

Name \_\_\_\_\_ Period \_\_\_\_\_

College Prep Chemistry of the Earth

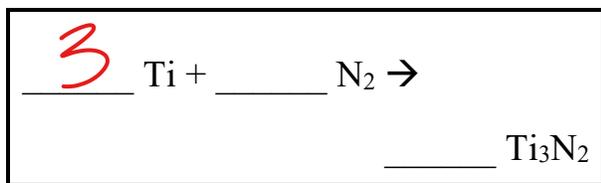
Assignment 4Q – Balancing Equations (Part 3)

Balance the following chemical reactions, showing complete balancing chart.

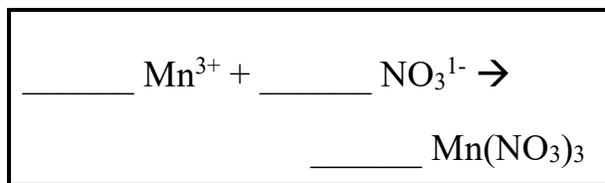
20 Points

Atom Ratio	1:1	2:2	1:2	1:3	2:4	2:3	4:3	2:6	3:6
Coefficients	1-1	1-1	2-1	3-1	2-1	3-2	3-4	3-1	2-1

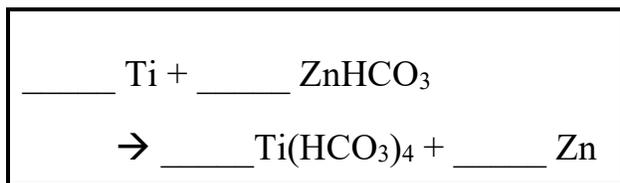
Atom Ratio	3:3	4:4	2:1	3:1	4:2	3:2	3:4	6:2	6:3
Coefficients	1-1	1-1	1-2	1-3	1-2	2-3	4-3	1-3	3-1



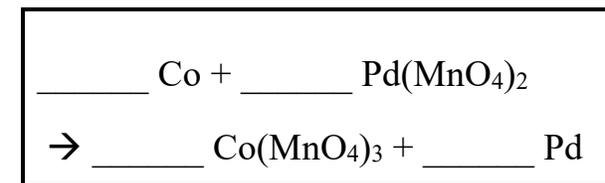
Reactants		Products	
Ti	<del>1</del> 3	Ti	3
N	2	N	2



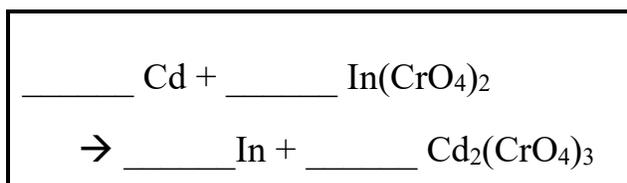
Reactants		Products	
Mn		Mn	
NO <sub>3</sub>		NO <sub>3</sub>	



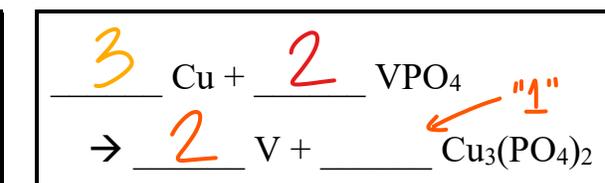
Reactants		Products	
Ti		Ti	
Zn		Zn	
HCO <sub>3</sub>		HCO <sub>3</sub>	



Reactants		Products	
Co		Co	
Pd		Pd	
MnO <sub>4</sub>		MnO <sub>4</sub>	



Reactants		Products	
Cd		Cd	
In		In	
CrO <sub>4</sub>		CrO <sub>4</sub>	



Reactants		Products	
Cu	<del>1</del> 3	Cu	3
V	<del>1</del> 2	V	<del>1</del> 2
PO <sub>4</sub>	<del>1</del> 2	PO <sub>4</sub>	2

① 1:2  
PO<sub>4</sub> 2-1  
② 2:1  
V 1-2  
③ 1:3  
Cu 3-1

①  $1:3$   
 $\text{Cr}_2\text{O}_7$   $3-1$   
 left right  
 ②  $6:1$   
 $\text{K}$   $1-6$   
 ③  $3:6$   
 $\text{ClO}_3$   $6-3$   
 Reduc!  $\frac{6}{3} = \frac{3}{3}$   
 $2-1$

$3 \cdot 2 = 6$

$3 \text{ (Cr}_2\text{O}_7)_1 \leftarrow 3 \cdot 1 = 3$       $2 \text{ Al(ClO}_3)_3 \leftarrow 2 \cdot 1 = 2$   
 $\rightarrow 6 \text{ KClO}_3 + 1 \text{ Al}_2(\text{Cr}_2\text{O}_7)_3$   
 $6 \cdot 1 = 6$       $6 \cdot 1 = 6$

Reactants (top)		Products (bottom)	
<u>K</u>	26	<u>K</u>	16
<u>Cr<sub>2</sub>O<sub>7</sub></u>	13	<u>Cr<sub>2</sub>O<sub>7</sub></u>	3
<u>Al</u>	12	<u>Al</u>	2
<u>ClO<sub>3</sub></u>	36	<u>ClO<sub>3</sub></u>	16

$2 \cdot 3 = 6$

$\text{FeC}_2\text{O}_4 + \text{Sc}(\text{IO}_3)_3$   
 $\rightarrow \text{Fe}(\text{IO}_3)_2 + \text{Sc}_2(\text{C}_2\text{O}_4)_3$

Reactants		Products	
Fe		Fe	
C <sub>2</sub> O <sub>4</sub>		C <sub>2</sub> O <sub>4</sub>	
Sc		Sc	
IO <sub>3</sub>		IO <sub>3</sub>	

$\text{HNO}_3 + \text{Cr}(\text{OH})_2$   
 $\rightarrow \text{HOH} + \text{Cr}(\text{NO}_3)_2$

Reactants		Products	
H		H	
NO <sub>3</sub>		NO <sub>3</sub>	
Cr		Cr	
OH		OH	

$\text{H}_2\text{SO}_4 + \text{Fe}(\text{OH})_3$   
 $\rightarrow \text{HOH} + \text{Fe}_2(\text{SO}_4)_3$

Reactants		Products	
H		H	
SO <sub>4</sub>		SO <sub>4</sub>	
Fe		Fe	
OH		OH	

①  $1:3$   
 $\text{Ti}$   $3-1$   
 left right  
 ②  $12:1$   
 $\text{OH}$   $1-12$   
 ③  $3:12$   
 $\text{H}$   $12-3$   
 Reduc!  $4-1$

$4 \cdot 3 = 12$       $4 \cdot 1 = 4$       $3 \cdot 1 = 3$       $3 \cdot 4 = 12$   
 $4 \text{ H}_3\text{PO}_4 + 3 \text{ Ti}(\text{OH})_4$   
 $\rightarrow 12 \text{ HOH} + \text{Ti}_3(\text{PO}_4)_4$   
 $12 \cdot 1 = 12$       $12 \cdot 1 = 12$

Reactants		Products	
H	312	H	112
<u>PO<sub>4</sub></u>	14	<u>PO<sub>4</sub></u>	4
<u>Ti</u>	13	<u>Ti</u>	3
<u>OH</u>	412	<u>OH</u>	112

$\text{H}_2\text{SO}_4 + \text{Cr}(\text{OH})_2$   
 $\rightarrow \text{HOH} + \text{CrSO}_4$

Reactants		Products	
H		H	
SO <sub>4</sub>		SO <sub>4</sub>	
Cr		Cr	
OH		OH	

Don't start w/ H or OH!