Name: ANSWERS

Date: _____

BCI SCIENCE

Balancing Equations
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. 2 $H_{2(g)}$ + ___ $O_{2(g)}$ → 2 $H_2O_{(g)}$

Rocket fuel is burned in a shuttle main engine.

Reactants		Products	
Element	#	Element	#
H	4	H	4
O	2	O	2

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

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

Reactants		Products	
Element	#	Element	#
C	1	C	1
H	4	H	4
O	4	O	4

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

Hydrogen peroxide decomposes when put on a cut.

Reactants		Products	
Element	#	Element	#
H	4	H	4
O	4	O	4

4. 4 $NH_{3(g)}$ + 3 $O_{2(g)}$ → 2 $N_{2(g)}$ + 6 $H_2O_{(g)}$

Ammonia will burn slowly in pure oxygen.

Reactants		Products	
Element	#	Element	#
N	4	N	4
H	12	H	12
O	6	O	6

5. ___ $CS_{2(l)}$ + 3 $Cl_{2(g)}$ → ___ $CCl_{4(l)}$ + ___ $S_2Cl_{2(g)}$

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

Reactants		Products	
Element	#	Element	#
C	1	C	1
S	2	S	2
Cl	6	Cl	6

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

How ammonia is made.

Reactants		Products	
Element	#	Element	#
N	2	N	2
H	6	H	6

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

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	2	Al	2
H	6	H	6
SO_4	3	SO_4	3

EXTRA TOUGH!!! Don't need to know how to do these in grade 10.

8. 4 $Fe_{(s)}$ + 6 $H_2O_{(g)}$ + 3 $O_{2(g)}$ → 2 $Fe_2O_3 \cdot 3H_2O_{(s)}$

Iron metal rusts in the presence of water and oxygen.

Reactants		Products	
Element	#	Element	#
Fe	4	Fe	4
H	12	H	12
O	12	O	12

9. 16 $H_2S_{(g)}$ + 8 $SO_{2(g)}$ → 16 $H_2O_{(g)}$ + 3 $S_{8(s)}$

Sour gas can be reacted with sulphur dioxide to deposit sulphur which can be stored.

Reactants		Products	
Element	#	Element	#
H	32	H	32
S	24	S	24
O	16	O	16

Name: _____ Date: _____ _____ _____

BCI SCIENCE
SNC 2D

Balancing Equations
Problem Set # 2

____1. 2 F_2 + 2 H_2O → 4 HF + ____ O_2

____2. 2 SO_2 + ____ O_2 → 2 SO_3

____3. ____ S_8 + 8 O_2 → 8 SO_2

____4. 3 C + ____ Fe_2O_3 → 3 CO + 2 Fe

____5. ____ CO_2 + ____ C → 2 CO

____6. ____ Fe_2O_3 + 3 CO → 3 CO_2 + 2 Fe

____7. 4 FeS + 7 O_2 → 2 Fe_2O_3 + 4 SO_2

____8. 2 $KClO_3$ → 2 KCl + 3 O_2

____9. 6 HCl + 1 Fe_2O_3 → 2 $FeCl_3$ + 3 H_2O

____10. 1 MnO_2 + 4 HCl → 1 $MnCl_2$ + 2 H_2O + 2 Cl_2

____11. 2 C_5H_{10} + 15 O_2 → 10 CO_2 + 10 H_2O

____12. 2 C_6H_6 + 15 O_2 → 12 CO_2 + 6 H_2O

____13. 2 KOH + 1 Cl_2 → 1 KClO + 1 KCl + 1 H_2O

____14. 2 Al + 6 NaOH → 2 Na_3AlO_3 + 3 H_2

____15. 2 $AsCl_3$ + 3 H_2S → 1 As_2S_3 + 6 HCl

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Balancing Equations
Problem Set # 3

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

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

____3. 3 $Fe_{(s)}$ + 4 $H_2O_{(l)}$ → 4 $H_{2(g)}$ + ____$Fe_3O_{4(aq)}$

____4. 2 $AsCl_{3(s)}$ + 3 $H_2S_{(aq)}$ → + ____$As_2S_{3(aq)}$ + 6 $HCl_{(aq)}$

____5. ____$CuSO_4 \cdot 5H_2O_{(l)}$ → ____$CuSO_{4(s)}$ + 5 $H_2O_{(g)}$

____6. ____$Fe_2O_{3(s)}$ + 3 $H_{2(g)}$ → 2 $Fe_{(s)}$ + 3 $H_2O_{(l)}$

____7. ____$CaCO_{3(s)}$ → ____$CaO_{(s)}$ + ____$CO_{2(g)}$

____8. 8 $Fe_{(s)}$ + ____$S_{8(s)}$ → 8 $FeS_{(s)}$

____9. ____$H_2S_{(aq)}$ + 2 $KOH_{(aq)}$ → 2 $H_2O_{(l)}$ + ____$K_2S_{(s)}$

____10. 2 $NaCl_{(l)}$ → 2 $Na_{(l)}$ + ____$Cl_{2(g)}$

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

____12. ____$H_3PO_{4(aq)}$ + 3 $NH_4OH_{(aq)}$ → 3 $H_2O_{(l)}$ + ____$(NH_4)_3PO_{4(aq)}$

____13. ____$C_3H_{8(l)}$ + 5 $O_{2(g)}$ → 4 $H_2O_{(l)}$ + 3 $CO_{2(g)}$

____14. 4 $Al_{(s)}$ + 3 $O_{2(g)}$ → 2 $Al_2O_{3(s)}$

____15. ____$CH_{4(l)}$ + 2 $O_{2(g)}$ → 2 $H_2O_{(l)}$ + ____$CO_{2(g)}$