

# Reviewing Unit 3 Basic Stoichiometry

## Answer Key

### Calculating Molar Mass

Molar Mass  $C_2H_6O$

Atom	# of atoms	Molar mass	Total	Total Molar mass
C	2	12.01	24.02	$\frac{46.08 \text{ g } C_2H_6O}{\text{mol}}$
H	6	1.01	6.06	
O	1	16.00	16.00	

Find from P.T

★ Always give 2 decimal places!

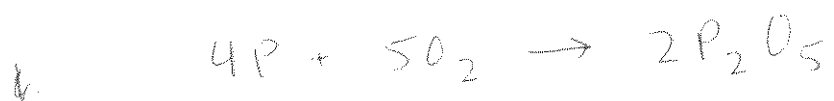
Br( $CaCO_3$ )

Atom	#	molar mass	Total	Total Molar Mass
Br	1	79.90	79.90	$\frac{179.99 \text{ g } Br(CaCO_3)}{\text{mol}}$
Ca	1	40.08	40.08	
C	1	12.01	12.01	
O	3	16.00	48	

3:  $H_2SO_4$

Atom	#	Molar Mass	Total	Total Molar Mass
H	2	1.01	2.02	$\frac{98.03 \text{ g } H_2SO_4}{\text{mol}}$
S	1	32.07	32.07	
O	4	16.00	64	

## Writing Mole to Mole Ratios



mole ratio of  $O_2$  to P

$$\boxed{5:4}$$

2. mole ratio of  $P_2O_5$  to P

$$\boxed{2:4}$$

or  $\boxed{1:2}$

(simplified)

3. mole ratio of  $O_2$  to  $P_2O_5$

$$\boxed{5:2}$$

★ use the coefficients from the balanced equation!

# Grams to Moles Calculations

240g  $H_2SO_4 \rightarrow$  moles

Given  $\times \frac{\text{units need}}{\text{units have}}$

$$\Rightarrow 240g \times \frac{1 \text{ moles}}{98.03 \text{ g}} = 2.45 \text{ moles}$$

$$2.45 \text{ moles}$$

$$\uparrow$$

$$H_2SO_4$$

Atom	#	molar mass	Total	Total molar mass
H	2	1.02	2.02	$\frac{98.03 \text{ g } H_2SO_4}{\text{mol}}$
S	1	32.07	32.07	
O	4	16.00	64.00	

4g  $LiOH \rightarrow$  moles

Given  $\times \frac{\text{units need}}{\text{units have}}$

$$4g \text{ LiOH} \times \frac{1 \text{ moles}}{23.95 \text{ g}} =$$

$$0.17 \text{ mol LiOH}$$

Atom	#	Molar Mass	Total	Total molar mass
Li	1	6.94	6.94	$\frac{23.95 \text{ g LiOH}}{\text{mol}}$
O	1	16.00	16.00	
H	1	1.01	1.01	

3512g  $MgO \rightarrow$  moles

$$3512g \text{ MgO} \times \frac{1 \text{ moles}}{40.31 \text{ g}} =$$

$$87.12 \text{ mol MgO}$$

Atom	#	molar mass	total	total molar mass
Mg	1	24.31	24.31	$40.31 \text{ g MgO} / \text{mol}$
O	1	16.00	16.00	

# Moles to Particles

1. 8 moles of  $P_2O_5 \rightarrow$  particles

Given  $\times \frac{\text{Need}}{\text{Have}}$

$$8 \text{ moles of } P_2O_5 \times \frac{6.622 \times 10^{23} \text{ particles}}{1 \text{ mole}} = \boxed{4.818 \times 10^{23} \text{ particles of } P_2O_5}$$

Avogadro's number

OR -

$$\boxed{4.82 \times 10^{24} \text{ particles of } P_2O_5}$$

2. 20 moles P  $\rightarrow$  particles

Given  $\times \frac{\text{Need}}{\text{Have}}$

$$20 \text{ moles of P} \times \frac{(6.622 \times 10^{23}) \text{ particles}}{1 \text{ mole}} = \boxed{120.44 \times 10^{23} \text{ particles P}}$$

OR

$$\boxed{1.20 \times 10^{25} \text{ particles P}}$$

3.  $12.644 \times 10^{23}$  particles  $O_2 \rightarrow$  moles

$$12.644 \times 10^{23} \text{ particles } O_2 \times \frac{1 \text{ mole}}{6.622 \times 10^{23} \text{ particles}} = \boxed{2 \text{ moles of } O_2}$$