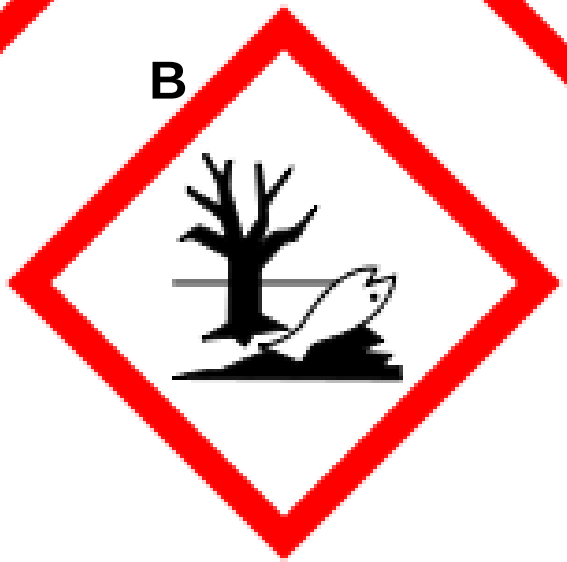
Q1 What do each of these hazard symbols mean?

A

Corrosive

B

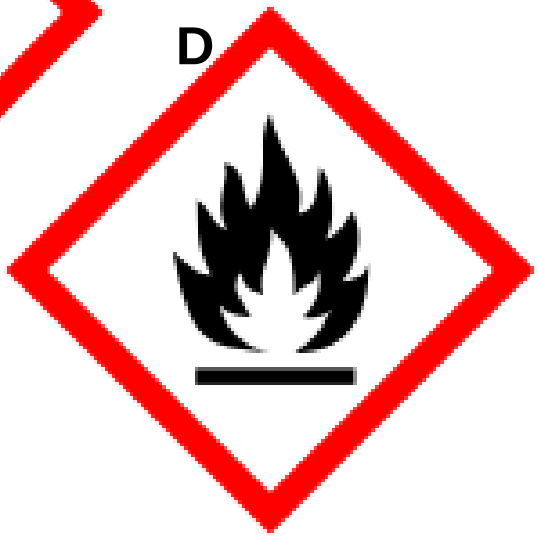


Harmful to the environment

C

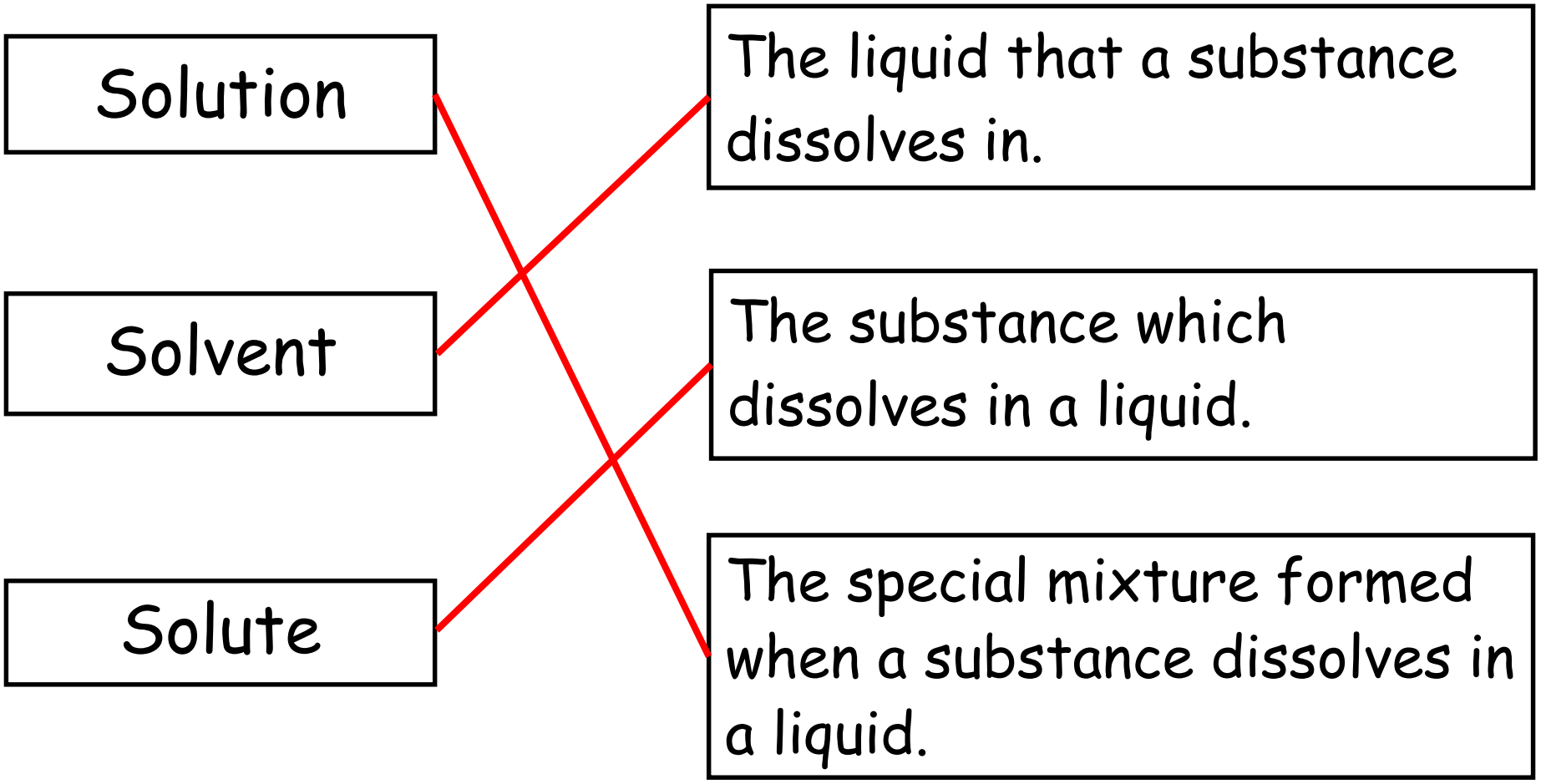
Toxic

D



Flammable

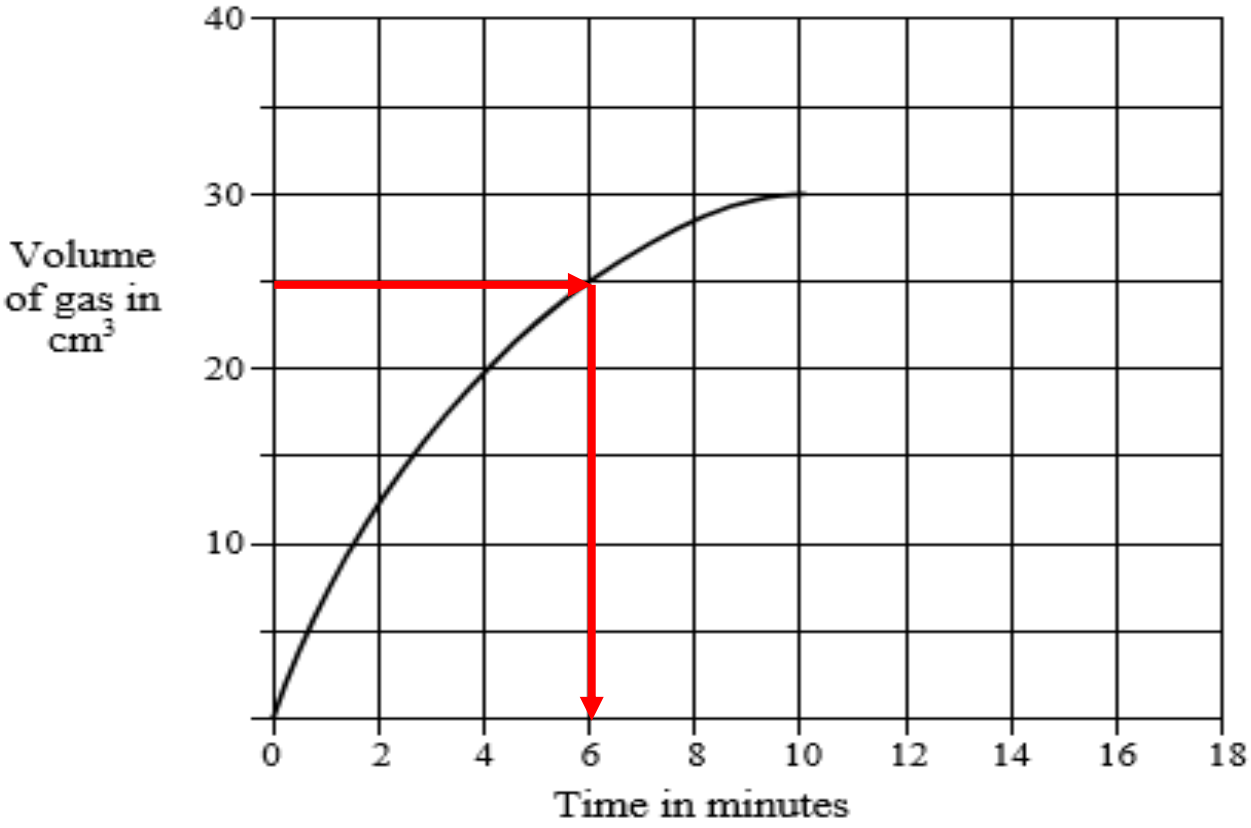
Q2 Match the word to the definition.



Q3

When chalk lumps react with acid, a gas is given off.

The graph shows the volume of gas given off during the reaction.



How long does it take to produce 25 cm^3 of gas?

Answer 6 minutes

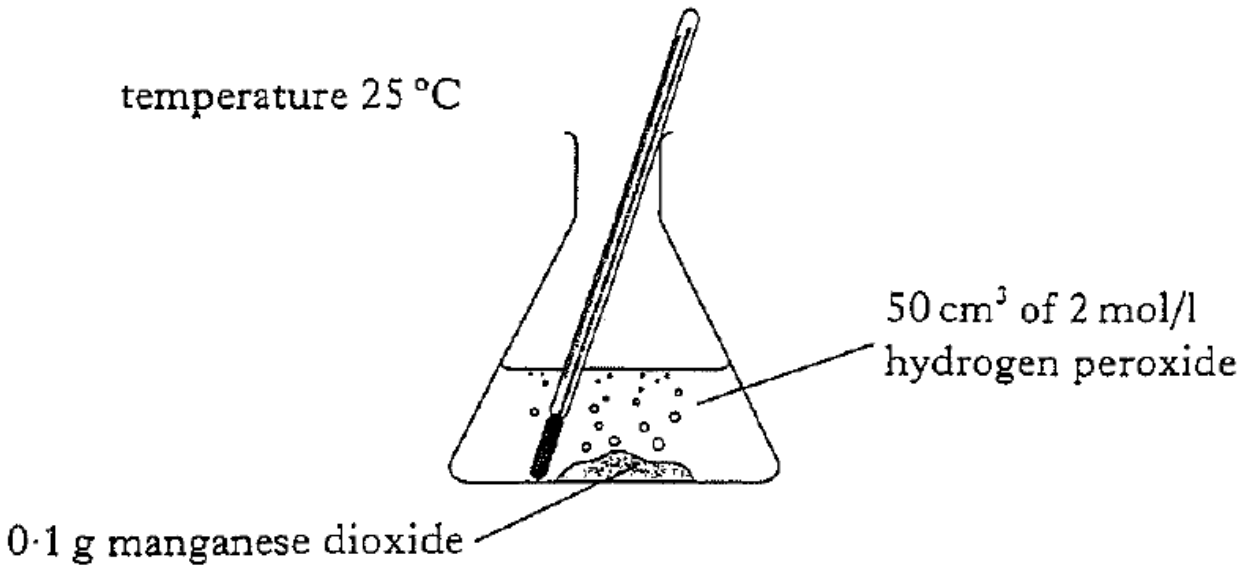
1

Mark

Q4

When Matthew added manganese dioxide to hydrogen peroxide solution, oxygen was produced.

Manganese dioxide is a catalyst.



(a) (i) What is the purpose of a catalyst?

To speed up the reaction (it is not used up itself)

1

(ii) What will be the mass of the manganese dioxide at the end of the reaction?

0.1 g

1

Q5

The names of some elements are shown.

A zinc	B magnesium	C sulphur
D sodium	E carbon	F copper

(*a*) Identify the element with the symbol Na.

You may wish to use page 8 of the data booklet to help you.

D - sodium

(*b*) Identify the **two** elements which react together to form a covalent compound.

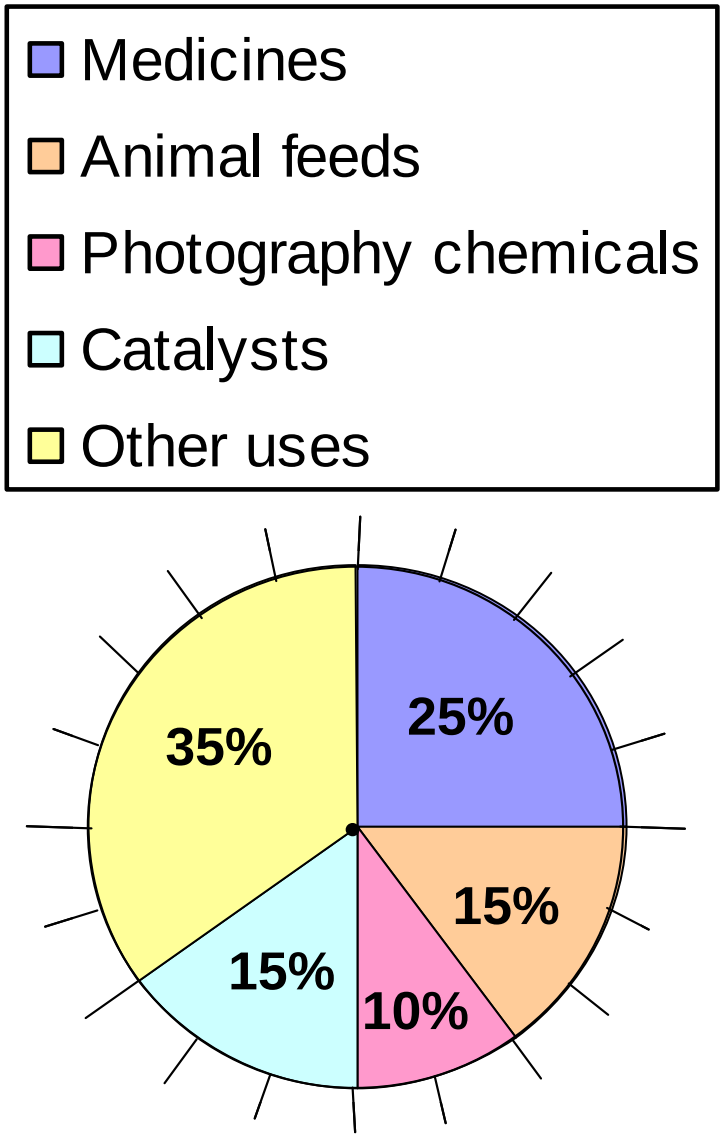
You may wish to use page 8 of the data booklet to help you.

C- Sulphur

E – Carbon **(these are the only 2 non-metals)**

Q6 The pie chart shows the different uses of iodine.

Present this information in the form of a table with appropriate headings.

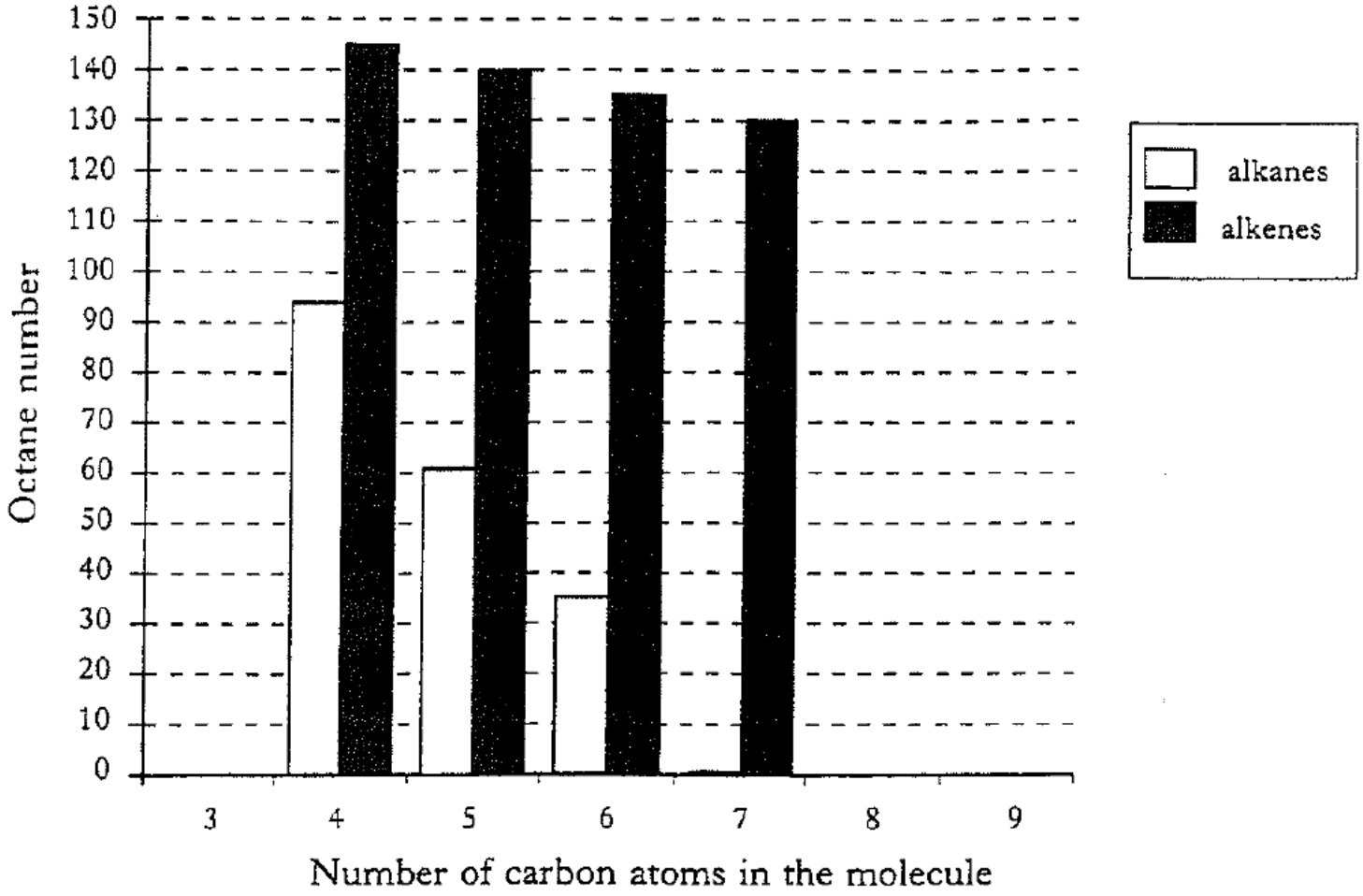


Use of Iodine	Percentage (%)
Medicines	25
Animal Feeds	15
Photography Chemicals	10
Catalysts	15
Other Uses	35

Q7

The higher the octane number of a fuel, the more efficiently it burns.

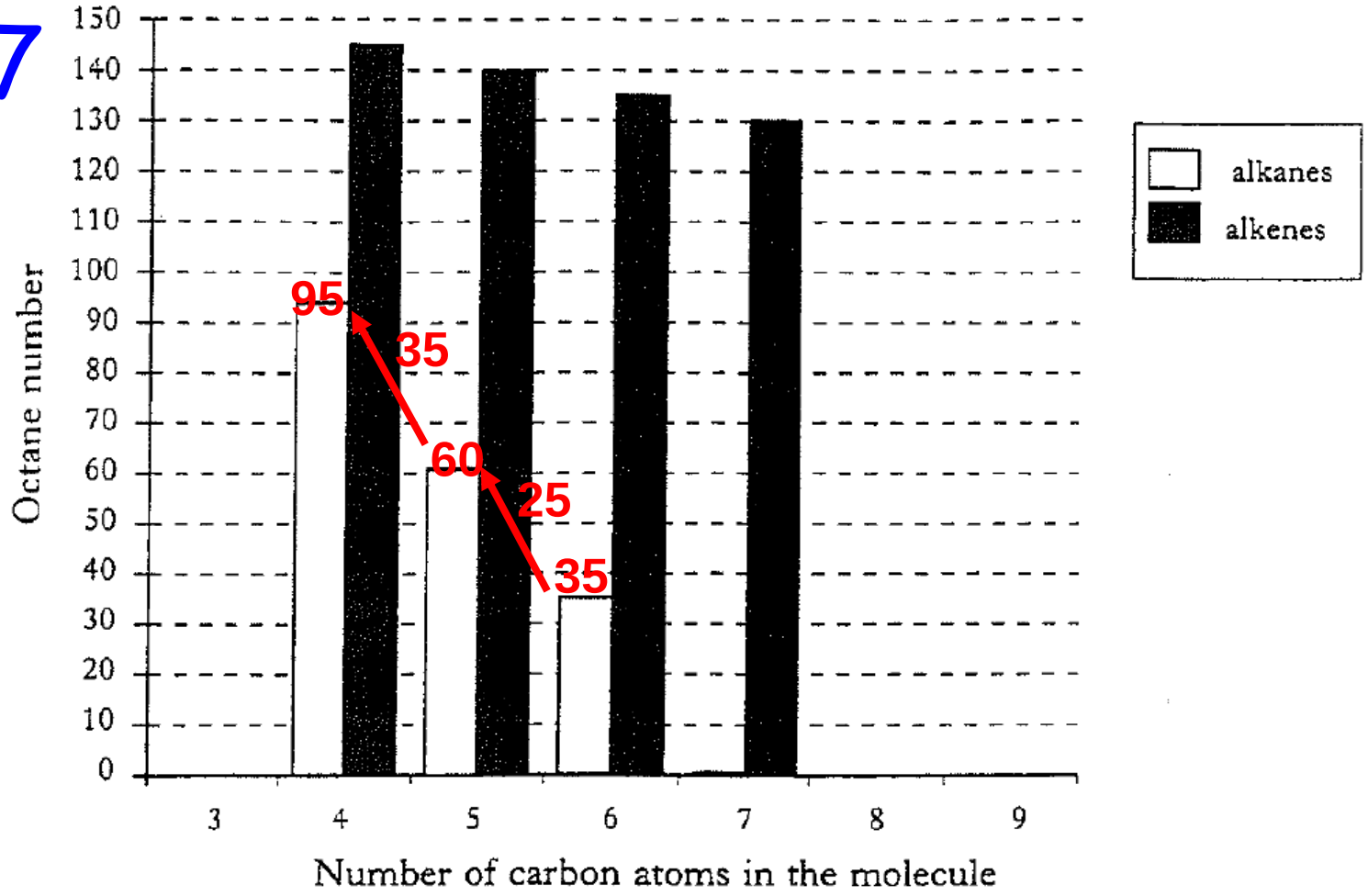
The bar chart below shows the octane numbers for some hydrocarbons.



(*a*) Describe the trend shown by the chart for the alkanes.

As the number of carbons increases the octane number……decreases……..

Q7



(*b*) From the chart, predict the octane number of the alkane with 3 carbon atoms. Accept 120-130 i.e. (95 + 25) to (95+35)

(*c*) What general statement can be made about the octane number of the alkenes compared with the alkanes?

The octane numbers of the alkenes are higher than those of alkanes

Q8

Which of the substances below is/are ionic?
There may be more than one!

A Ethanol (C_2H_5OH)

B Aluminium fluoride (AlF_3)

C Sodium bromide (NaBr)

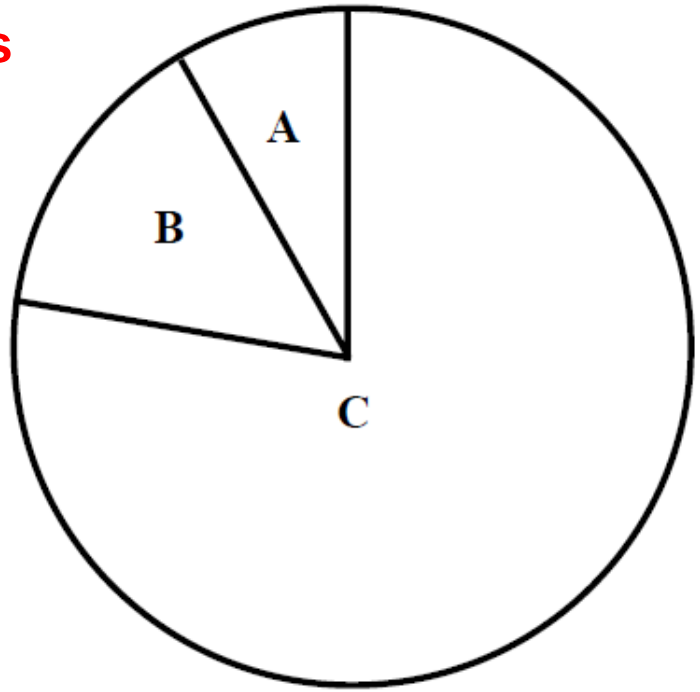
D Nitrogen hydride (NH_3)

Q9 Label the sections of the pie chart labelled A-C below:

The piechart gives information about limestone which is quarried in the UK.

80% is used as construction materials
12% is made into cement
8% is used in other industrial processes

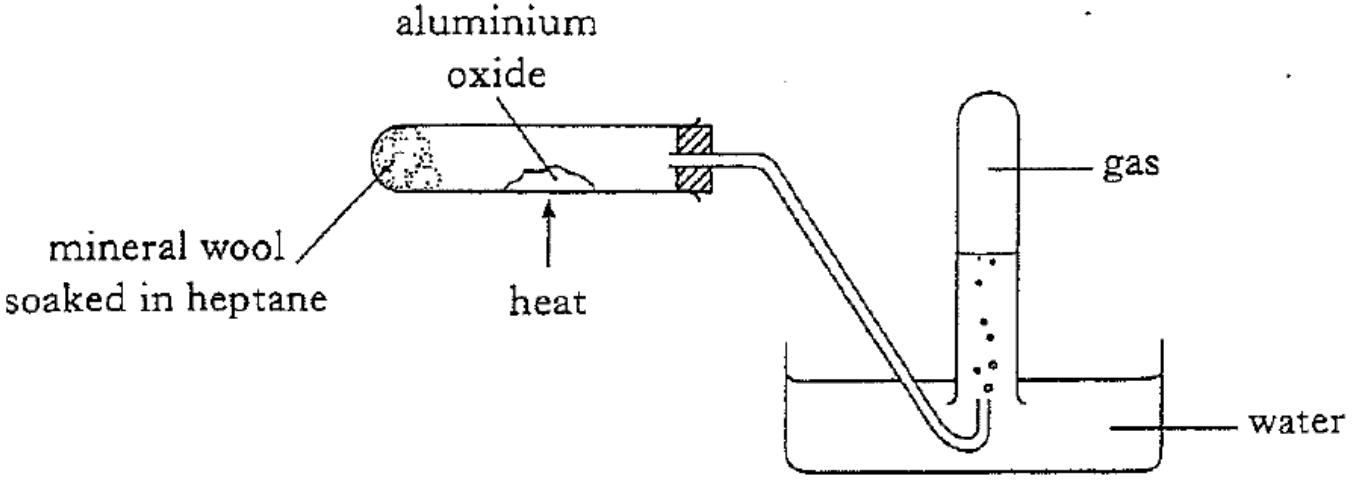
Piechart



A – Other industrial processes
B – Cement
C – Construction Materials

Q10

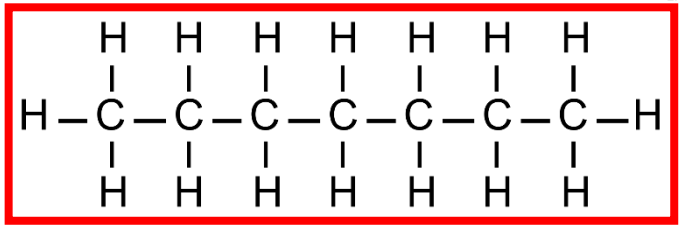
Heptane can be cracked using aluminium oxide as the catalyst.



One of the reactions which takes place is

$$\underset{\text{heptane}}{C_7H_{16}(\ell)} \longrightarrow C_3H_6(g) + \mathbf{X}$$

(*a*) Draw the full structural formula for **heptane**.

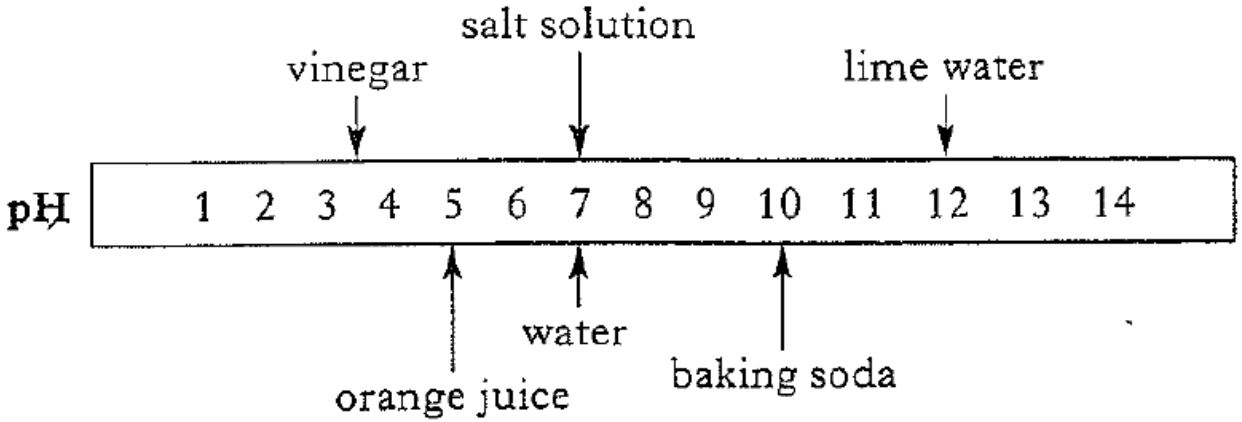


(*b*) Write the molecular formula for **X**.

C_4H_{10}

Q11

The chart shows the pH of different substances.



A vinegar	B salt solution	C lime water
D orange juice	E water	F baking soda

(*a*) A wasp sting is alkaline.

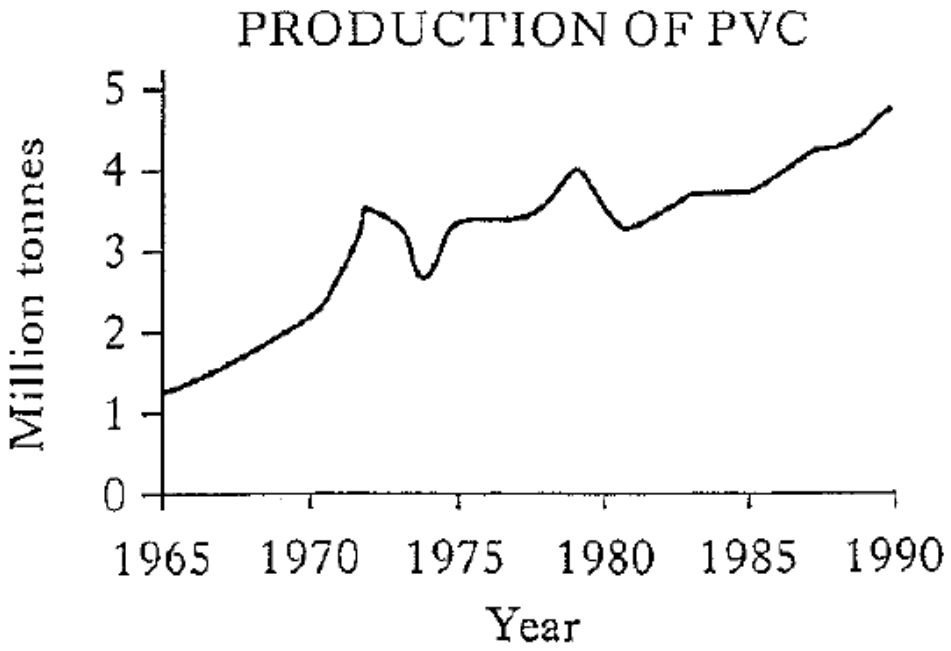
Which **two** substances could be used to neutralise a wasp sting?

A – vinegar and D – orange juice

(*b*) Identify the substance which is the most alkaline. **C - limewater**

Q12

The graph shows the production of PVC in Western Europe.

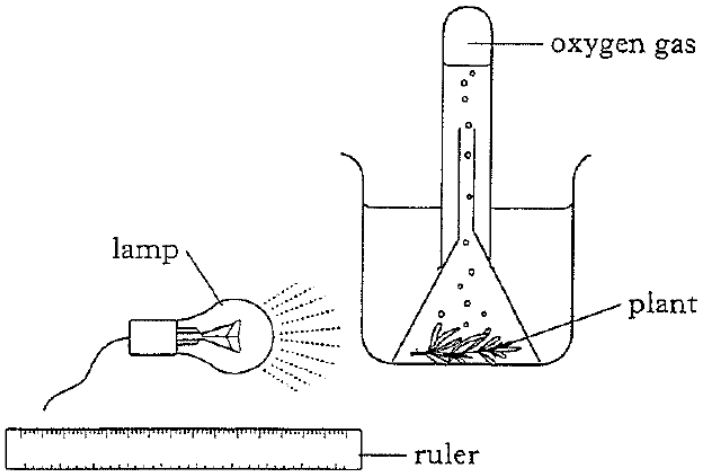


Describe the general trend in the production of PVC from 1965 to 1990.

It is increasing

Q13

A pupil set up the apparatus shown to investigate the rate of photosynthesis. Oxygen gas produced by the plant was collected in the test tube.



Distance of lamp from plant/cm	Number of bubbles of oxygen gas produced in one minute
30	24
40	19
60	10
100	4

(i) What effect does the distance of the lamp from the plant have on the number of bubbles of oxygen gas produced?

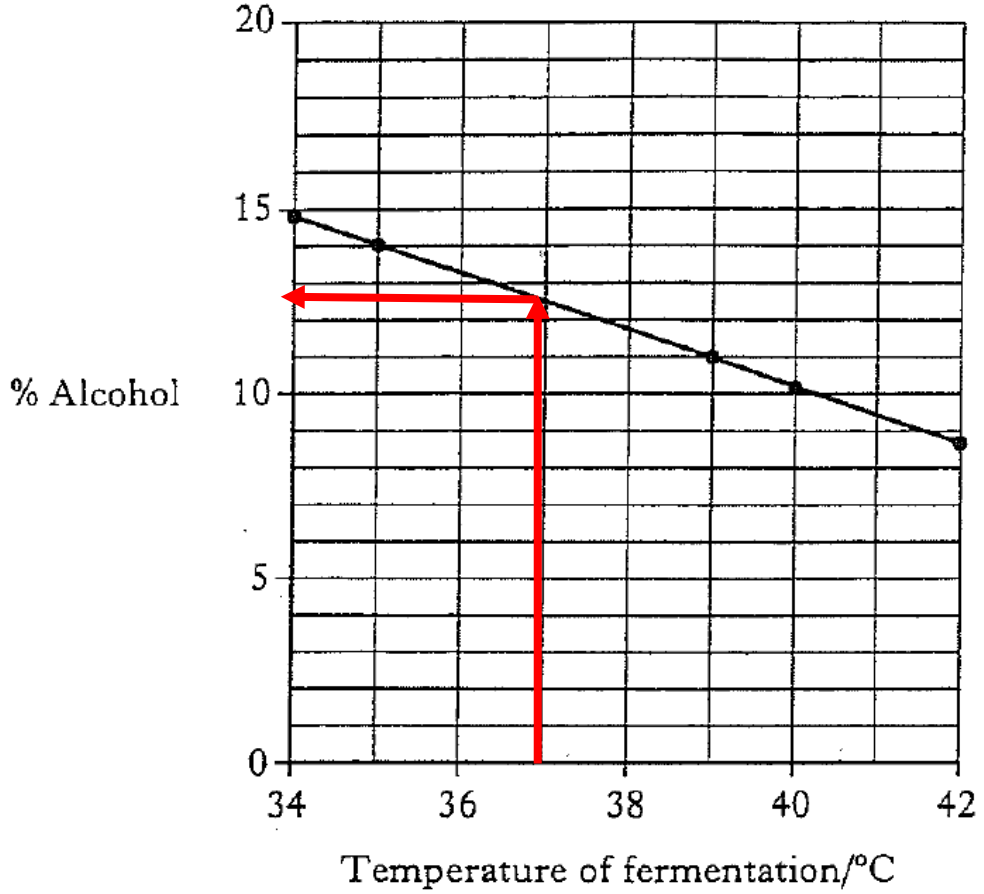
As the distance of the lamp from the plant increases the number of bubbles of oxygen gas produced in one minute decreases.

(ii) Plot a suitable graph of the data in the table

Line graph required. Use both headings and units from table (one for each axis). Suggested scale for distance 0-100 (going up in 10s) and for number of bubbles 0-25 (going up in 5s). Plot points like co-ordinates then join the points with a ruler.

Q14

The percentage of alcohol in a wine depends on the temperature of the fermentation process. Some results are shown on the graph.



(i) Describe how the temperature of fermentation affects the % alcohol produced.

As the temperature of fermentation increases the % alcohol produced decreases.

(ii) Use the graph to estimate the % alcohol when the temperature is 37 °C. **12.5%**

Q15

Magnesium sulphate is a compound present in Epsom Salts.

(*a*) Name the elements present in magnesium sulphate.

Magnesium, sulphur and oxygen

(*b*) A **solution** can be made by dissolving magnesium sulphate in water.

What term can be used to describe the water?

solvent

Q16

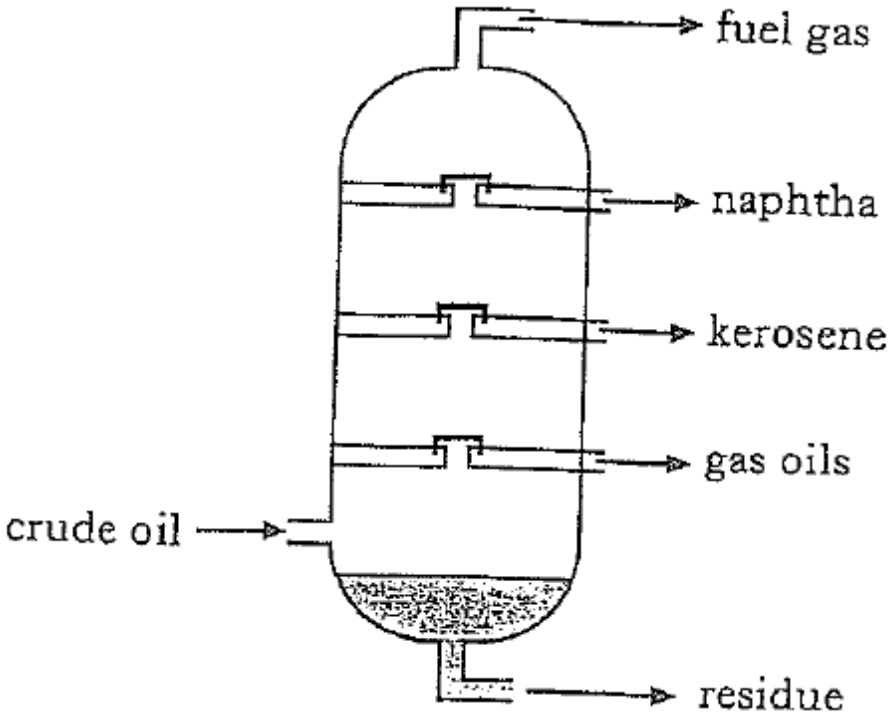
There are many compounds of potassium.

A potassium sulphate	B potassium chloride
C potassium sulphite	D potassium nitrate

Identify the compound which does **not** contain oxygen.

Q17

The diagram shows a tower in which crude oil is separated.



(*a*) Name the process used to separate crude oil. **Fractional distillation**

(*b*) Naphtha can be cracked to produce molecules that are more useful.

How does the **size** of these more useful molecules compare to the **size** of the molecules in naphtha?

The more useful molecules will be smaller than naptha.

Q18

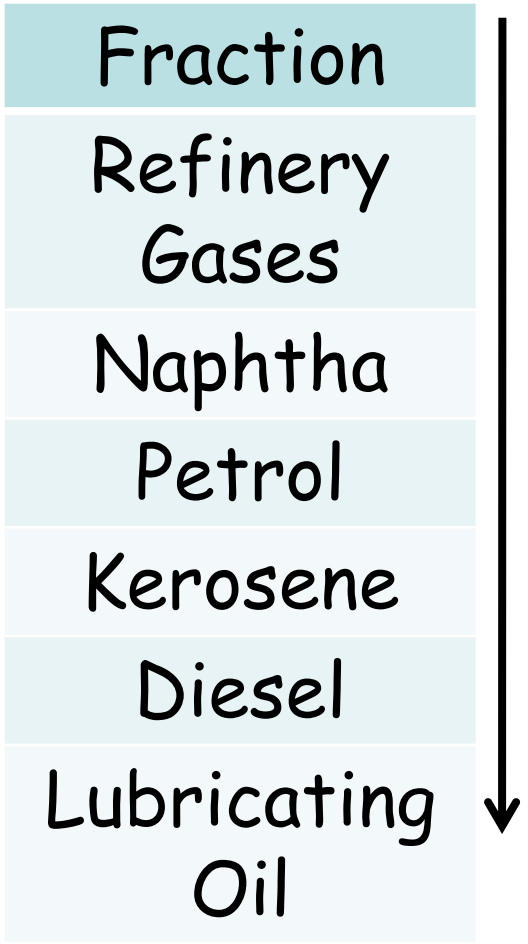
As the fraction gets **heavier**, what happens to the:

A. Boiling Point — increases

B. Viscosity — increases

C. Flammability — decreases

D. Evaporation rate — decreases



Q19 Crude oil contains sulphur compounds, such as hydrogen sulphide.

Hydrogen sulphide burns in oxygen to produce sulphur dioxide and water.

Write a **word** equation for this reaction.

Hydrogen sulphide + oxygen → sulphur dioxide + water

Q20 (i) Write the formula for carbon dioxide gas. **CO_2**

(ii) Describe what would be seen when carbon dioxide gas is bubbled through lime water. **The limewater turns cloudy**

Q21 Crude oil and natural gas are fossil fuels.

Fossil fuels are a finite resource.

What is meant by the term **finite**? **It will run out**

Q22 Prefixes can sometimes be used as a guide to formulae. Make use of prefixes to help you write the formulae for the following compounds

(a) difluorine monoxide **F_2O**

(b) nitrogen monoxide **NO**

Q23 A covalent compound contains two nitrogen atoms and four oxygen atoms. Write the chemical formula for this compound. **N_2O_4**

Q24

Hydrocarbons contain hydrogen and carbon only.

A butene	B methane	C hexene
D pentane	E pentene	F propene

(a) Identify the **two** hydrocarbons which are alkanes. **B and D**

(b) Identify the hydrocarbon with the highest boiling point. **C**
You may wish to use page **9** of the data booklet to help you.

Q25

Butene is an unsaturated hydrocarbon.

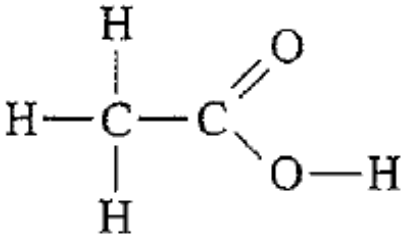
(i) Write the molecular formula for butene. **C_4H_8**

(ii) Describe a chemical test, including the result, to show that butene is unsaturated.

Butene (an unsaturated molecule) will decolourise bromine water.

Q26

(a) The diagram shows a molecule of ethanoic acid.



Write the molecular formula for ethanoic acid. C_4H_8

(b) Describe how you would use universal indicator or pH paper to measure the pH of ethanoic acid solution.

Dip pH paper into ethanoic acid and compare to a pH colour chart.
OR Add a few drops of universal indicator to the ethanoic acid and compare to a pH colour chart.

(c) Complete the sentence below by circling the correct answer.

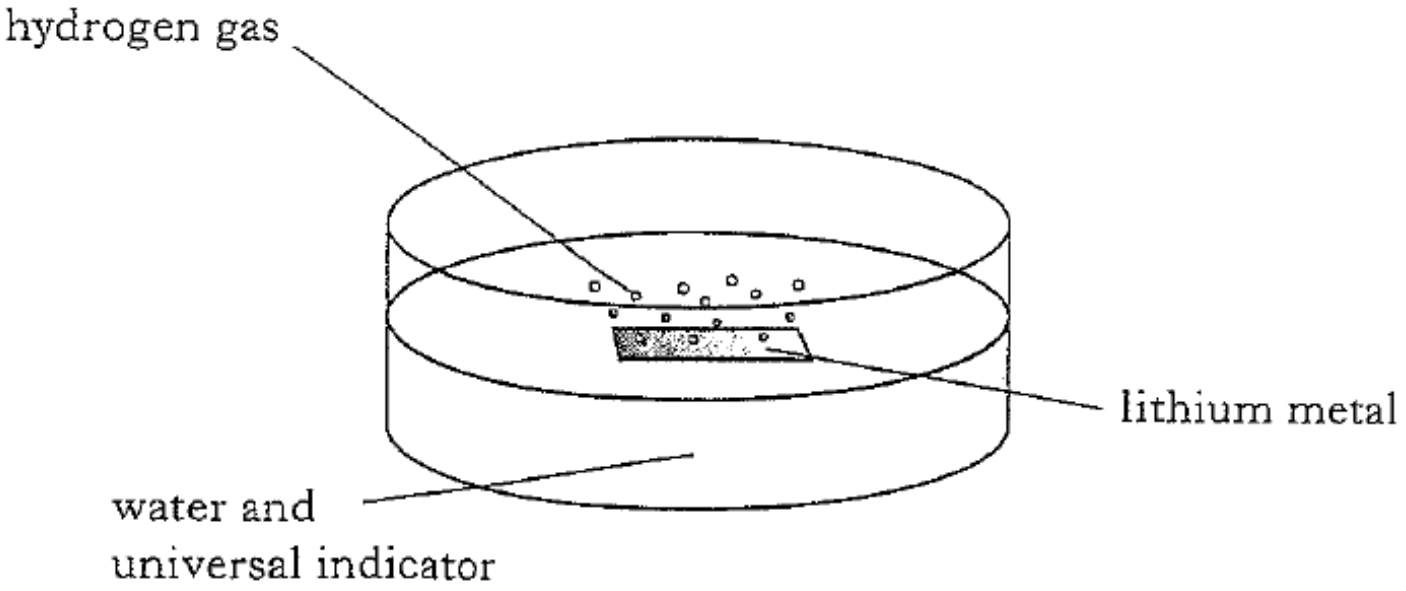
Diluting an ethanoic acid solution with water will

increase / not change / decrease

the pH number.

Q27

A teacher demonstrated the following experiment.



(*a*) State the test for hydrogen gas. **It burns with a pop.**

(*b*) The universal indicator turned purple.

Circle the correct word to complete the sentence.

A solution which turns universal indicator purple is { acidic / neutral / alkaline }.

Q28 Nitrates are used as fertilisers as they contain the essential element nitrogen.

(i) Name **one** other essential element for plant growth.

Phosphorus (P) OR Potassium (K)

(ii) Suggest another property of nitrates which makes them suitable for use as fertilisers. They are soluble in water.

Q29 Starch and glucose are carbohydrates.

Which chemical would you use to test for starch?

Iodine (changes from brown to blue-black with starch)

Q30 The grid shows the names of some elements.

A	hydrogen
B	helium
C	oxygen
D	silicon
E	carbon

A- Hydrogen and C- Oxygen 2

(*a*) Identify the **two** elements which exist as **diatomic** molecules.

(*b*) Identify the element which has the electron arrangement 2,4.

You may wish to use page 6 of the data booklet to help you. Carbon 1

Q31

Various solutions can be used to identify substances.

A iodine solution	B lime water	C ferroxyl indicator
D Benedict's solution	E bromine solution	F pH indicator

A) Identify the solution used to test for glucose.

D – Benedict's solution (turns from blue to orange with glucose).

B) Identify the solution used to test for carbon dioxide gas.

B – Lime water (turns from clear/colourless to cloudy/white with carbon dioxide).

Q32

The grid shows the names of some compounds.

A copper carbonate	B potassium sulphite
C sodium fluoride	D calcium sulphide

(*a*) Identify the compound which could be used as a fertiliser. **B** 1

(*b*) Identify the compound which produces a yellow flame colour. **C** 1
You may wish to use page **6** of the data booklet to help you.

(*c*) Identify the **two** compounds which contain oxygen. **A and B** 2

Q33

The grid gives information about the melting points and boiling points of some compounds.

Compound	Melting point/°C	Boiling point/°C
A	7	81
B	80	218
C	−160	−14
D	−79	138
E	41	182
F	−124	21

Identify the **two** compounds which are liquids at room temperature (25 °C).

A	B	C	D	E	F

Q34

The names of some oxides are shown in the grid.

A sodium oxide	B potassium oxide	C copper(II) oxide
D carbon dioxide	E zinc oxide	F sulphur dioxide

(*a*) Identify the **two** oxides which dissolve in water to form alkaline solutions.

A	B	C
D	E	F

1

(*b*) Identify the **two** oxides which are covalent.

A	B	C
D	E	F

1

Q35

The grid contains information about the particles found in atoms.

A relative mass = 1	B charge = zero	C relative mass almost zero
D charge = 1–	E found outside the nucleus	F charge = 1+

Identify the **two** terms which can be applied to protons.

2

Q36

A student made some statements about the particles found in atoms.

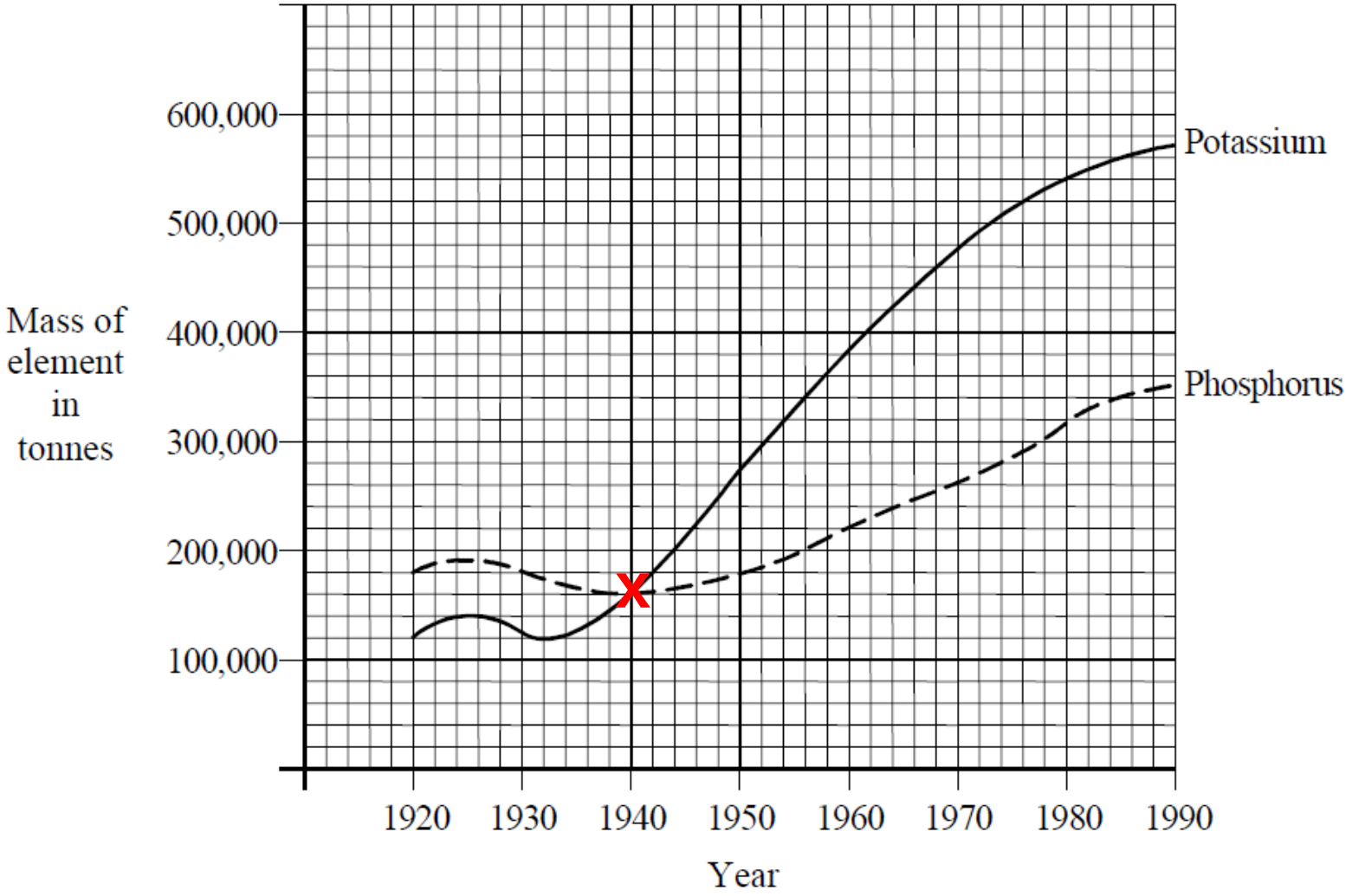
A	It has a positive charge.
B	It has a negative charge.
C	It has a relative mass of almost zero.
D	It has a relative mass of 1.
E	It is found inside the nucleus.
F	It is found outside the nucleus.

Identify the **two** statements which apply to **both** a proton and a neutron.

2

Q37

This graph shows the masses of potassium and phosphorus used in making man-made fertilisers between 1920 and 1990.



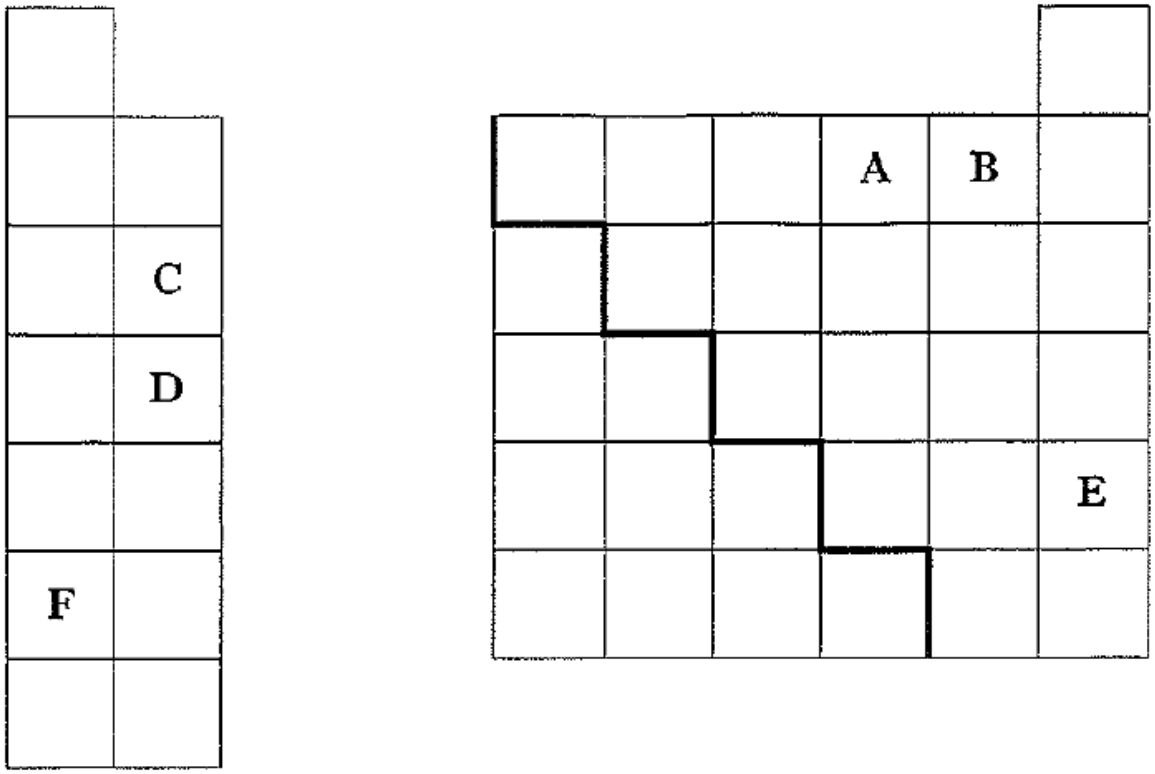
In which year were **equal** masses of potassium and phosphorus used?

Year 1940

1

Q38

The diagram shows part of the Periodic Table.
The letters do **not** represent the symbols for the elements.



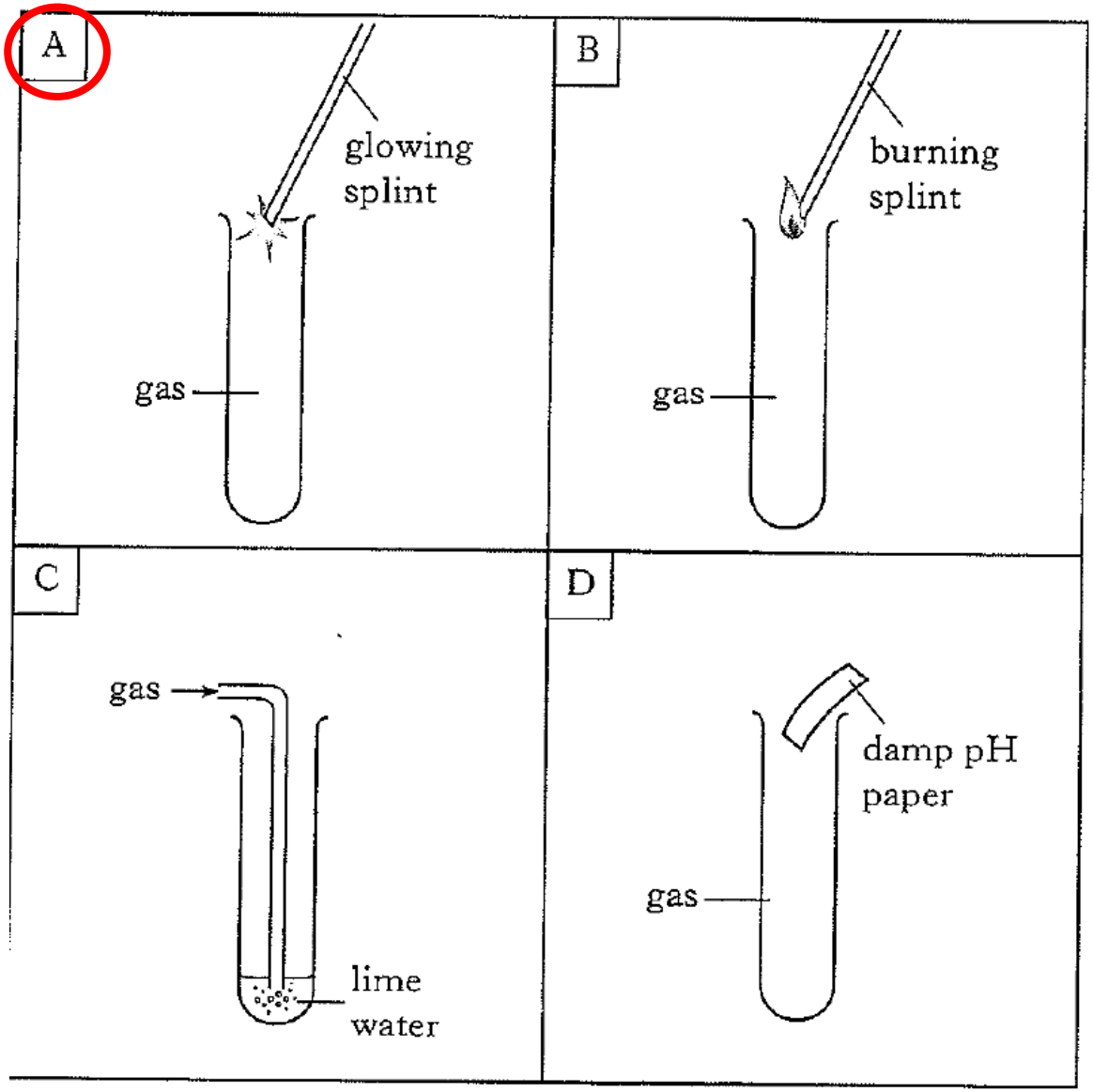
(*a*) Identify the element which has the electron arrangement 2, 7. **B**
You may wish to use page 6 of the data booklet to help you.

(*b*) Identify the unreactive element. **E**

(*c*) Identify the **two** elements which are in the same group. **C and D**

Q39

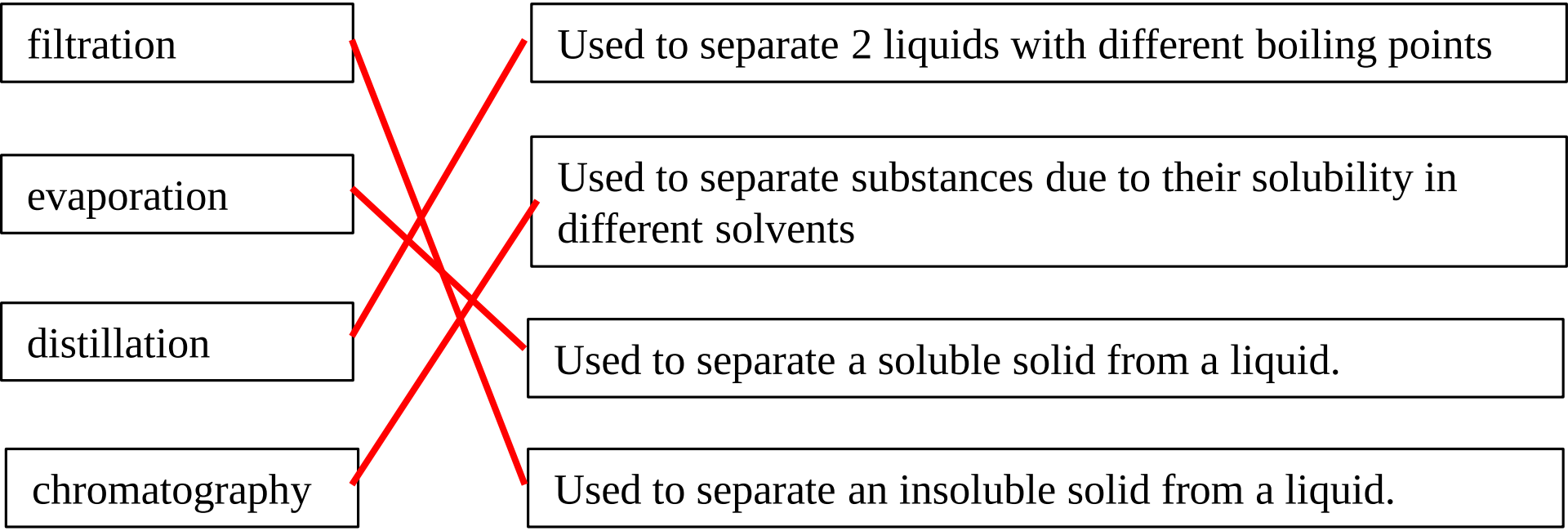
Testing gases



Identify the test for oxygen gas. **Oxygen re-lights a glowing splint**

Q40

Draw a line to match the name of the separation technique to the type of mixture it is used to separate



Q41 Interpreting Reaction Rate Graphs

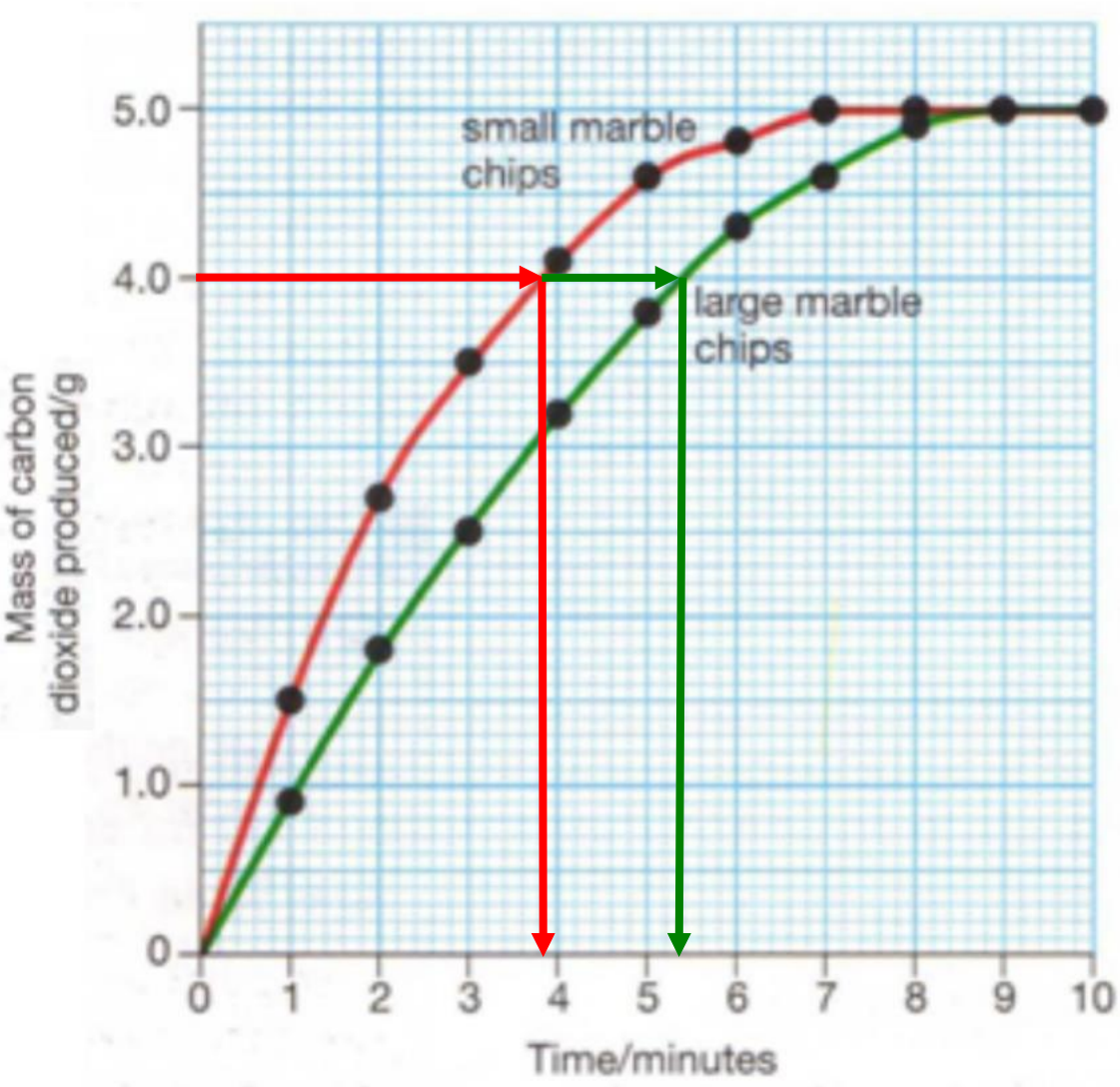
FROM THE GRAPH

Small: 3.8 min
Large: 5.4 min

No more CO_2 is made (graph levels off)

Same mass CO_2 is made in both experiments (graphs both level off at same height)

The steeper the slope the faster the rate of reaction.



Q42 Write a word equation for the following reaction:

Calcium carbonate fizzes up when it is added to nitric acid. This is because carbon dioxide *gas is being made.* **Calcium nitrate and water are left in the beaker at the end of the reaction.**

calcium carbonate + nitric acid → carbon dioxide + calcium nitrate + water

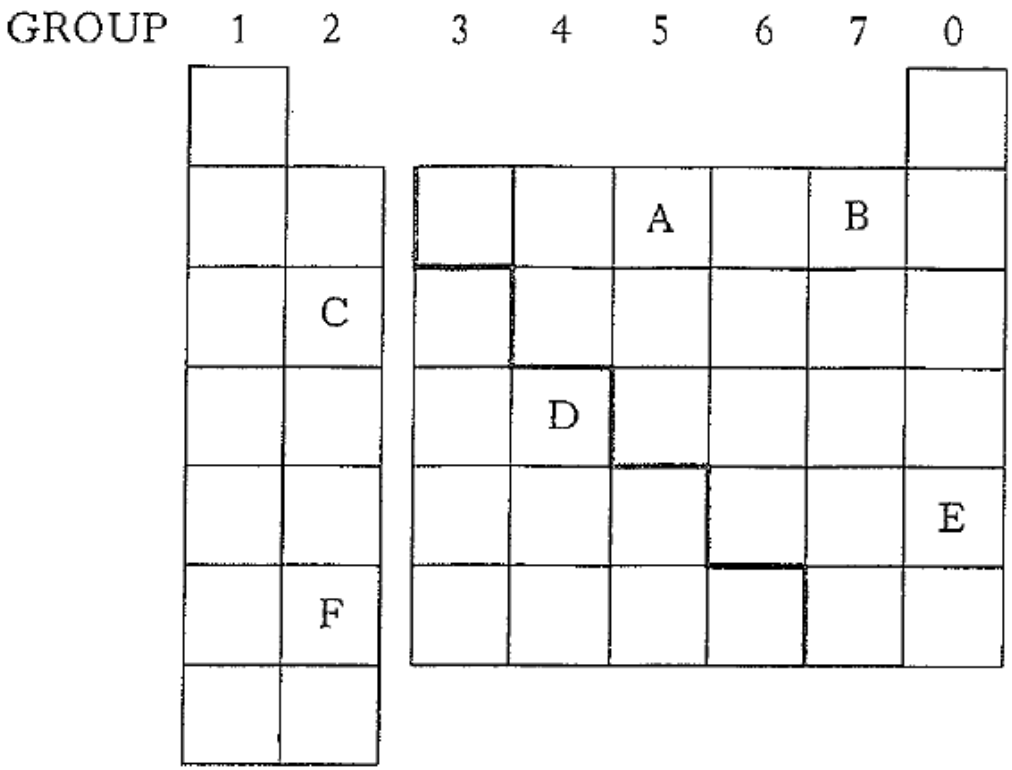
Q43

Name the 3 different salts formed when the following 3 pairs of acids and bases react.

	Name of acid	Name of base	Name of salt
A	sulphuric acid	sodium oxide	**Sodium sulfate**
B	hydrochloric acid	calcium hydroxide	**Calcium chloride**
C	nitric acid	copper(II) oxide	**Copper nitrate**

Q44

The diagram shows part of the Periodic Table.
The letters do **not** represent the symbols for the elements.



(*a*) Identify the element which has the electron arrangement 2, 5. **A**

(*b*) Identify the **two** elements with similar chemical properties. **C and F**

(*c*) Identify the noble gas. **E**

Q45

Global warming is due to an increase in the level of carbon dioxide in the atmosphere. One of the main causes of this is

planting more forests or **burning fossil fuels**

Q46

Write the symbols for the ions formed by each of the 4 elements below (Note - filling in the table will help you work out the final answers)

	Ion Name	Atom electron arrangement	Closest Noble Gas electron arrangement	Change to electrons	Ion symbol
A	Aluminium	2,8,3	2,8	Lose 3	Al^{3+}
B	Chloride	2,8,7	2,8,8	Gain 1	Cl^{-}
C	Oxygen	2,6	2,8	Gain 2	O^{2-}
D	Lithium	2,1	2	Lose 1	Li^{+}

Q47

Complete the following word equations:

Complete combustion of hydrocarbon

Hydrocarbon + oxygen ⟶ ____A____ + water

A = carbon dioxide

Incomplete combustion of hydrocarbon

Hydrocarbon + oxygen ⟶ ____B____ + water

B = carbon monoxide (or carbon / soot)

Q48

Use the nuclide notation given below to work out the number of protons, electrons and neutrons in this atom of Boron.

$$^{11}_{5}B$$

P = 5 (atomic number)

E = 5 (same as number of protons in an atom)

N = 6 (mass number - atomic number)

Q49

The volume of hydrogen produced at different times during one reaction is shown below.

Time in seconds	Volume of hydrogen
0	0
25	24
50	38
75	46
100	52
125	55

(i) What is the volume of hydrogen produced in the first 50 seconds?

Answer 38 cm^3 **1**

(ii) As the reaction proceeded, the speed of reaction:

Tick (✓) the correct box.

stayed the same ☐

decreased ☑

increased ☐ **1**

Q50

A student added magnesium ribbon to dilute sulphuric acid.

The experiment was repeated using magnesium powder.

How do the reaction speeds compare?

Answer With magnesium ribbon, the reaction speed is slower