oxygen. What is the empirical formula for the compound? $300 - (145.946 + 24.3243) = 129.7297\text{g O}$

C: $\frac{145.946\text{g}}{12.01\text{g C}} \Big| \frac{1\text{mol}}{} = \frac{12.152}{8.108} = 1.5 \times 2$

H: $\frac{24.3243\text{g}}{1.01\text{g H}} \Big| \frac{1\text{mol}}{} = \frac{24.08}{8.108} = 3 \times 2$

O: $\frac{129.7297\text{g}}{16.00\text{g}} \Big| \frac{1\text{mol}}{} = \frac{8.108}{8.108} = 1 \times 2$

$C_3H_6O_2$

Empirical and Molecular Formula Worksheet

1. An oxide of chromium is found to have the following % composition: 68.4 % Cr and 31.6 % O. Determine this compound's empirical formula.

$Cr: \frac{68.4\,g\,Cr}{52.00\,g\,mol^{-1}} = \frac{1.315}{1.315} = 1 \times 2$ $O: \frac{31.6\,g\,O}{16.00\,g\,mol^{-1}} = \frac{1.975}{1.315} = 1.5 \times 2$

Cr_2O_3

2. The percent composition of a compound was found to be 63.5 % silver, 8.2 % nitrogen, and 28.3 % oxygen. Determine the compound's empirical formula.

$Ag: \frac{63.5\,g\,Ag}{107.87\,g\,mol^{-1}} = \frac{0.5887}{0.585} \approx 1$ $N: \frac{8.2\,g\,N}{14.01\,g\,mol^{-1}} = \frac{0.585}{0.585} = 1$

$O: \frac{28.3\,g}{16.00\,g\,mol^{-1}} = \frac{1.769}{0.585} \approx 3$

$AgNO_3$

3. A 170.00 g sample of an unidentified compound contains 29.84 g sodium, 67.49 g chromium, and 72.67 g oxygen. What is the compound's empirical formula?

$Na: \frac{29.84\,g}{22.99\,g\,mol^{-1}} = \frac{1.298}{1.298} = 1 \times 2$ $Cr: \frac{67.49\,g}{52.00\,g\,mol^{-1}} = \frac{1.298}{1.298} = 1 \times 2$

$O: \frac{72.67\,g}{16.00\,g\,mol^{-1}} = \frac{4.542}{1.298} = 3.5 \times 2$

$Na_2Cr_2O_7$

4. A 60.00 g sample of tetraethyl lead, a gasoline additive, is found to contain 38.43 g lead, 17.83 g carbon, and 3.74 g hydrogen. Find its empirical formula.

$Pb: \frac{38.43\,g}{207.2\,g\,mol^{-1}} = \frac{0.1855}{0.1855} = 1 \times 2$ $C: \frac{17.83\,g}{12.01\,g\,mol^{-1}} = \frac{1.485}{0.1855} = 8$

$H: \frac{3.74\,g}{1.01\,g\,mol^{-1}} = \frac{3.703}{0.1855} = 20$

$Pb\,H_{20}C_8$

5. A compound containing 5.9265 % H and 94.0735 % O has a molar mass of 34.01468 g/mol. Determine the empirical and molecular formula of this compound.

$H: \frac{5.9265\,g}{1.01\,g\,mol^{-1}} = \frac{5.868}{5.868} = 1$

$O: \frac{94.0735\,g}{16.00\,g\,mol^{-1}} = \frac{5.88}{5.868} \approx 1$

HO = E. F. $\rightarrow 17.01$

$\frac{34.01468}{17.01} \approx 2$

M.F. H_2O_2

6. The empirical formula for trichloroisocyanuric acid, the active ingredient in many household bleaches, is OCNCl. The molar mass of this compound is 232.41 g/mol. What is the molecular formula of trichloroisocyanuric acid?

$CONCl = 77.47\ g\,mol^{-1}$

$\frac{232.41}{77.47} = 3$

$C_3O_3N_3Cl_3$

7. Determine the molecular formula of a compound with an empirical formula of NH_2 and a formula mass of 32.06 amu.

$NH_2 = 16.03\ g\,mol^{-1}$ $\quad \frac{32.06}{16.03} = 2$ $\quad N_2H_4$

8. The empirical formula of a hydrocarbon (compound that contains only C and H) is found to be CH. Laboratory procedures have found that the molar mass of the compound is 78 g/mol. What is the molecular formula of this compound?

$CH = 13.02\ g\,mol^{-1}$ $\quad \frac{78}{13.02} \approx 6$ $\quad C_6H_6$

9. The molar mass of nicotine is 162.1 g/mol. It contains 74.0 % carbon, 8.7 % hydrogen, and 17.3 % nitrogen. Determine nicotine's empirical formula and molecular formula.

C: $\frac{74.0\ g\,C}{12.01\ g} \times \frac{1\ mol}{} = \frac{6.16}{1.24} = 5$

N: $\frac{17.3\ g\,N}{14.01\ g\,mol^{-1}} = \frac{1.24}{1.24} = 1$

H: $\frac{8.7\ g\,H}{1.01\ g} \times \frac{1\ mol}{} = \frac{8.61}{1.24} = 7$

E.F. $= C_5H_7N$

$\hookrightarrow 81.13\ g\,mol^{-1}$

$\frac{162.1}{81.13} = 2$

$C_{10}H_{14}N_2 = M.F.$

10. Phenyl magnesium bromide is used as a Grignard reagent in organic synthesis. Determine its empirical and molecular formula if its molar mass is 181.313 g/mol and it contains 39.7458 % C, 2.77956 % H, 13.4050 % Mg, and 44.0697 % Br.

C: $\frac{39.7458\ g\,C}{12.01\ g\,mol^{-1}} = \frac{3.309}{0.5514} = 6$

E.F. $= C_6H_5MgBr$

$\hookrightarrow 181.32\ g\,mol^{-1}$

H: $\frac{2.77956\ g\,H}{1.01\ g\,mol^{-1}} = \frac{2.752}{0.5514} = 5$

Mg: $\frac{13.4050\ g\,Mg}{24.31\ g\,mol^{-1}} = \frac{0.5514}{0.5514} = 1$

Br: $\frac{44.0697\ g}{79.90\ g\,mol^{-1}} = \frac{0.5516}{0.5514} = 1$

$\frac{181.32}{181.31} = 1$

M.F. $= C_6H_5MgBr$

Empirical and Molecular Formulas Worksheet

Objectives:

- be able to calculate empirical and molecular formulas

Empirical Formula

1) What is the empirical formula of a compound that contains 0.783g of Carbon, 0.196g of Hydrogen and 0.521g of Oxygen?

C: $\frac{0.783\text{g C}}{12.01\text{g}} \times \frac{1\text{mol}}{} = \frac{0.065}{0.033} = 1.96$

O: $0.521\text{g O} \times \frac{1\text{mol}}{16.00\text{g}} = \frac{0.033}{0.033} = 1$

H: $\frac{0.196\text{g H}}{1.01\text{g}} \times \frac{1\text{mol}}{} = \frac{0.194}{0.033} = 5.9$

C_2H_6O

2) What is empirical formula of a compound which consists of 89.14% Au and 10.80% of O?

Au: $\frac{89.14\text{g}}{196.97\text{g}} \times \frac{1\text{mol}}{} = \frac{0.453}{0.453} = 1 \times 2$ Au_2O_3

O: $\frac{10.80\text{g O}}{16.00\text{g}} \times \frac{1\text{mol}}{} = \frac{0.675}{0.453} = 1.5 \times 2$

3) What is empirical formula if compound consists of 21.2%N, 6.1%H, 24.2%S and 48.5%O?

N: $\frac{21.2\text{g N}}{14.01\text{g}} \times \frac{1\text{mol}}{} = \frac{1.513}{0.756} = 2$

S: $\frac{24.2\text{g}}{32.00\text{g}} \times \frac{1\text{mol}}{} = \frac{0.756}{0.756} = 1$

H: $\frac{6.1\text{g H}}{1.01\text{g}} \times \frac{1\text{mol}}{} = \frac{6.04}{0.756} = 8$

$N_2H_8SO_4$

O: $\frac{48.5\text{g O}}{16.00\text{g}} \times \frac{1\text{mol}}{} = \frac{3.031}{0.756} = 4$

Molecular Formula

4) Empirical formula of a substance is CH_2O. Molar mass is 180. What is the molecular formula?

$CH_2O = 30.03$ $\frac{180}{30.03} = 6.0$ $C_6H_{12}O_6$

5) Sample (3.585g) contains 1.388g of C, 0.345g of H, 1.850g O and its molar mass is 62g. What is molecular formula of this substance?

C: $\frac{1.388\text{g C}}{12.01\text{g mol}^{-1}} = \frac{0.1156}{0.1156} = 1$

H: $\frac{0.345\text{g H}}{1.01\text{g mol}^{-1}} = \frac{0.342}{0.1156} = 3$

O: $\frac{1.850\text{g O}}{16.00\text{g mol}^{-1}} = \frac{0.1156}{0.1156} = 1$

CH_3O = E.F.

↳ 31.04

$\frac{62\text{g}}{31.04\text{g}} = 2$

$C_2H_6O_2$ = M.F.

1. C_2H_6O
2. Au_2O_3
3. $N_2H_8SO_4$
4. $C_6H_{12}O_6$
5. $C_2H_6O_2$

Topic 7 Hydrate Worksheet #3

Solve the following problems. Show work to support your answer.

1. A hydrate of magnesium sulfate has a mass of 13.52 g. This sample is heated until no water remains. The $MgSO_4$ anhydrate has a mass of 6.60 g. Find the formula and name of the hydrate.

$MgSO_4: \frac{6.60g}{120.38g\,mol^{-1}} = \frac{0.0548}{0.0548} = 1$

$H_2O: 13.52 - 6.60 = 6.92g\ H_2O \rightarrow \frac{6.92g}{18.02g\,mol^{-1}} = \frac{0.384}{0.0548} = 7$

$MgSO_4 \cdot 7H_2O$ magnesium sulfate heptahydrate

2. A sample of copper (II) sulfate hydrate has a mass of 3.97 g. After heating, the $CuSO_4$ that remains has a mass of 2.54 g. Determine the correct formula and name of the hydrate.

$H_2O = 3.97 - 2.54 = 1.43g\ H_2O \rightarrow \frac{1.43g}{18.02g\,mol^{-1}} = \frac{0.0794}{0.0159} = 5$

$CuSO_4: \frac{2.54g}{159.61g\,mol^{-1}} = \frac{0.0159}{0.0159} = 1$

$CuSO_4 \cdot 5H_2O$ copper sulfate pentahydrate

3. When 5.00 g of $FeCl_3 \cdot xH_2O$ are heated, 2.00 g of H_2O are driven off. Find the chemical formula and the name of the hydrate.

$5.00 - 2.00 = 3.00\ FeCl_3$

$FeCl_3: \frac{3.00g}{162.20g\,mol^{-1}} = \frac{0.0185}{0.0185} = 1$ $\frac{2.00g\ H_2O}{18.01g\,mol^{-1}} = \frac{0.11099}{0.0185} = 6$ $FeCl_3 \cdot 6H_2O$

4. A sample of the hydrate of sodium carbonate has a mass of 8.85 g. It loses 1.28 g when heated. Find the formula and the name of the hydrate.

$8.85g - 1.28g = 7.57g\ Na_2CO_3$

$Na_2CO_3: \frac{7.57g}{105.99g\,mol^{-1}} = \frac{0.0714}{0.0710} = 1$ $H_2O: \frac{1.28g}{18.02g\,mol^{-1}} = \frac{0.0710}{0.0710} = 1$ $Na_2CO_3 \cdot H_2O$

5. A 16.4 g sample of hydrated calcium sulfate is heated until all the water is driven off. The calcium sulfate that remains has a mass of 13.0 g. Find the formula and the chemical name of the hydrate.

$16.4g - 13.0g = 3.4g\ H_2O$

$CaSO_4 \cdot 2H_2O$

$CaSO_4: \frac{13.0g}{136.14g\,mol^{-1}} = \frac{0.0955}{0.0955} = 1$ $H_2O: \frac{3.4g}{18.02g\,mol^{-1}} = \frac{0.1887}{0.0955} = 2$

6. When 8.00 g of $Pb(C_2H_3O_2)_2 \cdot xH_2O$ are heated, 1.14 g of H_2O are driven off. Find the chemical formula and the name of the hydrate.

$8 - 1.14g = 6.86g\ Pb(C_2H_3O_2)_2$

$Pb(C_2H_3O_2)_2: \frac{6.86g}{325.29g\,mol^{-1}} = \frac{0.02109}{0.02109} = 1$ $H_2O: \frac{1.14g}{18.02g\,mol^{-1}} = \frac{0.0633}{0.02109} = 3$ $Pb(C_2H_3O_2)_2 \cdot 3H_2O$

7. A hydrate is determined to be 45.43% water and 54.57% $CoCl_2$. Find the chemical formula and name for this hydrate. (*Hint – assume that there is 100 g total of hydrate compound.)

$CoCl_2 \cdot 6H_2O$

$CoCl_2: \frac{54.57g}{129.84g\,mol^{-1}} = \frac{0.4203}{0.4203} = 1$

$H_2O: \frac{45.43g}{18.02g\,mol^{-1}} = \frac{2.521}{0.4203} = 6$

$2.24g - 0.54g = 1.7g\ Ca(NO_3)_2$

8. When a 2.24 gram sample of a hydrate of calcium nitrate was heated, 0.54 grams of water was driven off. What is the formula of the hydrate of calcium nitrate?

$Ca(NO_3)_2: \frac{1.7g}{164.09 g\,mol^{-1}} = \frac{0.0104}{0.0104} = 1$

$H_2O: \frac{0.54g}{18.02 g\,mol^{-1}} = \frac{0.02997}{0.0104} = 3$

$Ca(NO_3)_2 \cdot 3H_2O$

9. When a 5.0 gram sample of $Cu(NO_3)_2 \cdot x\ H_2O$ is heated, 3.9 grams of the anhydrous salt remains. What is the value of x? $5 - 3.9 = 1.1g\ H_2O$

$Cu(NO_3)_2: \frac{3.9g}{187.56 g\,mol^{-1}} = \frac{0.02079}{0.02079} = 1$

$H_2O: \frac{1.1g}{18.01 g\,mol^{-1}} = \frac{0.06104}{0.02079} = 3$

$Cu(NO_3)_2 \cdot 3H_2O$

$x = 3$

10. A hydrate of sodium sulfite, $Na_2SO_3 \cdot x\ H_2O$, contains almost exactly 50% water by mass. What is the value of x? [Hint: assume you have 100.00 grams of the stuff.]

$Na_2SO_3: \frac{50g}{126.04 g\,mol^{-1}} = \frac{0.3967}{0.3967} = 1$

$H_2O: \frac{50g}{18.02 g\,mol^{-1}} = \frac{2.775}{0.3967} = 7$

$x = 7$

$Na_2SO_3 \cdot 7H_2O$

11. A hydrate of sodium sulfate with the formula $Na_2SO_4 \cdot x\ H_2O$, weighing 3.223 g, is heated to drive off the water of hydration. The anhydrous sodium sulfate weighs 1.421 g. What is the value of x?

$3.223g - 1.421g = 1.802g\ H_2O$

$Na_2SO_4: \frac{1.421g}{142.04 g\,mol^{-1}} = \frac{0.0100}{0.0100} = 1$

$H_2O: \frac{1.802g}{18.02 g\,mol^{-1}} = \frac{0.1}{0.0100} = 10$

$Na_2SO_4 \cdot 10H_2O$

$x = 10$

0.00137g H_2O ← Combustion Analysis and Concentration Worksheet → 0.00586g CO_2

1. Combustion analysis of toluene a common organic solvent,gives 5.86 mg of CO_2 and 1.37 mg of H_2O. If the compound only contains carbon and hydrogen, what is its empirical formula?

C: $\frac{0.00586g(CO_2)}{44.0g} \left| \frac{1molCO_2}{1molCO_2} \right| \frac{1molC}{1molCO_2} = \frac{1.332\times10^{-4}}{1.332\times10^{-4}} = 1 \times 7$ $\boxed{C_7H_8}$

H: $\frac{0.00137g H_2O}{18.02g} \left| \frac{1molH_2O}{1molH_2O} \right| \frac{2molH}{1molH_2O} = \frac{1.52\times10^{-4}}{1.332\times10^{-4}} = 1.14 \times 7$

$\left(\frac{1}{0.14}\right) = 7$ fraction $0.14 = 1/7$

2. Menthol is composed of C, H, and O. A 0.1005 g sample is combusted, producing 0.2829 g of CO_2 and 0.1159 g of H_2O. What is the empirical formula for menthol? If the compound has a molar mass of 156 g/mol, what is its molecular formula?

C: $\frac{0.2829g CO_2}{44.0g CO_2} \left| \frac{1molCO_2}{1molCO_2} \right| \frac{1molC}{1molCO_2} = 0.00643molC \rightarrow \frac{0.00643molC}{1mol} \left| \frac{12.01g}{1mol} \right. = 0.0772gC$

$\frac{6.44\times10^{-4}}{6.44\times10^{-4}} = 10$

H: $\frac{0.1159g H_2O}{18.02g H_2O} \left| \frac{1molH_2O}{1molH_2O} \right| \frac{2molH}{1molH_2O} = 0.01286molH \rightarrow 0.0128molH \left| \frac{1.01g}{1mol} \right. = 0.013gH$

$\frac{6.44\times10^{-4}}{6.44\times10^{-4}} = 20$

$0.1005 - (0.0772 + 0.013) = 0.0103gO$

O: $\frac{0.0103gO}{16.00gO} \left| \frac{1molO}{} \right. = \frac{6.44\times10^{-4}molO}{6.44\times10^{-4}} = 1$

E.F. = $C_{10}H_{20}O$ = M.F.

↳ $156.3g\,mol^{-1}$

3. Combustion of 2.78 mg of ethyl butyrate produces 6.32 mg of CO_2 and 2.58 mg of H_2O. What is the empirical formula is the compound is composed of C, H, and O?

CO_2: $\frac{0.00632g CO_2}{44.00g CO_2} \left| \frac{1molCO_2}{1molCO_2} \right| \frac{1molC}{1molCO_2} = \frac{1.436\times10^{-4}molC}{4.9425\times10^{-5}} \rightarrow 1.436\times10^{-4} \times 12.01g\,mol^{-1} = 0.0017gC$

H_2O: $\frac{0.00258g H_2O}{18.02g H_2O} \left| \frac{1molH_2O}{1molH_2O} \right| \frac{2molH}{1molH_2O} = \frac{2.863\times10^{-4}molH}{4.9425\times10^{-5}} \rightarrow 2.863\times10^{-4} \times 1.01g\,mol^{-1} = 2.892\times10^{-4}gH$

O: $0.00278 - (0.0017 + 2.892\times10^{-4}) = 7.908\times10^{-4}gO \left| \frac{1mol}{16.00gO} \right. = \frac{4.9425\times10^{-5}molO}{4.9425\times10^{-5}}$

C_3H_6O (This problem has errors as it rounds 5.8 to 6 for H)