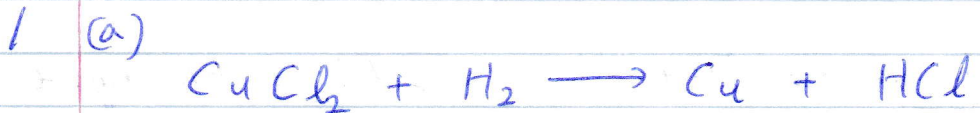


Exercises

1 (a)



Balance Cl

2 Cl on the left 1 Cl on the right.

we need 2 Cl on the right.



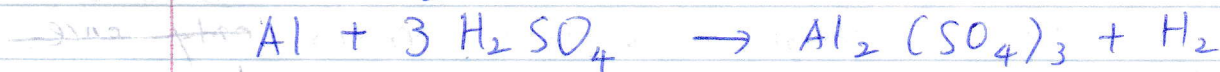
* ~~For~~ You cannot write HCl_2



Balance S

1 S on the left 3 S on the right

we need 3 S on the left



Balance H

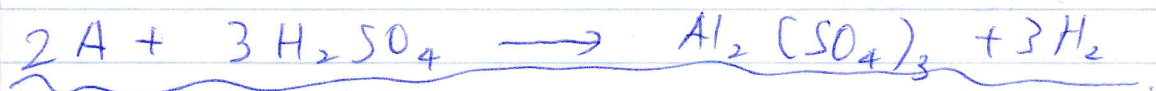
6 H on the left 2 H on the right

we need 6 H on the right.



Balance Al

1 Al on the left 2 Al on the right
we need 2 Al on the left.



(e)



O_2 appears twice on the right, so ~~two~~ balance O at the end.

K, N are balanced already.

Here we will try various combinations to match the two sides.

Balance O.

3 O on the left 4 O on the right

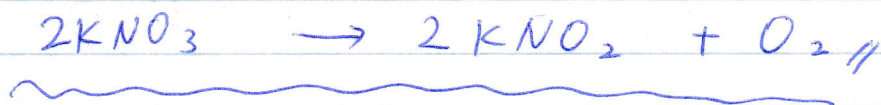
It is easier to change a compound appears alone on one side (KNO_3)

So change $\text{KNO}_3 \rightarrow 2\text{KNO}_3$



Balance K

Now 2 K on the left 1 K on the right



S is already balanced, we need to balance O.

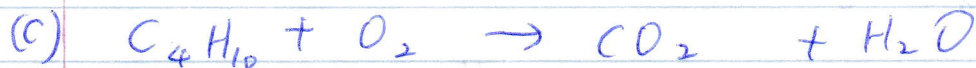
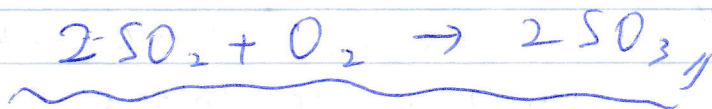
It is easy to change the number of compound which appears alone on one side.

Here change $\text{SO}_3 \rightarrow 2\text{SO}_3$



Balance S again

1 S on the left 2 S on the right



Balance C

4 C on the left 1 C on the right
so we need 4 CO_2 on the right side



Balance H

10 H on the left 2 H on the right



Balance O_2

2 O on the left

5 O on the right

We need $\frac{5}{2} O_2$ to balance this equation



However, we should not use fractions in the chemical reaction equation.

We can multiply 2 on the both sides



Now, we do not have to write a fractional number.

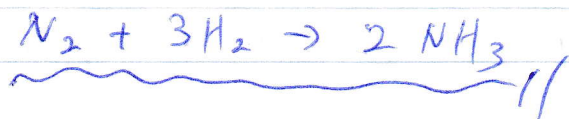
5 (a) Nitrogens^{and Hydrogens} exist as a diatomic molecule in nature, so we need to balance following equation



Balance N



Balance H



6(a) we need to balance following equation.



Balance Cl.



* This is an ionic bonding.

Ca ion has +2 charge

Cl ion has -1 charge

In order to balance the charge,

1 Ca^{2+} ion combines with 2 Cl^- ions.