Formulae Balanced Equations

GCSE Chemistry · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

Calcium nitrate has the formula $Ca(NO_3)_2$. State the number of each type of atom in one formula unit. (2 marks)

Step 1 · Outside the bracket

Ca has no number after it, so there is 1 calcium atom.

Step 2 · Multiply everything inside the bracket by 2

N: 1 × 2 = 2. O: 3 × 2 = 6.

Step 3 · Total

1 Ca, 2 N, 6 O: 9 atoms in all.

Answer: 1 calcium, 2 nitrogen, 6 oxygen

Check: A small number after a bracket multiplies every atom inside it.

2. Now try one with the steps

Balance the equation: $Na + Cl_2 \rightarrow NaCl$. (1 mark)

Step 1 · Count chlorine

Step 2 · Recount sodium

Step 3 · Check

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. State the total number of atoms in one molecule of sulfuric acid, H_2SO_4. [1]

2. State the number of oxygen atoms in one formula unit of calcium nitrate, $Ca(NO_3)_2$. [1]

3. Name the compound with the formula K_2CO_3. [1]

4. Describe the difference between an element and a compound. [2]

5. Magnesium ions are Mg^{2+} and chloride ions are Cl^{-}. Write the formula of magnesium chloride. [1]

6. Give the state symbol for sodium chloride dissolved in water. [1]

7. Balance the equation: $N_2 + H_2 \rightarrow NH_3$ [1]

8. Balance the equation: $Ca + H_2O \rightarrow Ca(OH)_2 + H_2$ [1]

9. Balance the equation: $Al + Cl_2 \rightarrow AlCl_3$ [1]

10. Explain why you must not change the small numbers in a formula when balancing an equation. [2]

11. Calculate the total number of atoms on the reactant side of $2Fe_2O_3 + 3C \rightarrow 4Fe + 3CO_2$. [1]

12. Write a balanced symbol equation, with state symbols, for solid calcium carbonate reacting with hydrochloric acid to form calcium chloride solution, water and carbon dioxide. [3]

13. Aluminium ions are Al^{3+} and sulfate ions are SO_4^{2-}. Write the formula of aluminium sulfate and state the total number of atoms in one formula unit. [2]

14. Balance the equation: $C_2H_6 + O_2 \rightarrow CO_2 + H_2O$ [2]

4. Before you hand it in

Balancing $H_2 + O_2 \rightarrow H_2O$ by writing $H_2 + O_2 \rightarrow H_2O_2$
Only put numbers in front: $2H_2 + O_2 \rightarrow 2H_2O$.

Reading $Ca(OH)_2$ as 1 Ca, 1 O, 2 H
$Ca(OH)_2$ has 1 Ca, 2 O and 2 H.

Writing (l) for a solution
A substance dissolved in water is (aq), aqueous.

Writing magnesium chloride
Mg^{2+} needs two Cl^- ions: $MgCl_2$.