

GCSE Combined Science: Trilogy

Worksheet: Neutralisation of acids and salt production

TIME 25 min	TOTAL 24 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Neutralisation of acids and salt production

NAME _____

CLASS _____

DATE _____

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

0 1

Acids react with bases, alkalis and carbonates to produce salts.

0 1 . 1

Name the salt produced when sodium hydroxide reacts with nitric acid.

.....

.....

.....

.....
[1 mark]

0 1 . 2

Name the salt produced when copper oxide reacts with sulfuric acid.

.....

.....

.....

.....
[1 mark]

0 1 . 3

What are the products when calcium carbonate reacts with hydrochloric acid?

Tick (✓) **one** box.

calcium chloride and water only

☐

calcium chloride, water and carbon dioxide

☐

calcium chloride and hydrogen

☐

calcium hydroxide and carbon dioxide

☐

[1 mark]

0 1 . 4

Which acid produces salts called chlorides?

.....

.....

.....

[1 mark]

0 2

Salts are named after the acid used and the metal (or ammonium) ion present.

0 2 . 1

Name the salt formed when potassium hydroxide reacts with hydrochloric acid.

.....

.....

.....

[1 mark]

0 2 . 2

Which type of substance reacts with an acid to produce a salt and water only, with no gas released?

Tick (✓) **one** box.

A reactive metal

☐

A metal carbonate

☐

A base (a metal oxide, metal hydroxide, or alkali)

☐

A metal below hydrogen in the reactivity series

☐

[1 mark]

0 3

Table 1 shows some acids and bases. Some of the salts formed are missing.

Table 1

Acid	Base	Salt formed
Hydrochloric acid	Sodium hydroxide	?
Sulfuric acid	Copper oxide	?
Nitric acid	Potassium hydroxide	?
Sulfuric acid	Magnesium oxide	?

0 3 . 1

Complete Table 1 to name each salt formed.

.....

.....

.....

.....

.....

.....

.....

.....

[4 marks]

0 4

A student is given a white powder and needs to test whether it is a metal carbonate.

0 4 . 1

Describe a test the student could carry out on the powder, and the result that would suggest a carbonate is present.

.....

.....

.....

.....

[2 marks]

0 4 . 2

Describe how the student could confirm that the gas produced is carbon dioxide.

.....

.....

[1 mark]

0 4 . 3

Write the general word equation for the reaction between a metal carbonate and an acid.

.....

.....

[1 mark]

0 5

Table 2 shows the formulae of some ions.

Table 2

Positive ions	Negative ions
Na^+	Cl^-
Ca^{2+}	NO_3^-
Al^{3+}	SO_4^{2-}

0 5 . 1

Give the formula of calcium nitrate.

.....

.....

[1 mark]

0 5 . 2

Give the formula of aluminium sulfate.

.....

.....

[1 mark]

0 5 . 3

Give the formula of sodium sulfate.

.....

.....

[1 mark]

0 5 . 4

Write a balanced symbol equation for the reaction of calcium hydroxide, Ca(OH)_2 , with nitric acid, HNO_3 .

.....

.....

.....

.....

[2 marks]

0 6

Metal oxides, metal hydroxides and metal carbonates all neutralise acids.

0 6 . 1

What is the difference between a base and an alkali?

.....

.....

[1 mark]

0 6 . 2

Write a balanced symbol equation for the reaction of zinc carbonate, ZnCO_3 , with sulfuric acid.

.....

.....

.....

.....

[2 marks]

0 6 . 3

Describe what you would see when green copper carbonate powder is added to dilute hydrochloric acid until no more reacts.

.....

.....

.....

.....

[2 marks]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Combined Science: Trilogy · Worksheet: Neutralisation of acids and salt production · 24 marks

Question 1 (4 marks)

01.1 [1 mark]

Answer: sodium nitrate

- sodium nitrate (1)
-

01.2 [1 mark]

Answer: copper sulfate

- copper sulfate / copper(II) sulfate (1)
-

01.3 [1 mark]

Correct: calcium chloride, water and carbon dioxide

01.4 [1 mark]

Answer: hydrochloric acid

- hydrochloric acid (1)
-

Question 2 (2 marks)

02.1 [1 mark]

Answer: potassium chloride

- potassium chloride (1)
-

02.2 [1 mark]

Correct: A base (a metal oxide, metal hydroxide, or alkali)

Question 3 (4 marks)

03.1 [4 marks]

Answer: sodium chloride; copper sulfate; potassium nitrate; magnesium sulfate

- sodium chloride (1)
 - copper sulfate (1)
 - potassium nitrate (1)
 - magnesium sulfate (1)
-

Question 4 (4 marks)

04.1 [2 marks]

- add dilute acid (e.g. dilute hydrochloric acid) to a sample of the powder (1)
- if it fizzes (produces bubbles of gas), this suggests a carbonate is present (1)

04.2 [1 mark]

- bubble the gas through limewater; if the limewater turns cloudy/milky, this confirms carbon dioxide (1)

04.3 [1 mark]

Answer: metal carbonate + acid $\rightarrow$ salt + water + carbon dioxide

- metal carbonate + acid $\rightarrow$ salt + water + carbon dioxide (1)
-

Question 5 (5 marks)

05.1 [1 mark]

Answer: $\text{Ca}(\text{NO}_3)_2$

- $\text{Ca}(\text{NO}_3)_2$ (1)

05.2 [1 mark]

Answer: $\text{Al}_2(\text{SO}_4)_3$

- $\text{Al}_2(\text{SO}_4)_3$ (1)

05.3 [1 mark]

Answer: Na_2SO_4

- Na_2SO_4 (1)

05.4 [2 marks]

Answer: $\text{Ca}(\text{OH})_2 + 2\text{HNO}_3 \rightarrow \text{Ca}(\text{NO}_3)_2 + 2\text{H}_2\text{O}$

- products $\text{Ca}(\text{NO}_3)_2$ and H_2O (1)
 - balanced: $\text{Ca}(\text{OH})_2 + 2\text{HNO}_3 \rightarrow \text{Ca}(\text{NO}_3)_2 + 2\text{H}_2\text{O}$ (1)
-

Question 6 (5 marks)

06.1 [1 mark]

- an alkali is a base that dissolves in water / an alkali is a soluble base (e.g. a soluble metal hydroxide) (1)

06.2 [2 marks]

Answer: $\text{ZnCO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2\text{O} + \text{CO}_2$

- products ZnSO_4 and H_2O and CO_2 (1)
- $\text{ZnCO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2\text{O} + \text{CO}_2$ (all formulae correct) (1)

06.3 [2 marks]

- fizzing / bubbles (of gas) (1)
- the green solid disappears / dissolves (until some is left over at the end) (1)
- the solution turns blue / blue-green (1)

Any 2 of the points above.
