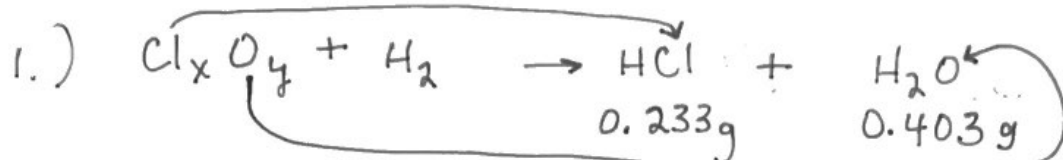


Some Unit 1 Sample Problems



$$\frac{.233\text{g HCl}}{1} \frac{1\text{mol HCl}}{36.46\text{g HCl}} \frac{1\text{mol Cl}}{1\text{mol HCl}} = .00639$$

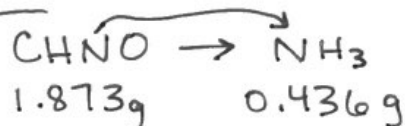
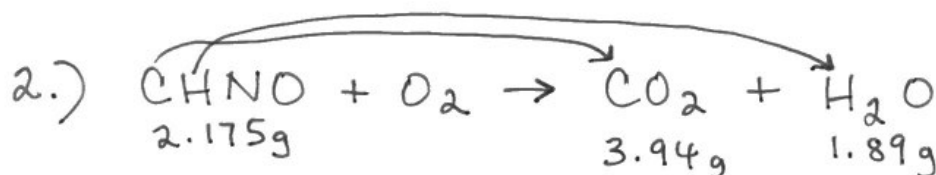
$$\frac{.403\text{g H}_2\text{O}}{1} \frac{1\text{mol H}_2\text{O}}{18.02\text{g H}_2\text{O}} \frac{1\text{mol O}}{1\text{mol H}_2\text{O}} = .0224\text{ mol O}$$

Cl:O

$$.00639 : .0224$$

$$.00639 : .00639$$

$$1 : 3.5 \rightarrow 2 : 7$$



$$\frac{.436\text{g NH}_3}{1} \frac{1\text{mol NH}_3}{17.04\text{g NH}_3} \frac{1\text{mol N}}{1\text{mol NH}_3} = .0256\text{ mol N}$$

$$\frac{2.175\text{g lysine}}{1} \frac{.0256\text{ mol N}}{1.873\text{g lysine}} = .0297\text{ mol N}$$

$$\frac{.0297\text{ mol N}}{1} \frac{14.01\text{g N}}{1\text{mol N}} = .416\text{ g N}$$

$$\frac{3.94\text{g CO}_2}{1} \frac{1\text{mol CO}_2}{44.01\text{g CO}_2} \frac{1\text{mol C}}{1\text{mol CO}_2} \frac{12.01\text{g C}}{1\text{mol C}} = 1.08\text{g C}$$

$$\rightarrow .0895\text{ mol C}$$

$$\frac{1.89\text{g H}_2\text{O}}{1} \frac{1\text{mol H}_2\text{O}}{18.02\text{g H}_2\text{O}} \frac{2\text{mol H}}{1\text{mol H}_2\text{O}} \frac{1.01\text{g H}}{1\text{mol H}} = .212\text{ g H}$$

$$\rightarrow .210\text{ mol H}$$

To find the moles and grams of N in 2.175g lysine



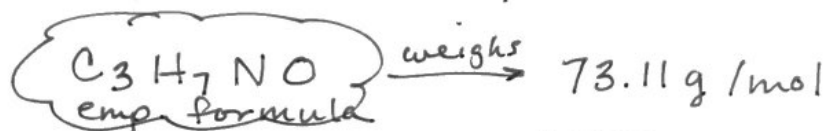
To find grams of Oxygen in 2.175g lysine :

$$2.175\text{g lysine} - .416\text{g O} - 1.08\text{g C} - .212\text{g H} = .467\text{g O}$$

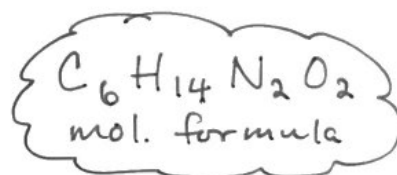
$$\frac{.467\text{g O}}{16.00\text{g O}} \times \frac{1\text{ mol O}}{16.00\text{g O}} = .0292\text{ mol O}$$

C	:	H	:	N	:	O
$\frac{.0895}{.0292}$		$\frac{.210}{.0292}$:	$\frac{.0297}{.0292}$:	$\frac{.0292}{.0292}$

3 7 1 1



$$150 / 73.11 \approx 2$$

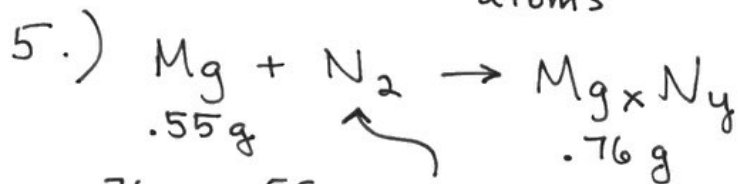


3.) A. $\frac{100\text{g Mg}}{1} \frac{1\text{mol Mg}}{24.30\text{g}} = 4.12\text{ mol Mg}$

B. $\frac{100\text{g Zn}}{1} \frac{1\text{mol Zn}}{65.38\text{g}} = 1.53\text{ mol Zn}$

C. $\frac{100\text{g Ag}}{1} \frac{1\text{mol Ag}}{107.87\text{g}} = .927\text{ mol Ag}$

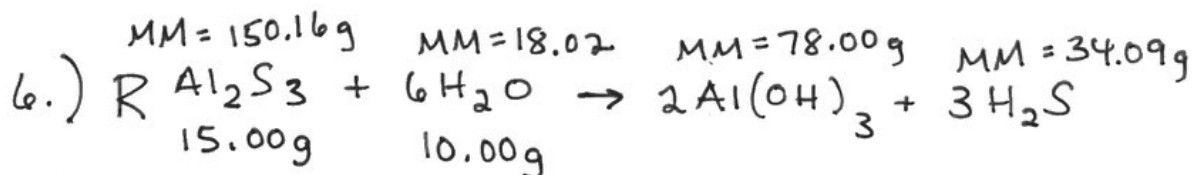
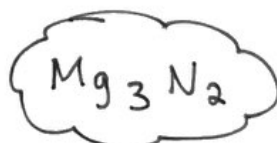
4.) $\frac{1\text{atom Cu}}{1} \frac{1\text{mol Cu}}{6.02 \times 10^{23}\text{ atoms}} \frac{63.55\text{g Cu}}{1\text{mol Cu}} = 1.06 \times 10^{-22}\text{ g Cu}$



$.76\text{g} - .55\text{g} = .21\text{g}$

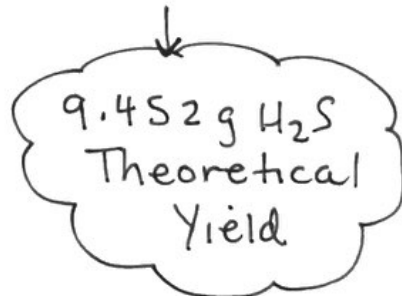
$\frac{.55\text{g Mg}}{1} \frac{1\text{mol Mg}}{24.30\text{g}} = \frac{.023\text{ mol Mg}}{.015} = 1.5 = 3$

$\frac{.21\text{g N}}{1} \frac{1\text{mol N}}{14.01\text{g}} = \frac{.015\text{ mol N}}{.015} = 1 = 2$

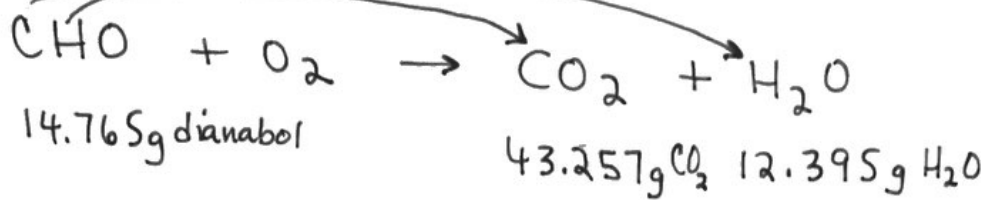


in moles

R	.09989	.5549	0	0
C	-.09248	-.5549	+.1849	+.27735
E	.00741	0	.1849	.27735



7)



$$\frac{43.257 \text{ g CO}_2}{1} \cdot \frac{1 \text{ mol CO}_2}{44.01 \text{ g CO}_2} \cdot \frac{1 \text{ mol C}}{1 \text{ mol CO}_2} \cdot \frac{12.01 \text{ g C}}{1 \text{ mol C}} = 11.80 \text{ g C}$$

→ .9829 mol C

$$\frac{12.395 \text{ g H}_2\text{O}}{1} \cdot \frac{1 \text{ mol H}_2\text{O}}{18.02 \text{ g H}_2\text{O}} \cdot \frac{2 \text{ mol H}}{1 \text{ mol H}_2\text{O}} \cdot \frac{1.01 \text{ g H}}{1 \text{ mol H}} = 1.39 \text{ g H}$$

→ 1.376 mol H

$$14.765 \text{ g dianabol} - 11.80 \text{ g C} - 1.39 \text{ g H} = 1.575 \text{ g O}$$

$$\frac{1.575 \text{ g O}}{1} \cdot \frac{1 \text{ mol O}}{16.00 \text{ g O}} = .09844 \text{ mol O}$$

C : H : O

$$\frac{.9829}{.09844} : \frac{1.376}{.09844} : \frac{.09844}{.09844}$$

$$9.985 : 13.98 : 1$$

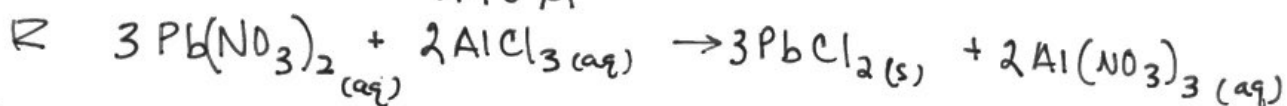
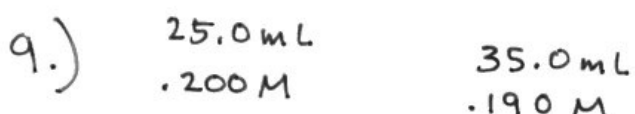
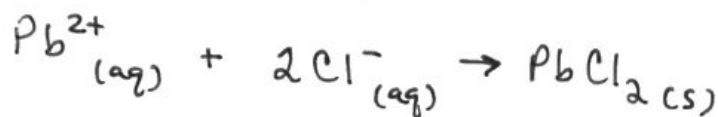
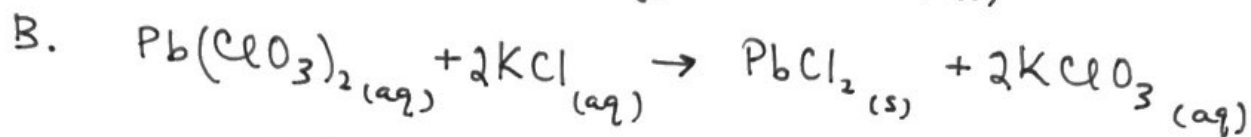
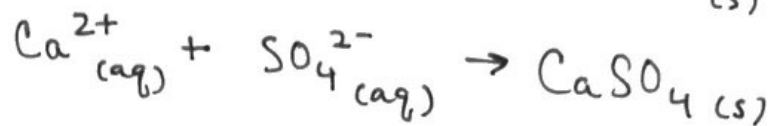
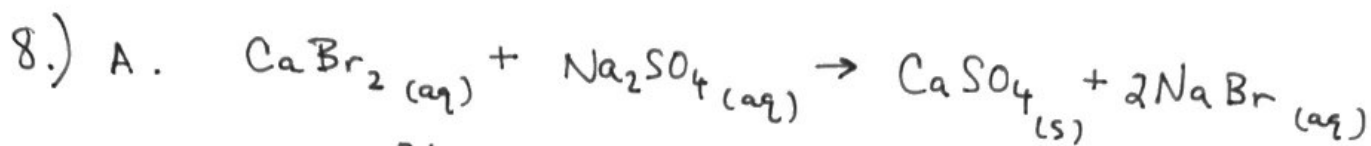
$$10 : 14 : 1$$

$$\text{MM} = 300.44$$

$$\frac{\sim 300}{\sim 150} \approx 2$$

emp. formula
 $\text{C}_{10}\text{H}_{14}\text{O}$
 ↓ weight
 $\sim 150 \text{ g/mol}$

molec. formula
 $\text{C}_{20}\text{H}_{28}\text{O}_2$



$\left. \begin{array}{l} \text{moles} \\ \hline \hline \hline \end{array} \right\}$	I	.00500	.00665	0	0
	C	-.00500	-.00333	+.00500	+.00333
	E	0	.00332 mol AlCl_3	.00500 mol PbCl_2	.00333 mol $\text{Al}(\text{NO}_3)_3$

$\frac{.00500 \text{ mol PbCl}_2}{1} \cdot \frac{278.1 \text{ g PbCl}_2}{1 \text{ mol PbCl}_2} = 1.39 \text{ g PbCl}_2$
 Theoretical yield

$[\text{Al}^{3+}] = \frac{.00332 \text{ mol} + .00333 \text{ mol}}{.06000 \text{ L}} = .0558 \text{ M Al}^{3+}$

$[\text{Cl}^{-}] = \frac{(.00332 \text{ mol}) \cdot 3}{.06000 \text{ L}} = .166 \text{ M Cl}^{-}$

$[\text{NO}_3^{-}] = \frac{(.00333) \cdot 3}{.06000 \text{ L}} = .167 \text{ M NO}_3^{-}$

