Reviewing Unit 3 Basic Stoichiometry
Answer Key

Calculating Molar Mass

Molar Mass C_2H_6O

Found from P.T

Atom	# of atoms		Molar Mass		Total	Total Molar Mass
C	2	×	12.01	=	24.02	
H	6	×	1.01	=	6.06	= 46.08 g C_2H_6O / mol
O	1	×	16.00	=	16.00	

★ Always give 2 decimal places!

. $Br(CaCO_3)$

Atom	#		Molar mass		Total	Total Molar Mass
Br	1	×	79.90	=	79.90	
Ca	1	×	40.08	=	40.08	
C	1	×	12.01	=	12.01	= 179.99 g $Br(CaCO_3)$ / mol
O	3	×	16.00	=	48	

; H_2SO_4

Atom	#		Molar Mass		Total	Total Molar Mass
H	2	×	1.01	=	2.02	
S	1	×	32.07	=	32.07	= 98.03 g H_2SO_4 / mol
O	4	×	16.00	=	64	

Writing Mole to Mole Ratios

4. $4P + 5O_2 \rightarrow 2P_2O_5$

1. 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 → moles

Given × $\frac{\text{units need}}{\text{units have}}$ ⇒ 240g × $\frac{1 \text{ moles}}{98.03 \text{ g}}$ = **2.45 moles H_2SO_4**

Atom	#	Molar mass	Total
H	2	1.02	2.02
S	1	32.07	32.07
O	4	16.00	64
			Total molar mass: 98.03 g H_2SO_4 / mol

4g LiOH → moles

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

4g LiOH × $\frac{1}{23.95}$ $\frac{\text{moles}}{\text{g}}$ = **0.17 mol LiOH**

Atom	#	Molar Mass	Total	Total Molar Mass
Li	1	6.94	6.94	23.95 g LiOH / mol
O	1	16.00	16.00	
H	1	1.01	1.01	

3512g MgO → moles

3512g MgO × $\frac{1}{40.31}$ $\frac{\text{moles}}{\text{g}}$ = **87.12 mol MgO**

Atom	#	Molar mass	total	total molar mass
Mg	1	24.31	24.31	40.31 g MgO / mol
O	1	16.00	16	

Moles to Particles

1. 8 moles of P_2O_5 → particles

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

Avogadro's number

8 moles of P_2O_5 × $\frac{6.022 \times 10^{23} \text{ particles}}{1 \text{ mole}}$ = $\boxed{48.18 \times 10^{23} \text{ particles of } P_2O_5}$

or

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

2. 20 moles P → particles

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

20 moles of P × $\frac{(6.022 \times 10^{23}) \text{ particles}}{1 \text{ mole}}$ = $\boxed{120.44 \times 10^{23} \text{ particles P}}$

or

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

3. 12.044×10^{23} particles O_2 → moles

2.44×10^{23} particles O_2 × $\frac{1 \text{ mole}}{6.022 \times 10^{23} \text{ particles}}$ = $\boxed{2 \text{ moles of } O_2}$