

Answer the questions below and then check your answers.

- 1 Name three acids and three alkalis commonly used in the laboratory.
- 2 What do all acids and all alkalis contain in their formulae?
- 3 What is used to test the pH of a substance?
- 4 What colour will acid turn universal indicator solution?
- 6 What are the products of a neutralisation reaction?
- 7 Complete the neutralisation equation below.
 - Acid + alkali → _____ + ____

8. Complete the table below by filling in the blanks:

acid	molecular	alkali	molecular formula		
	formula				
	HCl		NaOH		
sulfuric acid	H ₂ SO ₄	potassium hydroxide			
nitric acid		calcium hydroxide	Ca(OH)2		
	СН₃СООН		NH₄ OH		

9 Complete the following word equations:

- I sodium hydroxide + hydrochloric acid \rightarrow
- ii potassium hydroxide + hydrochloric acid →
- iii lithium hydroxide + hydrochloric acid \rightarrow

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- i magnesium hydroxide + sulphuric acid→
- iii ______ + _____ → calcium sulphate + water
 iiii ______ + _____ → magnesium nitrate + water
- iv _____ + sodium hydroxide → sodium chloride + water

- 10. The three common strong acids used in neutralisation reactions are hydrochloric, nitric and sulfuric acids. What are the salts called when an alkali or base is neutralised by each of these acids......
- i. Hydrochloric acid always makes salts called
- ii. nitric acid always makes salts called
- iii. sulfuric acid always makes salts called
- 11. If you are doing higher tier try writing balanced symbolic equations for the reactions in question 9. If you need help with working out the formulae for compounds try hlooking here for some additional help: <u>finding the formula</u>
- 12. Bases are also used to neutralise acids. Common bases include metal oxides and metal carbonates.
- a. Complete the equation below:

Acid + base → _____ + ____

b. Acid + metal carbonate → _____ + _____ + _____

13. Complete the following neutralisation word equations:

I sodium oxide + hydrochloric acid \rightarrow

ii potassium carbonate + sulfuric acid \rightarrow

iii lithium oxide+ hydrochloric acid →

iv calcium carbonate + nitric acid →

v magnesium oxide + hydrochloric acid→

14. Balance the equations.

a.
$$Na_2O$$
 + $HCI \rightarrow NaCI$ + H_2O

b. K_2CO_3 + $HCl \rightarrow KCl$ + CO_2 + H_2O

c.
$$MgCO_3$$
 + H_2SO_4 \rightarrow $MgSO_4$ + CO_2 + H_2O_3

d.
$$Li_2O$$
 + $HCI \rightarrow LiCI$ + H_2O

- e. $CaCO_3$ + $H_2NO_3 \rightarrow Ca(NO_3)_2$ + CO_2 + H_2O
- 14b. The equations above all show neutralisation reactions. They are all symbolic equations. Write word equations for these reactions.

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Neutralisation

Answers

1 Name three acids and three alkalis commonly used in the laboratory.

acids	alkalis
Hydrochloric	Sodium hydroxide
Sulfuric	Potassium hydroxide
nitric	Calcium hydroxide

- 2 What do all acids and all alkalis contain in their formulae? Acids contain $H^+_{(aq)}$ and alkalis contain $OH^-_{(aq)}$
- 3 What is used to test the pH of a substance? An indicator
- 4 What colour will acid turn universal indicator solution? red
- 6 What are the products of a neutralisation reaction? Salt and water
- 7 Complete the equation below.

Acid + alkali → salt + water

8.	Complete	the	table	below	by	filling	in	the	blanks:

acid	molecular formula	alkali	molecular formula
hydrochloric acid	нсі	sodium hydroxide	NaOH
sulfuric acid	H ₂ SO ₄	potassium hydroxide	кон
nitric acid	HNO3	calcium hydroxide	Ca(OH)2
ethanoic acid	СН₃СООН	ammonium hydroxide	NH₄ OH

9 Complete the following word equations:

I	sodium hydroxide	+	hydrochloric acid \rightarrow sodium chloride + water
ii	potassium hydroxide	+	hydrochloric acid → potassium chloride + water
iii	lithium hydroxide +	hyd	rochloric acid → lithium chloride + water

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i	magnesium hydroxide $+$ sulphuric acid \rightarrow magnesium sulfate $+$ water		
ii	calcium hydroxide + sulfuric acid → calcium sulphate + water		
iii	magnesium hydroxide + nitric acid \rightarrow magnesium nitrate + water		
iv	<mark>hydrochloric acid</mark> + sodium hydroxide → sodium chloride + water		
note you could have used metal oxides instead of metal hydroxides in these			

equations, the products would have been the same

- 10. The three common strong acids used in neutralisation reactions are hydrochloric, nitric and sulfuric acids. What are the salts called when an alkali or base is neutralised by each of these acids......
- i. Hydrochloric acid always makes salts calledchloride
- ii. nitric acid always makes salts callednitrate
- iii. sulfuric acid always makes salts calledsulfate
- 11. If you are doing higher tier try writing balanced symbolic equations for the reactions in question 9.
- 12. Bases are also used to neutralise acids. Common bases include metal oxides and metal carbonates.

Complete the equation below:

a. Acid + base \rightarrow salt + water

b. Acid + metal carbonate \rightarrow salt + water + carbon dioxide

13. Complete the following neutralisation word equations:

hydrochloric acid -- sodium chloride + water + potassium carbonate sulfuric acid \rightarrow potassium sulfate + water + ii + carbon dioxide

iii lithium oxide + hydrochloric acid \rightarrow lithium chloride + water

calcium carbonate + nitric acid \rightarrow calcium nitrate + water + carbon iv dioxide

magnesium oxide + hydrochloric acid \rightarrow magnesium chloride + water V

14. The equations below all show neutralisation reactions. They are all symbolic equations. Write word equations for these reactions.

14b. Balance the equations.

sodium oxide

1

Na20 + $2HCI \rightarrow 2NaCI + H_2O$ a. sodium oxide + hydrochloric acid \rightarrow sodium chloride + water

 $2HCI \rightarrow 2KCI + CO_2 + H_2O$ Ь. K2CO3 + potassium carbonate + hydrochloric acid \rightarrow sodium chloride + carbon dioxide + water

+ $H_2SO_4 \rightarrow MgSO_4 + CO_2 + H_2O$ C. MgCO3 magnesium carbonate + sulfuric acid -> magnesium sulfate + carbon dioxide + water

d. Li_2O + 2HCl \rightarrow 2LiCl + H₂O

lithium oxide + hydrochloric acid \rightarrow *lithium chloride + water*

e. $CaCO_3 + 2HNO_3 \rightarrow Ca(NO_3)_2 + CO_2 + H_2O$ calcium carbonate + nitric acid \rightarrow calcium nitrate + carbon dioxide + water