

Acids and alkalis/simple chemical reactions

7E & 7F

30 min

30 marks

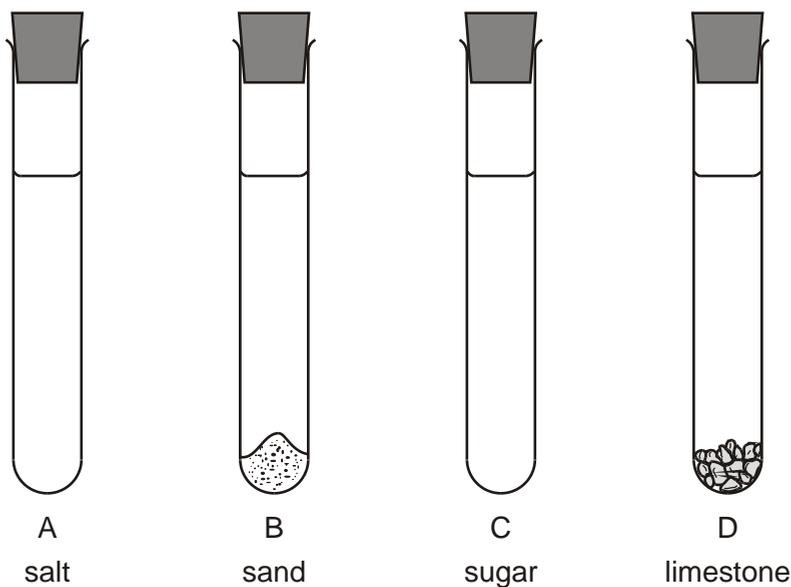
Q1-L3, Q2-L4, Q3-L4, Q4-L5, Q5-L6, Q6-L6

1. (a) Reshma had a mixture of iron filings and sand. What could she use to separate the iron filings from the mixture?

.....

1 mark

- (b) Reshma put 10 cm³ of water and 2 g of a different solid into each of four test-tubes. She shook each test-tube. The drawings show the test-tubes after 10 minutes.

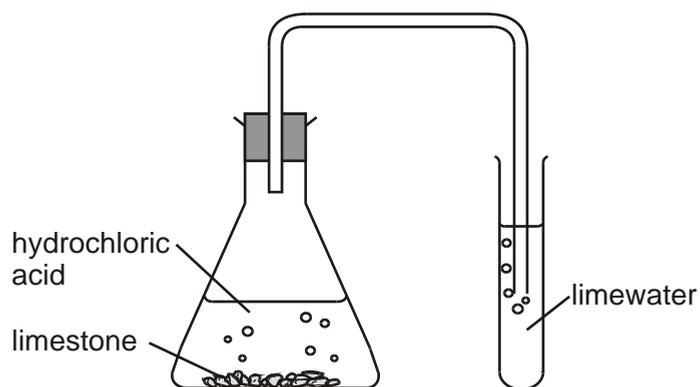


Why can the salt and sugar **no** longer be seen in test-tubes A and C?

.....
.....

1 mark

- (c) Reshma added hydrochloric acid to some pieces of limestone as shown below.



(i) Look at the diagram above. How can you tell that a gas is given off in this experiment?

.....

1 mark

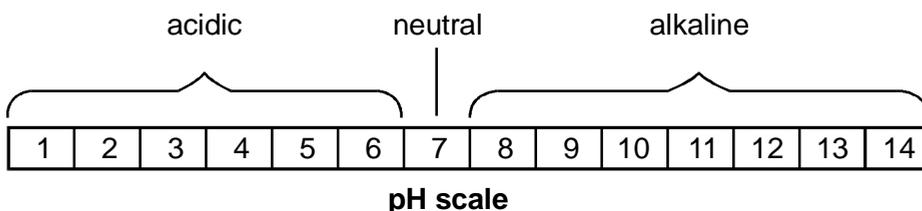
(ii) Reshma passed the gas through limewater. This showed that the gas was carbon dioxide.

What happened to the limewater?
 Tick the correct box.

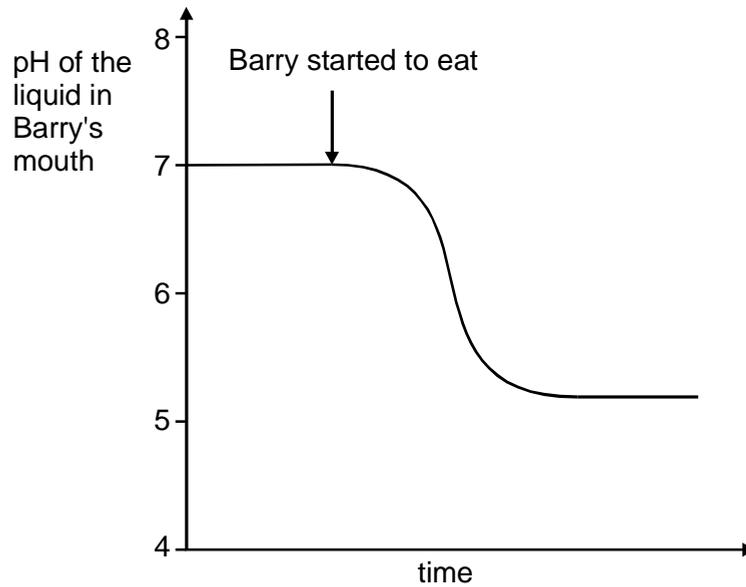
- It stayed clear.
- It turned blue.
- It turned cloudy.
- It turned red.

1 mark
 maximum 4 marks

2. The pH scale shown below is used to measure how acidic or alkaline a solution is.



The graph below shows how the pH of the liquid in Barry's mouth changed as he ate a meal.



- (a) (i) Use the **graph** to give the pH of the liquid in Barry's mouth before he started to eat.

pH

1 mark

- (ii) What does this pH tell you about the liquid in Barry's mouth before he started to eat?

Use the **pH scale** above to help you.
Tick the correct box.

It was acidic.

It was alkaline.

It was colourless.

It was neutral.

1 mark

- (b) Look at the **graph** above.
What happened to the pH of the liquid in Barry's mouth as he ate the meal?

.....

1 mark

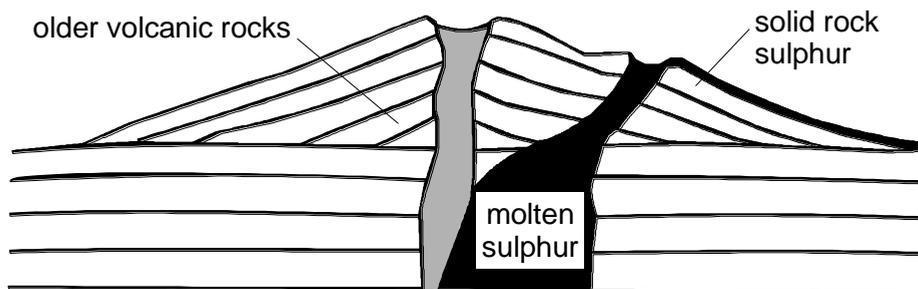
- (c) Barry chews special chewing gum after each meal. The chewing gum neutralises the liquid in his mouth.

What type of substance neutralises an acid?
Tick the correct box.

| | | | |
|--------------|--------------------------|-----------|--------------------------|
| an acid | <input type="checkbox"/> | an alkali | <input type="checkbox"/> |
| an indicator | <input type="checkbox"/> | a solid | <input type="checkbox"/> |

1 mark
Maximum 4 marks

3. A Japanese volcano erupted in 1936. Molten sulphur poured out of the volcano. When it cooled it formed rock sulphur.



- (a) (i) Which word describes molten rock that is underground?
Choose from **lava** or **magma** or **oil**.

.....

1 mark

- (ii) Which type of rock do volcanoes produce?
Choose from **igneous** or **metamorphic** or **sedimentary**.

.....

1 mark

- (b) Sulphur is a **non-metallic** element. It is yellow and melts at 115°C.

Complete the sentences about sulphur.

- (i) Sulphur is a poor conductor of

.....

1 mark

- (ii) At 115°C sulphur changes from

a into a

2 marks

- (c) Sulphur burns in air to form an oxide.
What gas in the air reacts with sulphur when it burns?

.....

1 mark

Maximum 6 marks

4. Bees and wasps are both insects which use a sting as part of their defence. The pH values of their stings are shown on the diagrams.



bee
bee sting, pH 2



wasp
wasp sting, pH 10

- (a) Complete the table below to show whether the stings are acidic or alkaline and what colour they would turn universal indicator paper.

| | acid or alkaline | colour of universal indicator paper |
|-------------------|------------------|-------------------------------------|
| bee sting (pH 2) | | |
| wasp sting (pH10) | | |

2 marks

(b) The table below shows five household substances and the pH of each substance.

| name of substance | pH of substance |
|------------------------|-----------------|
| bicarbonate toothpaste | 8 |
| lemon juice | 3 |
| vinegar | 4 |
| washing soda | 11 |
| water | 7 |

Give the name of **one** substance in the table which would neutralise each sting.

(i) bee sting

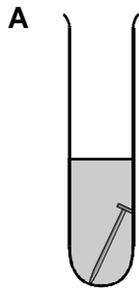
1 mark

(ii) wasp sting

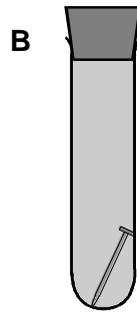
1 mark

Maximum 4 marks

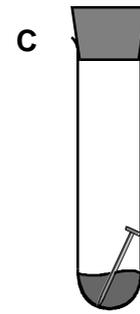
5. Jessica was investigating the rusting of iron. She set up five experiments as shown below, and left the test-tubes for three days.



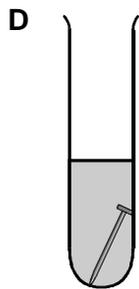
iron nail in distilled water



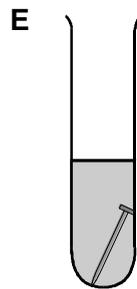
iron nail in tap water which has been boiled to remove dissolved gases



iron nail and a chemical to absorb water vapour



iron nail in sea water



iron nail in vinegar

Jessica wrote the following results in her book.

| Test-tube | observation |
|-----------|--|
| A | nail slightly rusty |
| B | nail still shiny |
| C | nail still shiny |
| D | nail very rusty |
| E | nail slightly rusty, bubbles of gas seen |

(a) Explain why the nails had **not** rusted in test-tubes B and C.

in test-tube B

.....

in test-tube C

.....

2 marks

(b) In test-tube E the iron nail reacted with the vinegar.

(i) Is vinegar **acidic**, **alkaline** or **neutral**?

.....

1 mark

(ii) When the iron reacted with the vinegar, bubbles of gas were formed.
What gas was formed?

.....

1 mark

(c) Before putting the iron nail in test-tube D, Jessica weighed the nail.
After three days she dried and weighed the nail **and** the rust which had formed.

(i) How did the total mass of the nail and rust compare to the mass of the nail
at the beginning?

.....

1 mark

(ii) Give the reason for your answer.

.....

.....

1 mark

(d) Jessica concluded that the presence of salt in the water made the nail rust more
quickly.

Explain why she drew that conclusion from her experiments.

.....

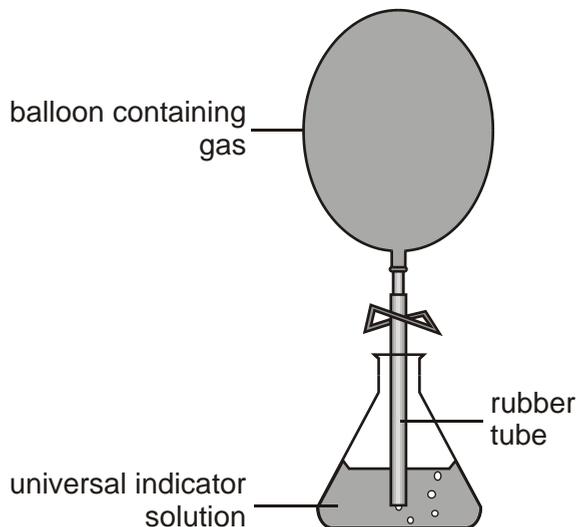
.....

.....

1 mark

Maximum 7 marks

6. A scientist compared the acidity of four gases to see which gas might cause acid rain. She used four balloons to collect the gases. She then bubbled the gases, in turn, through a fresh sample of green, neutral, universal indicator solution.



- (a) Three of the gases caused the indicator to change colour. The scientist added drops of alkali to the indicator until the indicator changed back to green. Her results are shown in the table below.

| gases collected | change in colour of indicator | number of drops of alkali needed to change the indicator back to green |
|--------------------------|--------------------------------------|---|
| exhaust gases from a car | green to red | 31 |
| carbon dioxide | green to red | 160 |
| air | no change | 0 |
| human breath | green to yellow | 10 |

Use information in the table to answer part (i) and part (ii) below.

- (i) Which gas dissolved to form the most acidic solution?

.....

Explain your choice.

.....

.....

1 mark

(ii) Which gas formed a neutral solution?

.....

Explain your choice.

.....

.....

1 mark

(iii) What effect does an alkali have on an acid?

.....

1 mark

(b) Some metals react with acids in the air.
Complete the word equation for the reaction between zinc and hydrochloric acid.

zinc + hydrochloric → +
acid

2 marks

maximum 5 marks