

For the following chemical reactions, complete the chart and perform the following conversions

Chemical Equation	$Ti(SO_4)_2 + 2Cl_2 \rightarrow TiCl_4 + 2SO_4$	
Molar Ratio	mol $Ti(SO_4)_2$ = 2 mol $Cl_2$ =	mol $TiCl_4$ = 2 mol $SO_4$ <del>X</del>

Single Step

$mol_A \rightarrow mol_B$   
1:1 Ratio  
Answer is the same as start!  
(2:2, 3:3)

Convert 2.74 mol $Ti(SO_4)_2$ to mol $TiCl_4$		Convert 8.28 mol $Cl_2$ to mol $SO_4$	
2.74 mol $Ti(SO_4)_2$	1 mol $TiCl_4$		
	1 mol $Ti(SO_4)_2$		
mol $TiCl_4$ =	2.74 mol $TiCl_4$	mol $SO_4$ =	

$Ti(SO_4)_2$   
① | ② | ③ | ④  
47.87  
+ 64.14  
+ 128.00

Element	#	Molar Mass	Element	#	Molar Mass
Titanium (Ti)	1	47.87 g	Titanium (Ti)	1	47.87 g
Sulfur (S)	2	32.07 g	Chlorine (Cl)	4	35.45 g
Oxygen (O)	8	16.00 g	Titanium(IV)Chloride $TiCl_4$		189.67 g
Titanium(IV)Sulfate $Ti(SO_4)_2$		204.01 g			

$TiCl_4$   
① | ④  
47.87  
+ 141.80  
189.67

Mass  
 $1 mol_A = MM_A$   
 $482.58 \times 1$   
189.67

Convert 482.58g $TiCl_4$ to mol $TiCl_4$		Convert ___ mol $TiCl_4$ to mol $SO_4$	
482.58g $TiCl_4$	1 mol $TiCl_4$	2.54 mol $TiCl_4$	2 mol $SO_4$
	189.67g $TiCl_4$		1 mol $TiCl_4$
mol $TiCl_4$ =	2.54 mol $TiCl_4$	mol $SO_4$ =	5.08 mol $SO_4$

Pick correct MM!  
blank!

$2.54 \times 2$   
1

Convert 3.27 mol $Ti(SO_4)_2$ to mol $Cl_2$		Convert ___ mol $Cl_2$ to volume $Cl_2$	
3.27 mol $Ti(SO_4)_2$	2 mol $Cl_2$	6.54 mol $Cl_2$	22.4 L $Cl_2$
	1 mol $Ti(SO_4)_2$		1 mol $Cl_2$
mol $Cl_2$ =	6.54 mol $Cl_2$	volume $Cl_2$ =	146.50 L $Cl_2$

Volume  
 $1 mol_A = 22.4 L_A$

Round to 2 places after decimal! (146.496) 49 → 50

For the following chemical reactions, complete the chart and perform the following conversions

Chemical Equation	$2\text{Mn}(\text{BrO}_3)_3 + 3\text{H}_2\text{S} \rightarrow \text{Mn}_2\text{S}_3 + 6\text{HBrO}_3$			
Molar Ratio	2 mol $\text{Mn}(\text{BrO}_3)_3 =$	3 mol $\text{H}_2\text{S} =$	1 mol $\text{Mn}_2\text{S}_3 =$	6 mol $\text{HBrO}_3$

Not all MM will be used!

MM $\text{Mn}(\text{BrO}_3)_3$	438.64g/mol
MM $\text{H}_2\text{S}$	34.09g/mol

MM $\text{Mn}_2\text{S}_3$	206.09g/mol
MM $\text{HBrO}_3$	128.91g/mol

Convert 374.53g $\text{Mn}(\text{BrO}_3)_3$ to mol $\text{Mn}(\text{BrO}_3)_3$	
mol $\text{Mn}(\text{BrO}_3)_3 =$	

Convert ___ mol $\text{Mn}(\text{BrO}_3)_3$ to mol $\text{HBrO}_3$	
mol $\text{HBrO}_3 =$	

Convert ___ mol $\text{HBrO}_3$ to mass $\text{HBrO}_3$	
mass $\text{HBrO}_3 =$	

Convert 57.29L $\text{H}_2\text{S}$ to mol $\text{H}_2\text{S}$	
57.29L $\text{H}_2\text{S}$	1 mol $\text{H}_2\text{S}$
	22.4L $\text{H}_2\text{S}$
mol $\text{H}_2\text{S} =$	2.56 mol $\text{H}_2\text{S}$

Convert <u>2.56</u> mol $\text{H}_2\text{S}$ to mol $\text{Mn}_2\text{S}_3$	
2.56 mol $\text{H}_2\text{S}$	1 mol $\text{Mn}_2\text{S}_3$
	3 mol $\text{H}_2\text{S}$
mol $\text{Mn}_2\text{S}_3 =$	0.85 mol $\text{Mn}_2\text{S}_3$

blank!

Convert mol $\text{Mn}_2\text{S}_3$ to mass $\text{Mn}_2\text{S}_3$	
0.85 mol $\text{Mn}_2\text{S}_3$	206.09g $\text{Mn}_2\text{S}_3$
	1 mol $\text{Mn}_2\text{S}_3$
mass $\text{Mn}_2\text{S}_3 =$	175.18g $\text{Mn}_2\text{S}_3$