Formulae and relative masses

AQA 8462 Separate Chemistry · Foundation and Higher

Answer on your own paper. Show your working where needed.

1. Read a formula

How many atoms of each element are represented by the formula $Mg(OH)_2$?

2. Build a neutral formula

Aluminium ions are Al^{3+} and oxide ions are O^{2-}. Work out the formula of aluminium oxide and show that its overall charge is zero.

3. Polyatomic ions

Calcium ions are Ca^{2+} and nitrate ions are NO_3^-. Write the formula of calcium nitrate and check that the charges balance.

4. Relative formula mass

Calculate the relative formula mass of $Al_2(SO_4)_3$. Use A_r values Al = 27, S = 32 and O = 16.

5. Percentage of a metal

Calculate the percentage by mass of iron in Fe_2O_3. Use A_r values Fe = 56 and O = 16.

6. Compare magnesium content

A gardener wants the higher percentage of magnesium by mass. Compare MgO with $MgCO_3$. Use A_r values Mg = 24, C = 12 and O = 16. Round to one decimal place.

7. Mass on the balance

Hydrochloric acid reacts with marble chips in an open flask. The measured mass falls from 153.8 g to 151.6 g. Identify what escaped and calculate its mass. Assume there were no other losses.

8. Check a supplier’s label

Two pure powders are labelled $CaCO_3$ and $Ca(OH)_2$. Analysis shows that one contains 54.1% calcium by mass. Identify it. Use A_r values Ca = 40, C = 12, O = 16 and H = 1.

9. Extra challenge · Audit a delivery

Two pure oxides have formulae Fe_2O_3 and Fe_3O_4. A supplier reports 72.4% iron by mass and labels the sample Fe_2O_3. Test the label using calculations. Find the mass of iron in 350 g of the oxide that matches the analysis. Use Ar values Fe = 56 and O = 16.

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