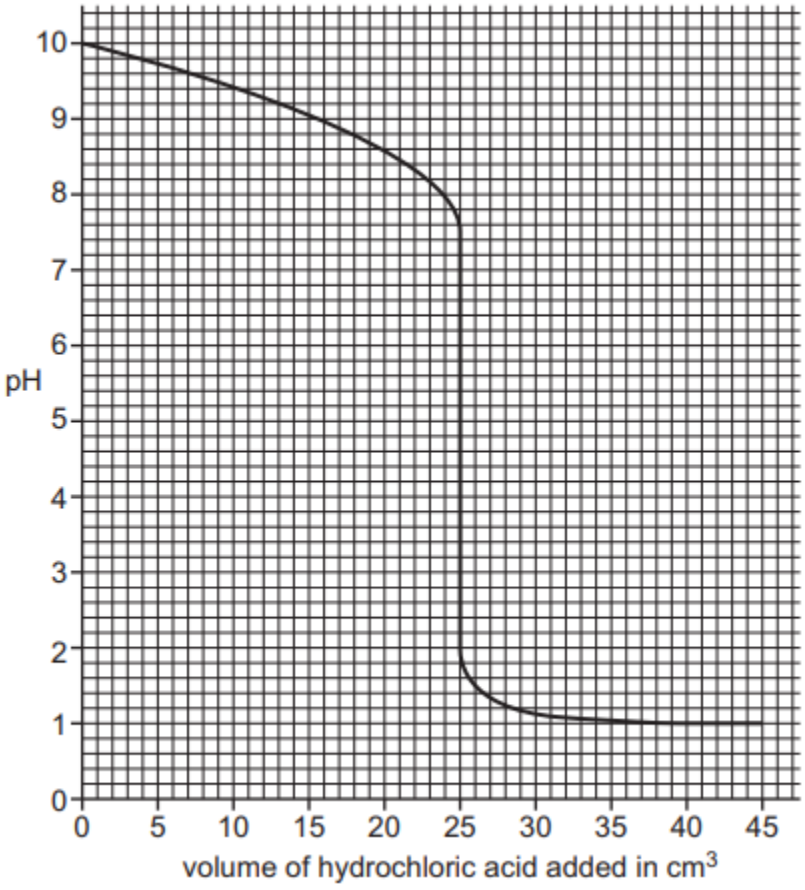
1 Rajiv investigates what happens when ammonia solution is added to other solutions.

(a) In his first experiment, Rajiv:

- step 1 - adds 25 cm^3 of ammonia solution to a beaker
- step 2 - measures the pH of the ammonia solution
- step 3 - adds 5 cm^3 portions of dilute hydrochloric acid to the beaker
- step 4 - measures the pH of the solution in the beaker after each addition
- step 5 - repeats step 3 and step 4 eight more times.

Look at the graph of his results.



(i) What is the pH of the ammonia solution at the start of the experiment?

pH = ... [1]

(ii) Describe the relationship between the volume of dilute hydrochloric acid added and the pH.

.....

..... [1]

(iii) What type of chemical reaction happens between ammonia solution and dilute hydrochloric acid.

..... [1]

(b) In his second experiment, Rajiv adds ammonia solution to copper sulfate solution.

He observes a pale blue precipitate in the test-tube.

Explain why a precipitate forms.

.....

.....

..... [2]

2

Metals and non-metals are the two main groupings of elements.

Write down **three** physical properties of metals that are different from non-metals.

1 .....

2 .....

3 .....

[3]

Describe **one** difference between an element and a compound.

.....

.....

..... [1]

3

Anastasia investigates four solutions, **J**, **K**, **L** and **M**, to see if they are acidic, alkaline or neutral.

She uses blue litmus and red litmus to test each solution.

Look at her results.

solution	colour change of red litmus	colour change of blue litmus	Is the solution acidic, alkaline or neutral?
J	turns blue	stays blue	
K	stays red	stays blue	
L	turns blue	stays blue	
M	stays red	turns red	

(a) Complete the last column of the table. [3]

(b) Describe how Anastasia shows that two solutions have the same pH value.

.....

..... [1]

3.

Oliver has a piece of grey magnesium.

He heats the magnesium in air.

The magnesium reacts with oxygen to make a compound.

The compound is a white powder.

(a) Name the compound made.

..... [1]

(b) When magnesium reacts with oxygen there is a chemical reaction.

Suggest how Oliver knows a chemical reaction has occurred.

..... [1]

(c) **(i)** Oxygen gas is an element.

In the box draw a particle model to describe oxygen gas.

Use O as a particle of oxygen.

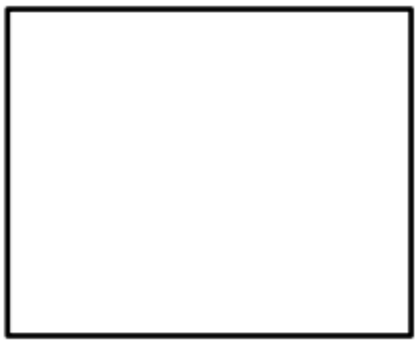


[1]

(ii) The solid compound formed in the reaction contains a magnesium particle and an oxygen particle.

In the box draw a particle model to describe the solid compound.

Use O as a particle of oxygen and ● as a particle of magnesium.



[1]

4.

Metals are electrical conductors.

State three **other** physical properties of **most** metals.

1 .....

2 .....

3 .....

[3]

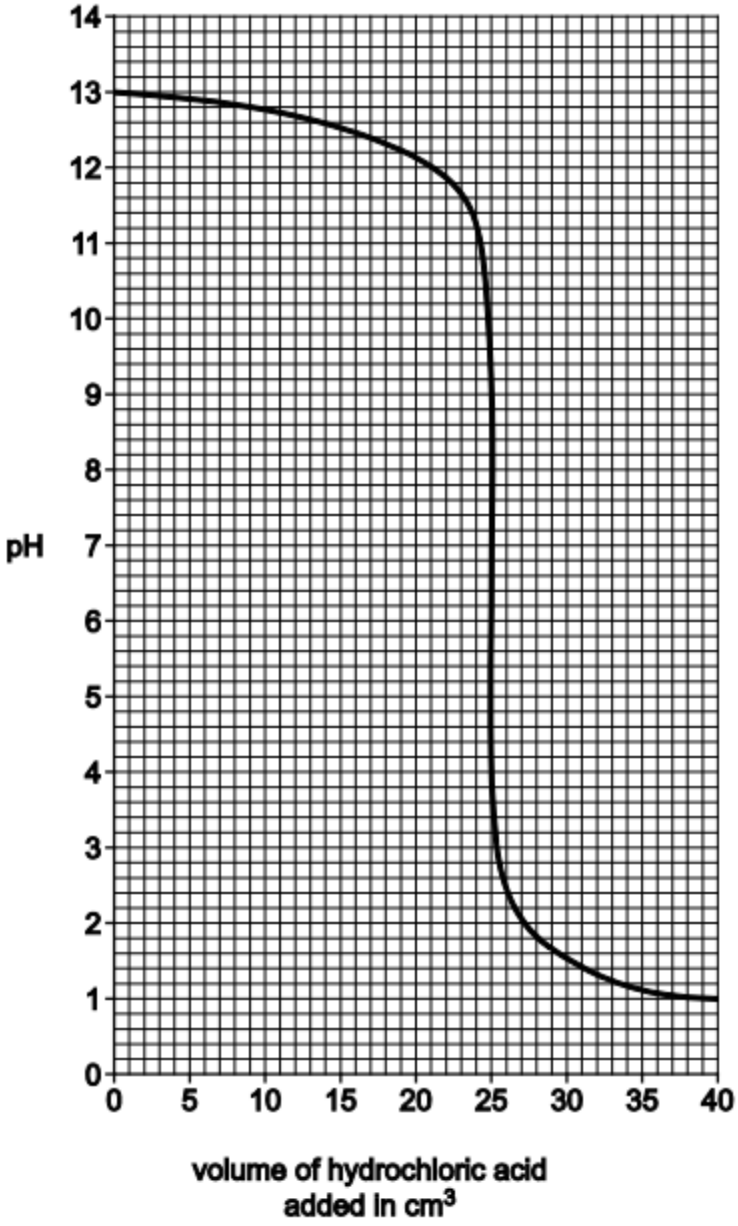
4b

Jamila and Angelique investigate a type of chemical reaction.

Jamila:

- adds 5 cm^3 of hydrochloric acid to sodium hydroxide solution
- measures the pH of the solution using a pH probe
- adds another 5 cm^3 of hydrochloric acid and measures the pH again
- continues until she has added 40 cm^3 of hydrochloric acid.

Here are her results.


14
13
12
11
10
9
8
pH
7
6
5
4
3
2
1
0
0
5
10
15
20
25
30
35
40
volume of hydrochloric acid added in cm3

(a) What is the pH of the sodium hydroxide solution at the start of the experiment?

pH ..... [1]

(b) What does the pH tell you about the sodium hydroxide solution?

Tick (✓) the correct box.

it is acidic	☐	it is alkaline	☐
it is neutral	☐	it is magnetic	☐

[1]

(c) Which type of chemical reaction is Jamila investigating?

..... [1]

(d) Jamila concludes that she needs to add 15 cm^3 of hydrochloric acid to make the pH of the solution pH7.

Is Jamila correct? .....

Explain your answer.

.....

..... [1]

(e) Angelique repeats the experiment.

She uses an indicator instead of the pH probe to measure the pH of the solution.

Which indicator does she use?

..... [1]

(f) Jamila says using the pH probe rather than an indicator will give better results.

Why is Jamila correct?

.....

..... [1]

5. Balance the following precipitation Reaction, putting the appropriate state of the species.

$AgN0_3$ + NaCl ---------→

$Pb(NO_3)_2$ + NaCl ----------→