



# GCSE REVISION 7

## Calculations

**1** Give the formula of the following ionic substances.

- a) potassium oxide ..... d) magnesium hydroxide .....
- b) aluminium bromide ..... e) ammonium iodide .....
- c) iron(III) sulfide ..... f) calcium nitrate .....

**2** Calculate the relative formula mass of the following substances.

- a) chlorine,  $\text{Cl}_2$  .....
- b) ammonium sulfate,  $(\text{NH}_4)_2\text{SO}_4$  .....

**3** a) What mass of sodium reacts with 95 g of titanium chloride?  $\text{TiCl}_4 + 4\text{Na} \rightarrow \text{Ti} + 4\text{NaCl}$

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b) Calculate the percentage atom economy to make titanium in this reaction.

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**4** Ammonia is made by reaction of nitrogen with hydrogen.  $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$

a) Calculate the maximum mass of ammonia that could be formed from reaction of 12 g of hydrogen reacting with nitrogen.

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b) In this reaction, only 15 g of ammonia was formed. Calculate the percentage yield.

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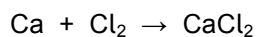
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c) Suggest two reasons why the yield was less than 100%.

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- 5** In an experiment, 4.0 g of calcium was reacted with 4.0 g of chlorine. One of the chemicals was in excess. Determine which is the limiting reagent and then calculate the mass of calcium chloride formed.



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- 6** 25.0 cm<sup>3</sup> of a solution of calcium hydroxide was titrated against a solution of 0.100 mol/dm<sup>3</sup> hydrochloric acid. 26.3 cm<sup>3</sup> of the hydrochloric acid was needed to neutralise the calcium hydroxide.

a) Describe how the titration is done.

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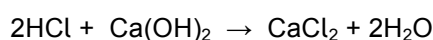
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b) Calculate the concentration of the calcium hydroxide in mol/dm<sup>3</sup>. The equation for the reaction is shown.



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c) Calculate the concentration of the calcium hydroxide in g/dm<sup>3</sup>.

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Area	Strength	To develop	Area	Strength	To develop	Area	Strength	To develop
Done with care and thoroughness			Can work out mass from moles			Work out moles for solutions		
Shows suitable working			Can work out % atom economy			Convert mol/dm <sup>3</sup> to g/dm <sup>3</sup>		
Can write ionic formulae			Can work out % yield			Does not round too much		
Can work out <i>M<sub>r</sub></i>			Understands why yield < 100%			Can use sig figs		
Work out moles from mass			Understands limiting reagents			Gives units		
Use equation to find reacting moles			Can describe how to do a titration					