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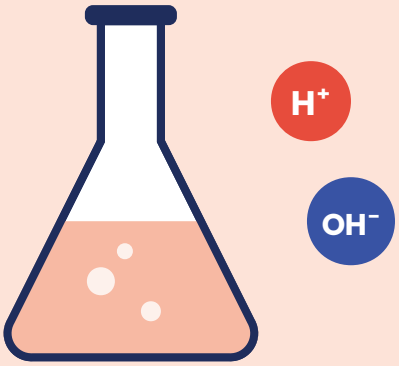

Year 8 · KS3 Chemistry · GCSE foundations

Acids, Alkalis & Salts

Homework Worksheet

Practise the pH scale, indicators, strong and weak acids, naming salts and writing word equations.



Name: _____ Class: _____

Date set: _____ Date due: _____

What's inside

Section A	The pH scale, acids, alkalis & indicators	Q1–Q3 · 22 marks
Section B	Strong & weak acids and neutralisation	Q4–Q6 · 21 marks
Section C	Naming salts, word equations & gas tests	Q7–Q9 · 28 marks
Challenge	Plan your own salt	Q10 · 4 marks

Instructions

- Answer **all** questions in the spaces provided.
- Use your class notes on acids, alkalis and salts.
- Marks for each question are shown in [ ].
- Write word equations with an arrow (→), not an equals sign.

Total score

/ 75

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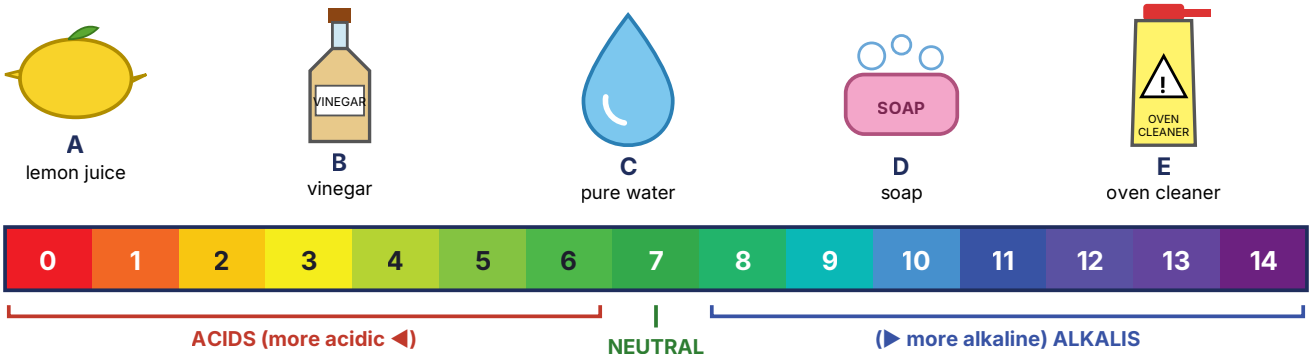
Section A — The pH scale, acids & alkalis

22 marks

Key facts: The pH scale runs from **0 to 14**. **Acids** have pH **below 7** and contain hydrogen ions, **H^+**. **Alkalis** have pH **above 7** and contain hydroxide ions, **OH^-**. **Neutral** = pH **7**. **Universal indicator** changes colour to show the pH.



Universal indicator colours on the pH scale

1 Complete the table using the pictures and pH scale above. Row A has been done for you. **[13]**

Letter	Substance	pH	Acid, alkali or neutral?	Universal indicator colour	Very or slightly acidic / alkaline?
A	Lemon juice	2	*acid*	*orange*	*very acidic*
B	Vinegar	3			
C	Pure water	7			—
D	Soap	10			
E	Oven cleaner	14			

b) Which substance (A–E) is the **most acidic**? _____

c) Which substance would be **most dangerous** on your skin? Give a reason. _____

2 Complete the sentences using words from the box. **[6]**

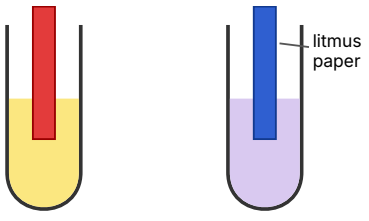
7 · below · above · hydrogen · hydroxide · indicator

a) An acid has a pH _____ 7 and contains _____ ions (H^+).

b) An alkali has a pH _____ 7 and contains _____ ions (OH^-).

c) A neutral solution has a pH of _____ . d) A substance that changes colour to show pH is an _____ .

3 **Litmus paper:** blue litmus turns **red** in an acid; red litmus turns **blue** in an alkali. **[3]**



a) Blue litmus turned red in Tube X. Is X acidic or alkaline?

_____

b) Red litmus turned blue in Tube Y. Is Y acidic or alkaline?

_____

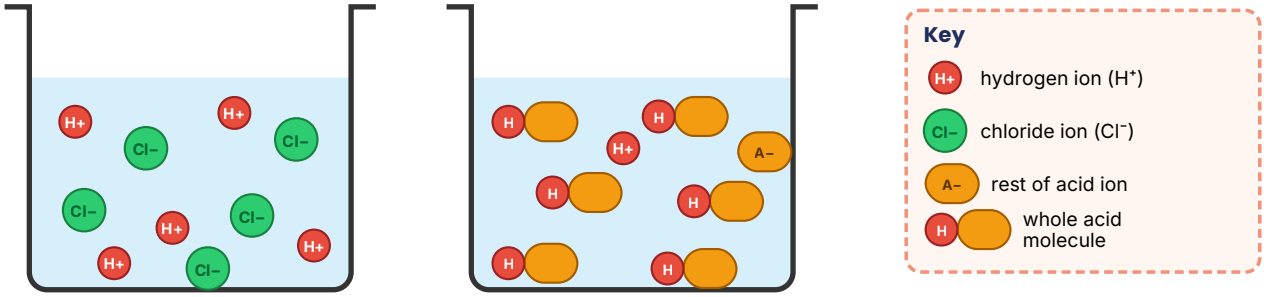
c) Give one reason why universal indicator is more useful than litmus.

Section B — Strong acids, weak acids & neutralisation

21 marks

A **strong acid** ionises (dissociates) **completely** into hydrogen ions, H^+ — e.g. hydrochloric acid **HCl**, sulfuric acid **H_2SO_4**, nitric acid **HNO_3**.
A **weak acid** does **not** completely ionise — it only **partially ionises** — e.g. ethanoic acid **CH_3COOH** (in vinegar).

4 Look at the particles inside the two beakers. **[4]**



Beaker P Beaker Q

a) Which beaker shows a **strong** acid? _____ b) Which beaker could be **ethanoic acid**? _____

c) Explain your answer to (a) using the word **ionise**.

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.....

5 Strong or weak? **[10]**

a) Sort these acids into the table:
hydrochloric · ethanoic · sulfuric · citric · nitric · carbonic

Strong acids	Weak acids

Hint: citric acid is in lemons; carbonic acid is in fizzy drinks.

b) Draw a line to match each acid to its formula.

Nitric acid	HCl
Ethanoic acid	H_2SO_4
Hydrochloric acid	CH_3COOH
Sulfuric acid	HNO_3

6 **Neutralisation** — acids and alkalis cancel each other out. **[7]**

acid + alkali → salt + water | $H^+ + OH^- \rightarrow H_2O$



a) A bee sting is acidic. Treat it with **vinegar (pH 3)** or **baking soda (pH 9)**? Why?

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b) How does an indigestion tablet (a base) help with too much stomach acid?

.....

c) Farmers add lime (calcium hydroxide) to acidic soil. What happens to the soil pH?

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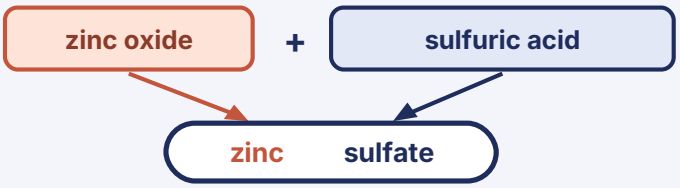
d) Hydrochloric acid is slowly added to sodium hydroxide (pH 13) with universal indicator until neutral. Colour change: from _____ to _____ . Final pH = _____

Section C — Naming salts & word equations

28 marks

The name of a salt has two parts:
1st part → from the **metal** (metal, metal oxide, metal hydroxide or metal carbonate).
2nd part → from the **acid**.



Acid	Salt ends in…
hydrochloric acid	**chloride** (Cl^-)
sulfuric acid	**sulfate** (SO_4^{2-})
nitric acid	**nitrate** (NO_3^-)

General word equations
acid + metal → salt + **hydrogen**
acid + metal oxide → salt + **water**
acid + metal hydroxide → salt + **water**
acid + metal carbonate → salt + **water** + **carbon dioxide**

7 Name the salt made in each reaction. **[11]**

	hydrochloric acid	sulfuric acid	nitric acid
sodium hydroxide	*sodium chloride*		
magnesium			
copper oxide			
calcium carbonate			

8 Complete the word equations. **[13]**

a) sodium hydroxide + hydrochloric acid → _____ + _____

b) zinc oxide + sulfuric acid → _____ + _____

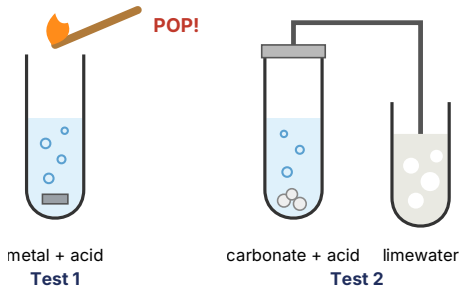
c) magnesium + hydrochloric acid → _____ + _____

d) potassium hydroxide + nitric acid → _____ + _____

e) calcium carbonate + hydrochloric acid → _____ + _____ + _____

f) _____ + _____ → copper nitrate + water

9 Testing for the gases **[4]**



a) Test 1: a lit splint gives a squeaky **pop**. Name the gas. _____

b) Test 2: limewater turns **cloudy**. Name the gas. _____

c) Which reactant does **not** make a gas with acid: metal, metal oxide or metal carbonate? _____

d) What would you **see** when a metal reacts with an acid? _____

10 **Challenge ★** Lily wants to make **magnesium sulfate**; Omar wants to make **potassium nitrate**. Write a word equation for each, choosing your own reactants. **[4]**

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