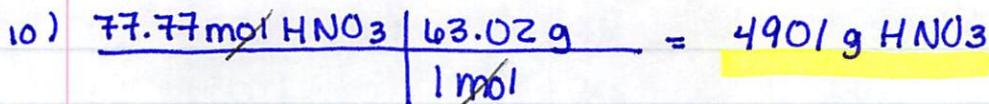
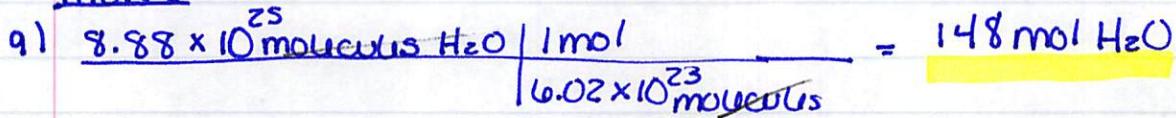


## Moles / Stoichiometry Test Review Key

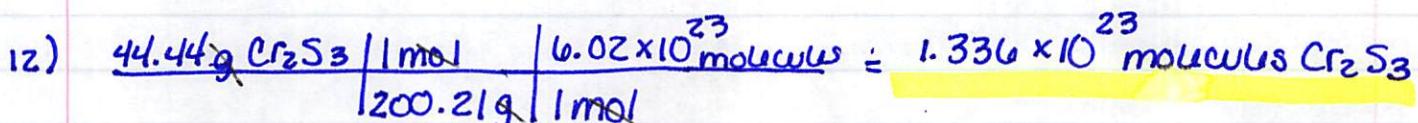
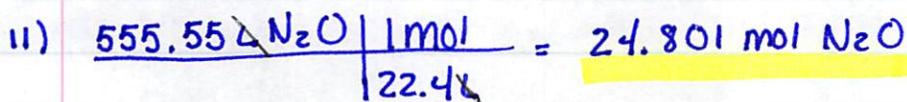
### Old Stuff

- |                               |                                 |
|-------------------------------|---------------------------------|
| 1) $\text{Cr}(\text{NO}_3)_2$ | 5) $\text{SO}_3$                |
| 2) $\text{H}_2\text{S}$       | 6) $\text{Na}_2\text{S}$        |
| 3) $\text{Li}_2\text{O}$      | 7) $\text{HCl}$                 |
| 4) $\text{H}_2\text{CO}_3$    | 8) $\text{Al}_2(\text{SO}_4)_3$ |

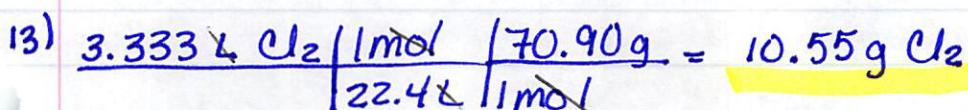
### Moles



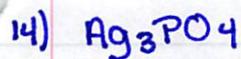
Molar Mass  
 $\text{H} = 1(1.01 \text{ g}) = 1.01 \text{ g}$   
 $\text{N} = 1(14.01 \text{ g}) = 14.01 \text{ g}$   
 $\text{O} = 3(16.00 \text{ g}) = 48.00 \text{ g}$   
 $\underline{\quad}$   
 $63.02 \text{ g}$



Molar Mass  
 $\text{Cr} = 2(52.00 \text{ g}) = 104.00 \text{ g}$   
 $\text{S} = 3(32.07 \text{ g}) = \frac{96.21 \text{ g}}{200.21 \text{ g}}$



Molar Mass  
 $\text{Cl} = 2(35.45 \text{ g}) = 70.90 \text{ g}$



Molar Mass

$$\text{Ag} = 3(107.87 \text{ g}) = 323.61 \text{ g}$$

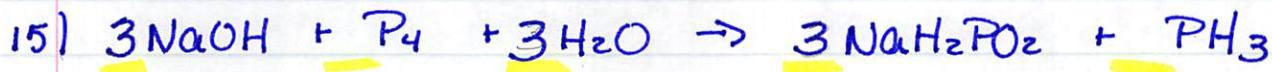
$$\text{P} = 1(30.97 \text{ g}) = 30.97 \text{ g}$$

$$\text{O} = 4(16.00 \text{ g}) = \frac{64.00 \text{ g}}{418.58 \text{ g}}$$

$$\% \text{Ag} = \frac{323.61 \text{ g}}{418.58 \text{ g}} \times 100 = 77.31\%$$

$$\% \text{P} = \frac{30.97 \text{ g}}{418.58 \text{ g}} \times 100 = 7.40\%$$

$$\% \text{O} = \frac{64.00 \text{ g}}{418.58 \text{ g}} \times 100 = 15.29\%$$



$$16) \frac{80.00 \text{ g NaOH}}{40.00 \text{ g NaOH}} \left| \begin{array}{c} 1 \text{ mol NaOH} \\ 3 \text{ mol NaOH} \end{array} \right| \frac{1 \text{ mol PH}_3}{3 \text{ mol NaOH}} = 0.6667 \text{ mol PH}_3$$

molar mass

$$\begin{aligned} \text{Na} &= 1 \times 22.99 \text{ g} = 22.99 \text{ g} \\ \text{O} &= 1 \times 16.00 \text{ g} = 16.00 \text{ g} \\ \text{H} &= 1 \times 1.01 \text{ g} = \frac{1.01 \text{ g}}{40.00 \text{ g}} \end{aligned}$$

$$17) \frac{61.94 \text{ g P}_4}{123.88 \text{ g P}_4} \left| \begin{array}{c} 1 \text{ mol P}_4 \\ 1 \text{ mol P}_4 \end{array} \right| \frac{3 \text{ mol H}_2\text{O}}{1 \text{ mol P}_4} = 1.500 \text{ mol H}_2\text{O}$$

$$18) \frac{120.0 \text{ g NaOH}}{40.00 \text{ g NaOH}} \left| \begin{array}{c} 1 \text{ mol NaOH} \\ 3 \text{ mol NaOH} \end{array} \right| \frac{3 \text{ mol NaH}_2\text{PO}_2}{1 \text{ mol NaH}_2\text{PO}_2} \left| \begin{array}{c} 87.98 \text{ g NaH}_2\text{PO}_2 \\ 1 \text{ mol NaH}_2\text{PO}_2 \end{array} \right| = \frac{263.94 \text{ g}}{\text{NaH}_2\text{PO}_2}$$

$$\begin{aligned} \text{molar mass} \quad \text{Na} &= 1 \times 22.99 \text{ g} = 22.99 \text{ g} \\ \text{H} &= 2 \times 1.01 \text{ g} = 2.02 \text{ g} \\ \text{P} &= 1 \times 30.97 \text{ g} = 30.97 \text{ g} \\ \text{O} &= 2 \times 16.00 \text{ g} = \frac{32.00 \text{ g}}{87.98 \text{ g}} \end{aligned}$$

19) A limiting reactant is the reactant that is used up first and controls how much product is made in a reaction

20) An excess reactant is the reactant that is not completely used up in a reaction.

21. toothpaste <u>ingredients</u>	<u>Factory Supply</u>	<u>#tubes possible</u>
62.5 g H <sub>2</sub> O	32,000,000g	512,000
125 g abrasives	65,000,000g	520,000
2.50 g fluoride	1,250,000g	500,000
5.00 g foaming agent	2,600,000g	520,000
1.75 g mint	200,000g	114,286

- You could make a maximum of 114,286 tubes of toothpaste.
- The limiting reactant is mint flavoring, you would run out of the mint after making 114,286 tubes.

- Left over ingredients

$$\frac{\text{original amount} - \text{amount used}}{\text{in factory}} = \# \text{ leftover}$$

$$\text{H}_2\text{O } 32,000,000 \text{ g} - (62.5 \text{ g} \times 114,286) = 24,857,125 \text{ g}$$

$$\text{abrasives } 65,000,000 \text{ g} - (125 \text{ g} \times 114,286) = 50,714,250 \text{ g}$$

$$\text{fluoride } 1,250,000 \text{ g} - (2.50 \text{ g} \times 114,286) = 944,285 \text{ g}$$

$$\text{foaming agent } 2,600,000 \text{ g} - (5.00 \text{ g} \times 114,286) = 2,028,570 \text{ g}$$

$$\text{mint flavor} \quad 200,000 \text{ g} - (1.75 \text{ g} \times 114,286) = 0 \text{ g.}$$