Balancing Problem Set #1

Count the total number of each kind of "reactant atom" and total number of each type of "product atom" to balance the following equations. Record the numbers in the spaces provided.

1. ____$H_{2\,(g)}$ + ____$O_{2(g)}$ → ____$H_2O_{(g)}$

Rocket fuel is burned in a shuttle main engine.

Reactants		Products	
Element	#	Element	#
H		H	
O		O	

2. ____$CH_{4(g)}$ + ____$O_{2(g)}$ → ____$CO_{2(g)}$ + ____$H_2O_{(g)}$

Natural gas is burned in a gas furnace in many homes.

Reactants		Products	
Element	#	Element	#
C		C	
H		H	
O		O	

3. ____$H_2O_{2(l)}$ → ____$H_2O_{(l)}$ + ____$O_{2(g)}$

Hydrogen peroxide decomposes when put on a cut.

Reactants		Products	
Element	#	Element	#
H		H	
O		O	

4. ____ $NH_{3(g)}$ + ____$O_{2(g)}$ → ____$N_{2(g)}$ + ____$H_2O_{(g)}$

Ammonia will burn slowly in pure oxygen.

Reactants		Products	
Element	#	Element	#
N		N	
H		H	
O		O	

5. ____$CS_{2(l)}$ + ____$Cl_{2(g)}$ → ____$CCl_{4(l)}$ + ____ $S_2Cl_{2(g)}$

How carbon tetrachloride (banned cleaning fluid) used to be made.

Reactants		Products	
Element	#	Element	#
C		C	
S		S	
Cl		Cl	

6. ____$N_{2(g)}$ → ____$H_{2(g)}$ + ____$NH_{3(g)}$

How ammonia is made.

Reactants		Products	
Element	#	Element	#
N		N	
H		H	

7. ____$Al_{(s)}$ + ____ $H_2SO_{4\,(aq)}$ → $H_{2(g)}$ + ____$Al_2(SO_4)_{3(aq)}$

Aluminum should never be used to hold acid !!!

Reactants		Products	
Element	#	Element	#
Al		Al	
H		H	
S		S	
O		O	

8. ____$Al_{(s)}$ + ____ $H_2SO_{4\,(aq)}$ → $H_{2(g)}$ + ____$Al_2(SO_4)_{3(aq)}$

Note: If the complex ion does not break up then balance the number of complex ions on each side of the chemical equation.

Reactants		Products	
Element	#	Element	#
Al		Al	
H		H	
SO_4		SO_4	

Problem Set #2

____1. ____F_2 + ____H_2O → ____HF + ____O_2

____2. ____SO_2 + ____O_2 → ____SO_3

____3. ____S_8 + ____O_2 → ____SO_2

____4. ____C + ____Fe_2O_3 → +____CO + ____Fe

____5. ____CO_2 + ____C → ____CO

____6. ____ Fe_2O_3 + ____CO → ____CO_2 + ____Fe

____7. ____FeS + ____O_2 → ____$Fe_2 O_3$ + ____ SO_2

____8. ____$KClO_3$ → ____KCl + ____O_2

____9. ____HCl + ____ Fe_2O_3 → $FeCl_3$ + ____H_2O

____10. ____MnO_2 + ____HCl → ____$MnCl_2$ + ____H_2O + ____Cl_2

____11. ____C_5H_{10} + ____O_2 → ____CO_2 + ____H_2O

____12. ____C_6H_6 + ____O_2 → ____CO_2 + ____ H_2O

____13. ____KOH + ____Cl_2 → ____KClO + ____KCl + ____H_2O

____14. ____Al + ____NaOH → ____Na_3AlO_3 + ____H_2

____15. ____$AsCl_3$ + ____H_2S → ____As_2S_3 + ____HCl

____16. ____ $Fe_2O_{3(s)}$ + ____$H_{2(g)}$ → ____$Fe_{(s)}$ + ____$H_2O_{(l)}$

____17. ____$CaCO_{3(s)}$ → $CaO_{(s)}$ + ____$CO_{2(g)}$

____18. ____$Fe_{(s)}$ + ____$S_{8(s)}$ → $FeS_{(s)}$

____19. ____$H_2S_{(aq)}$ + ____$KOH_{(aq)}$ → $H_2O_{(l)}$ + ____$K_2S_{(s)}$

____20. ____NaCl $_{(l)}$ → ____$Na_{(l)}$ + ____$Cl_{2(g)}$

____11. ____$Al_{(s)}$ + ____$H_2SO_{4(aq)}$ → ____$H_{2(g)}$ + ____$Al_2(SO_4)_{3(aq)}$

____12. ____$H_3PO_{4(aq)}$ + ____$NH_4OH_{(aq)}$ → ____$H_2O_{(l)}$ + ____$(NH_4)_3PO_{4(aq)}$

____13. ____$C_3H_{8(l)}$ + ____$O_{2(g)}$ → ____$H_2O_{(l)}$ + ____$CO_{2(g)}$

____14. ____$Al_{(s)}$ + ____$O_{2(g)}$ → ____$Al_2O_{3(s)}$

____1. ____$Cu_{(s)}$ + ____$O_{2(g)}$) → ____$CuO_{(s)}$

____2. ____$H_2O_{(l)}$ → ____$H_{2(g)}$ + ____$O_{2(g)}$

____3. ____$Fe_{(s)}$ + $H_2O_{(l)}$ → $H_{2(g)}$ + ____$Fe_3O_{4(aq)}$

____4. ____$AsCl_{3(s)}$ + ____$H_2S_{(aq)}$ → +____$As_2S_{3(aq)}$ + ____$HCl_{(aq)}$

____5. ____$CH_{3(l)}$ + $O_{2(g)}$ → $H_2O_{(l)}$ + ____$CO_{2(g)}$