Key.

SCIENCE 10 HONOURS Name: _____

BALANCING CHEMICAL EQUATIONS

1. How many oxygen atoms are there in each of the following?

a) H_2SO_4 4 d) CH_3COON 2 g) $Ca(OH)_2$ 2

b) $6\,H_2O$ 6 e) $2\,H_2C_2O_4$ 8 h) $7\,Mg(OH)_2$ 14

c) CH_3CH_2COOH 2 f) $3\,(Hg_2)_3(PO_4)_2$ 48 i) $9\,KClO_3$ 27

2. $Zn + HCl \rightarrow ZnCl_2 + H_2$

What are the products of this reaction? Zinc Chloride and Hydrogen gas

What are the reactants? Zinc metal and Hydrochloric acid

Is the equation balanced? No

How many chlorine atoms actually take part in the reaction? Two

3. Can you change the subscripts (small, lower numbers) in the formulas when balancing a chemical equation? No!

4. Balance these expressions to make true chemical equations.

a) 2 $KClO_3 \rightarrow$ 2 KCl + 3 O_2

b) 4 P + 5 $O_2 \rightarrow$ 2 P_2O_5

c) ____ $Al_2(SO_4)_3$ + 3 $Ca(OH)_2 \rightarrow$ 2 $Al(OH)_3$ + 3 $CaSO_4$

d) 8 Fe + ____ $S_8 \rightarrow$ 8 FeS

e) 2 Na + 2 $H_2O \rightarrow$ 2 $NaOH$ + ____ H_2

f) ____ H_2 + ____ $Cl_2 \rightarrow$ 2 HCl

g) 3 H_2 + ____ $N_2 \rightarrow$ 2 NH_3

h) ____ NH_3 + 2 $O_2 \rightarrow$ ____ HNO_3 + ____ H_2O

i) 3 CaO + ____ $P_2O_5 \rightarrow$ ____ $Ca_3(PO_4)_2$

j) 2 $AgNO_3$ + ____ $CuCl_2 \rightarrow$ 2 $AgCl$ + ____ $Cu(NO_3)_2$

k) 2 Al + 2 $NaOH$ + 6 $H_2O \rightarrow$ 2 $NaAl(OH)_4$ + 3 H_2

l) 3 $CuSO_4$ + 2 $Fe \rightarrow$ ____ $Fe_2(SO_4)_3$ + 3 Cu

BALANCE THE FOLLOWING EQUATIONS

1. 2 $NaCl$ + 3 O_2 → 2 $NaClO_3$

2. 4 CrS + 7 O_2 → 2 Cr_2O_3 + 4 SO_2

3. 2 K + 2 H_2O → 2 KOH + ____ H_2

4. 2 Al + 3 NiO → ____ Al_2O_3 + 3 Ni

5. ____ $Co_2(SO_4)_3$ + 3 $Ca(OH)_2$ → 2 $Co(OH)_3$ + 3 $CaSO_4$

6. 4 Na + ____ S_8 → 4 NaS_2

7. ____ $C_6H_{12}O_6$ + 6 O_2 → 6 CO_2 + 6 H_2O

8. 3 Na_2CO_3 + 2 H_3PO_4 → 2 Na_3PO_4 + 3 H_2O + 3 CO_2

9. 2 Al_2O_3 + 6 CO → 4 Al + 6 CO_2

10. 4 P + 5 O_2 → 2 P_2O_5

WRITE OUT BALANCED EQUATIONS FOR THE FOLLOWING

1. potassium chlorate yields potassium chloride plus oxygen

2 $KClO_3$ → 2 KCl + 3 O_2

2. methane plus oxygen yields carbon dioxide plus water

____ CH_4 + 2 O_2 → ____ CO_2 + 2 H_2O

3. cobalt (II) sulphide plus oxygen yields cobalt (III) oxide plus sulphur dioxide

4 CoS + 7 O_2 → 2 Co_2O_3 + 4 SO_2

4. hydrogen plus nitrogen yields ammonia

3 H_2 + ____ N_2 → 2 NH_3

5. silver sulphate plus copper yields copper (II) sulphate plus silver

____ Ag_2SO_4 + ____ Cu → ____ $CuSO_4$ + 2 Ag