Q1.

Matthew measured the pH of different soils.

(a) Tick **one** box in each row to show if each soil is acidic, neutral **or** alkaline.

soil	pH of soil	acidic	neutral	alkaline
A	4.5			
B	5.5			
C	6.3			
D	7.0			
E	7.8			

2 marks

(b) A hydrangea is a flowering plant. Matthew notices that the colour of hydrangea flowers is different for plants grown in different places.


hydrangea flower

He records the colour of the flowers on each plant.

His results are shown in the table below.

soil	pH of soil	colour of flowers			
		blue	violet	light pink	dark pink
A	4.5	✓			
B	5.5		✓		
C	6.3		✓		
D	7.0			✓	
E	7.8				✓

Look at Matthew's results.
Do his results support the statement that the colour of hydrangea flowers depends on pH?

yes ☐ no ☐

Explain your answer.

.....

.....

1 mark

(c) Matthew measured the pH of the soil near hydrangea plants found in different places.

Suggest one **other** variable Matthew could **not** control in his investigation.

.....

.....

1 mark

(d) Matthew wants to find out if the colour of blue hydrangea flowers depends on inherited factors **or** environmental factors.
The flowers were growing in soil of pH 4.5.
He plants them in soil of pH 6.3.

Complete the table below to show the colours of the new flowers in soil of **pH 6.3**

(i) if the colour is due to inheritance
(ii) if the colour is due to the environment

Use the table above to complete the table below.

	colour
starting colour of hydrangea flowers	blue
colour of new flowers if only due to inheritance	
colour of new flowers if only due to environment	

2 marks
maximum 6 marks

Q2.

Michelle added some universal indicator solution to four liquids.

Michelle uses the pH chart to fill in her table of results.

pH chart

pH	1	2	3	4	5	6	7	8	9	10	11	12	13	14
colour	red			orange			green	blue			purple			

(a) The table below shows some of Michelle's results.

Complete Michelle's table of results below.
Use the pH chart to help you.

liquid	colour of universal indicator solution	pH
milk	green	
rain water		5
hydrochloric acid	red	
bleach		11

2 marks

(b) Explain why using acids can be dangerous.

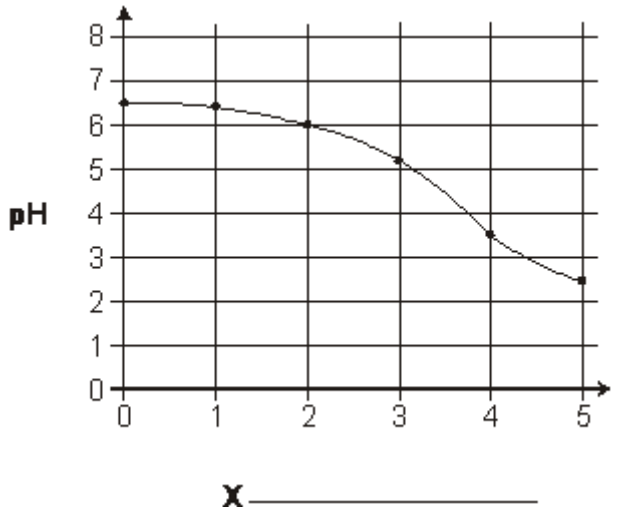
.....

.....

1 mark

(c) Michelle measured the pH of some milk stored at room temperature for five days.

The graph of Michelle's results is shown below.
One of the axes has been labelled.



1 mark

(i) Write the axis label for the graph **at X.**

(ii) Use the graph. How does the pH of the milk change over the five days?

.....

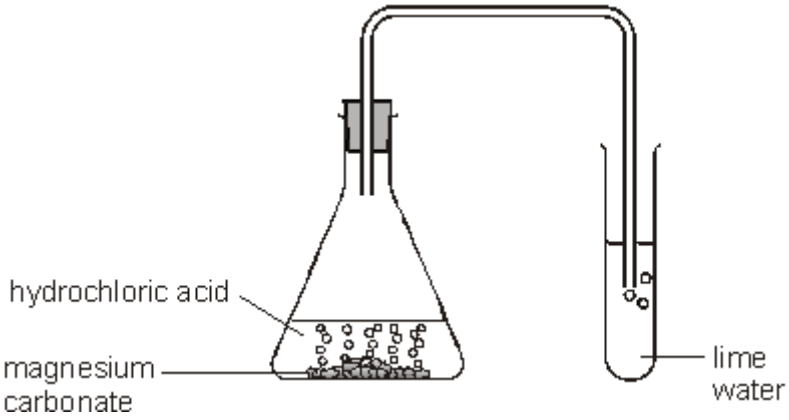
1 mark
maximum 5 marks

Q3.

The word equation for the reaction between magnesium carbonate and hydrochloric acid is shown below.

magnesium carbonate + hydrochloric acid → magnesium chloride + carbon dioxide + water

(a) Sadiq added hydrochloric acid to magnesium carbonate in a flask.



(i) Suggest the pH of hydrochloric acid.

.....

(ii) The carbon dioxide produced was bubbled through lime water.

How would the lime water change?

.....

2 marks

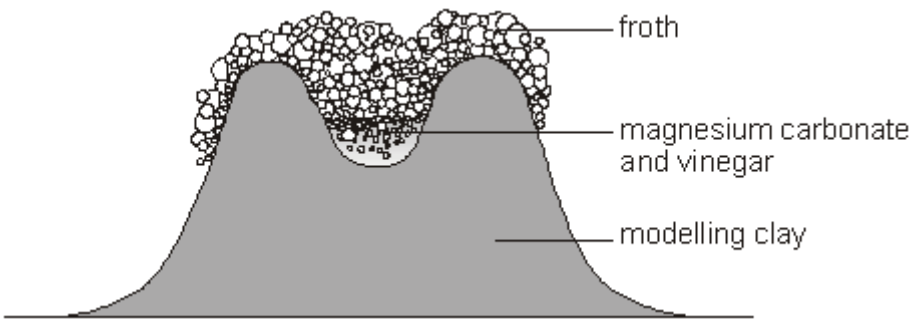
(b) Sadiq repeated the experiment by adding **sulphuric acid** to magnesium carbonate.

Complete the word equation for the reaction that took place.

magnesium carbonate + sulphuric acid → ..... + carbon dioxide + water

1 mark

(c) Sadiq made a model volcano.
He put magnesium carbonate into the model.
He added vinegar and a drop of washing-up liquid.



The mixture fizzed, and froth poured out of the model volcano.

(i) The vinegar reacted with the magnesium carbonate.

Suggest the pH of vinegar.

.....

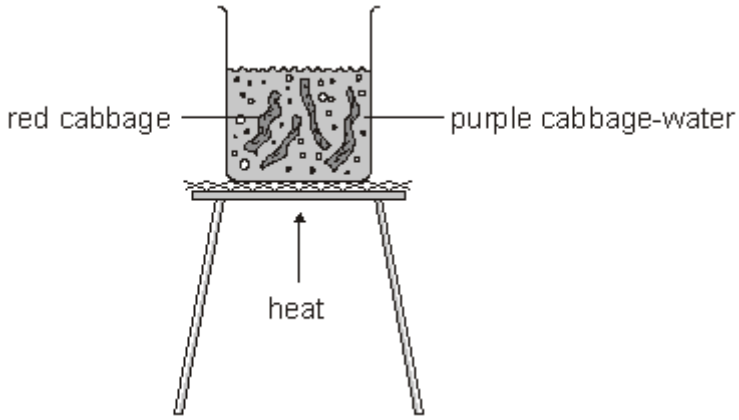
(ii) The froth running down the side of the model represents part of a real volcano.
Give the name of this part.

.....

2 marks
maximum 5 marks

Q4.

Sharna boiled some red cabbage in water. The cabbage-water turned purple.



(a) (i) Sharna separated pieces of cabbage from the cabbage-water.

Which method did she use?
Tick the correct box.

chromatography	☐	filtration	☐
condensation	☐	freezing	☐

1 mark

(ii) Sharna wanted to find out if the purple cabbage-water contained more than one **coloured** substance.

Which method did she use?
Tick the correct box.

chromatography	☐	filtration	☐
condensation	☐	freezing	☐

1 mark

(b) Sharna mixed the purple cabbage-water with some other liquids.
She wrote the colours of the mixtures in a table as shown below.

	colour of cabbage-water mixed with liquid	Is the liquid acidic, alkaline or neutral?
liquid 1	red	acidic
liquid 2	blue	alkaline
liquid 3	purple	neutral

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

(i) Sharna mixed cabbage-water with colourless washing-up liquid.
The mixture turned **blue.**

What does this tell you about the washing-up liquid?

.....

1 mark

(ii) Sharna then mixed cabbage-water with lemon juice.
Lemon juice is **acidic.**

What colour was the mixture?

.....

1 mark

(c) What is the name of a chemical which changes colour when it is mixed with acids or alkalis?
Tick the correct box.

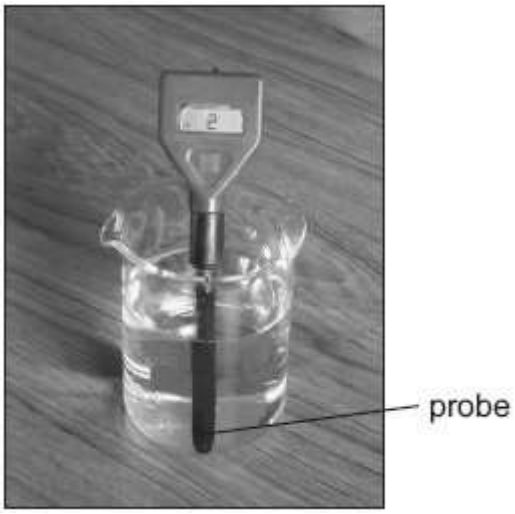
filtrate ☐ indicator ☐

non-metal ☐ solution ☐

1 mark
maximum 5 marks

Q5.

Molly used a pH sensor to test different liquids. She dipped the probe of the sensor into each liquid and recorded the pH value in a table.



(a) In the table below, tick **one** box for each liquid to show whether it is **acidic**, **neutral** or **alkaline**. One has been done for you.

liquid	pH value	acidic	neutral	alkaline
alcohol	7			
dilute hydrochloric acid	2	✓		
distilled water	7			
vinegar	3			
sodium hydroxide solution	11			

2 marks

(b) Between each test Molly dipped the probe into distilled water.

(i) Why did she do this?

.....

.....

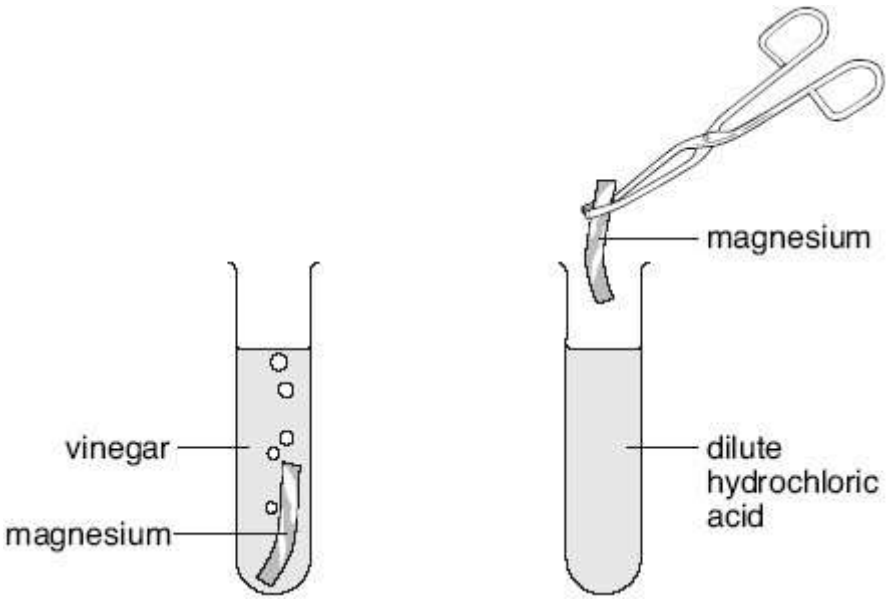
1 mark

(ii) Which other liquid in the table could Molly use between tests to have the same effect as distilled water?

.....

1 mark

(c) Molly put a piece of magnesium into a test-tube containing 20 cm^3 of vinegar. She put another piece of magnesium into a test-tube containing 20 cm^3 of dilute hydrochloric acid.



(i) Molly thought that magnesium would react more vigorously with hydrochloric acid than with vinegar.
What information in the table made Molly think this?

.....

.....

1 mark

(ii) How would Molly be able to tell if a more vigorous reaction took place with hydrochloric acid than with vinegar?

.....

.....

1 mark

(d) (i) Complete the word equation for the reaction between magnesium and hydrochloric acid.

magnesium + hydrochloric acid → ..... + ...

2 marks

(ii) After some time this reaction stopped. Why did the reaction stop?

.....

.....

1 mark

maximum 9 marks **[9]**