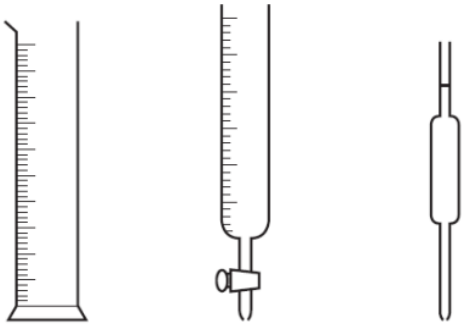
2 The diagram shows three pieces of apparatus that are used for measuring the volume of a liquid.



1 2 3

What are these pieces of apparatus?

	1	2	3
A	burette	measuring cylinder	pipette
B	burette	pipette	measuring cylinder
C	measuring cylinder	burette	pipette
D	measuring cylinder	pipette	burette

0620_w/14/qp11

---

2 A student measures the rate of two reactions.

In one reaction, there is a change in mass of the reactants during the reaction.

In the second reaction, there is a change in temperature during the reaction.

Which piece of apparatus would be essential in **both** experiments?

A balance

B clock

C pipette

D thermometer

0620_w/13/qp11

3 Part of the instructions in an experiment reads as follows.

Quickly add 50 cm^3 of acid.

What is the best piece of apparatus to use?

A a burette

B a conical flask

C a measuring cylinder

D a pipette

0620_w/12/qp11

---

30 A liquid turns white anhydrous copper sulfate blue and has a boiling point of 103°C.

Which could be the identity of the liquid?

A alcohol

B petrol

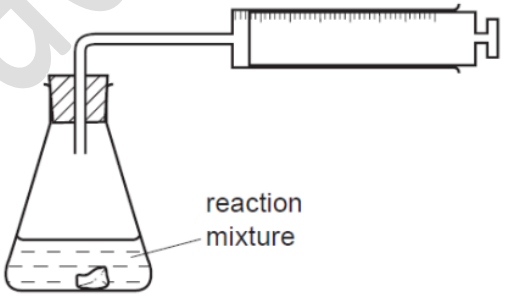
C salt solution

D pure water

0620_w/11/qp11

---

15 An experiment to determine the rate of a chemical reaction could be carried out using the apparatus shown.



Which reaction is being studied?

A $Cl_2 + 2KBr \rightarrow 2KCl + Br_2$

B $Mg + H_2SO_4 \rightarrow MgSO_4 + H_2$

C $NaCl + AgNO_3 \rightarrow NaNO_3 + AgCl$

D $NaOH + HCl \rightarrow NaCl + H_2O$

0620_w/11/qp11

2 A student was provided with only a thermometer, a stopwatch and a beaker.

What could the student measure?

A 10.5 g solid and 24.8 cm^3 liquid

B 10.5 g solid and 25 °C

C 24.8 cm^3 liquid and 45 seconds

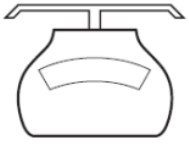
D 25 °C and 45 seconds

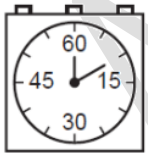
0620_w/11/qp11

---

15 The diagrams show some pieces of laboratory equipment.

1	2	3
balance	stop-clock	thermometer





Which equipment is needed to find out whether dissolving salt in water is an endothermic process?

A 1 only **B** 1 and 3 **C** 2 and 3 **D** 3 only

0620_w/10/qp11

---

2 Part of the instructions in an experiment reads as follows.

Quickly add 50 cm^3 of acid.

What is the best piece of apparatus to use?

A a burette

B a conical flask

C a measuring cylinder

D a pipette

0620_w/07/qp1

---

13 Which piece of apparatus is essential to measure the speed of a reaction?

A accurate balance

B gas syringe

C stopwatch

D thermometer

0620_w/06/qp1

---

2 A student mixes 25 cm^3 samples of dilute hydrochloric acid with different volumes of aqueous sodium hydroxide. Each time, the student measures the change in temperature.

Which piece of apparatus is **not** needed?

A

beaker

B

clock

C

measuring cylinder

D

thermometer

0620_w/06/qp1

---

3 Which piece of apparatus should be used for the **accurate** measurement of 30.0 cm^3 of a liquid?

A a beaker

B a burette

C a conical flask

D a measuring cylinder

0620_w/06/qp1

2 The reaction between solution **P** and solution **Q** is exothermic.

A student is told to test this statement by mixing equal volumes of the two solutions and measuring the temperature change.

Which two pieces of apparatus should the student use?

A balance and clock

B balance and thermometer

C pipette and clock

D pipette and thermometer

0620_w/05/qp1

---

29 What is used to test for the presence of water?

A anhydrous copper(II) sulphate

B aqueous barium chloride

C aqueous sodium hydroxide

D Universal indicator paper

0620_w/04/qp1

---

4 A student wishes to extract a coloured solution from some berries to make an indicator solution.

Which of the listed instructions should the student follow?

1	crush the berries
2	add acid
3	add a solvent
4	filter the mixture
5	distil the filtrate

A 1, 2 and 4

B 1, 3 and 4

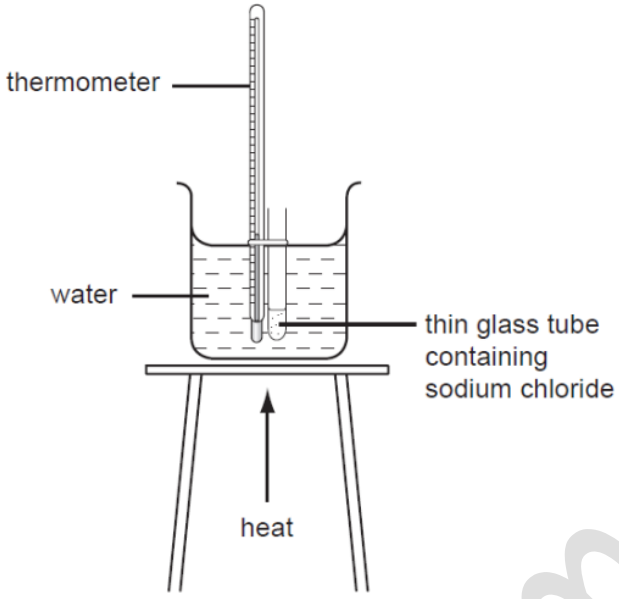
C 2, 3 and 5

D 2, 4 and 5

0620_w/04/qp1

---

3 The apparatus shown **cannot** be used to determine the melting point of sodium chloride, Na^+Cl^-.



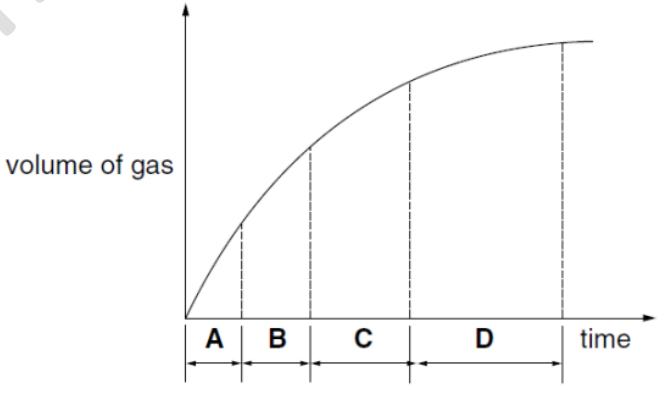
Why is this?

	melting point of sodium chloride is greater than 100 °C	sodium chloride dissolves in the water
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

0620_w/04/qp1

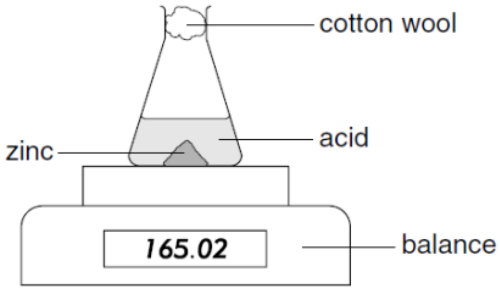
14 The graph shows how the total volume of a gas given off from a reaction changes with time.

In which time interval is **least** gas given off?



0620_w/03/qp1

4 A student investigates the speed of the reaction between a lump of zinc and an acid at room temperature.



Which other item of apparatus does the student need for this experiment?

A Bunsen burner

B measuring cylinder

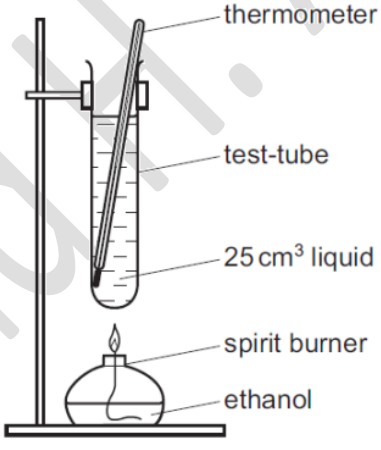
C stop clock

D thermometer

0620_w/03/qp1

---

2 A liquid is heated until it boils.



Which result shows that the liquid in the test-tube is pure water?

A Condensation forms at the top of the test-tube.

B Steam is produced.

C The thermometer reads 100 °C.

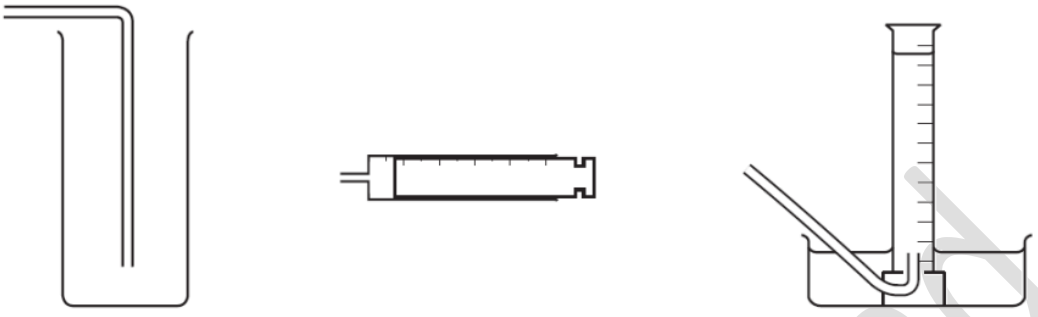
D There is nothing left behind in the test-tube.

0620_s/14/qp12

17 An experiment is carried out to investigate the rate of reaction when calcium carbonate is reacted with hydrochloric acid.

The volume of carbon dioxide gas given off is measured at different intervals of time.

The diagram shows pieces of apparatus used to collect gases.



1
downward delivery

2
gas measuring syringe

3
over water in graduated tube

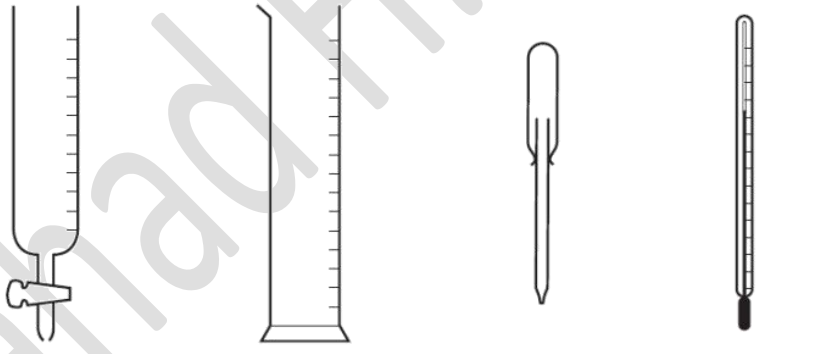
Which apparatus is suitable to collect and measure the volume of the carbon dioxide?

A 1, 2 and 3 **B** 2 and 3 only **C** 1 only **D** 3 only

0620_s/14/qp11

---

2 The four pieces of apparatus shown below are used in chemical experiments.



burette

measuring cylinder

pipette

thermometer

Which statement about the apparatus is correct?

A The burette measures the volume of liquid added in a titration.

B The measuring cylinder measures the mass of a substance used in an experiment.

C The pipette measures the volume of gas given off in a reaction.

D The thermometer measures the density of a solution.

0620_s/14/qp11

2 Crystals of sodium chloride were prepared by the following method.

1 25.0 cm^3 of dilute hydrochloric acid was accurately measured into a conical flask.

2 Aqueous sodium hydroxide was added until the solution was neutral. The volume of sodium hydroxide added was measured.

3 The solution was evaporated and the crystals washed with approximately 15 cm^3 of water.

Which row shows the pieces of apparatus used to measure the 25.0 cm^3 of hydrochloric acid, the volume of aqueous sodium hydroxide and the 15 cm^3 of water?

	25.0 cm^3 of hydrochloric acid accurately	the volume of aqueous sodium hydroxide added	15 cm^3 of water approximately
A	burette	pipette	measuring cylinder
B	measuring cylinder	burette	pipette
C	pipette	burette	measuring cylinder
D	pipette	measuring cylinder	burette

0620_s/13/qp11

---

3 Lead iodide is insoluble in water.

Lead iodide is made by adding aqueous lead nitrate to aqueous potassium iodide.

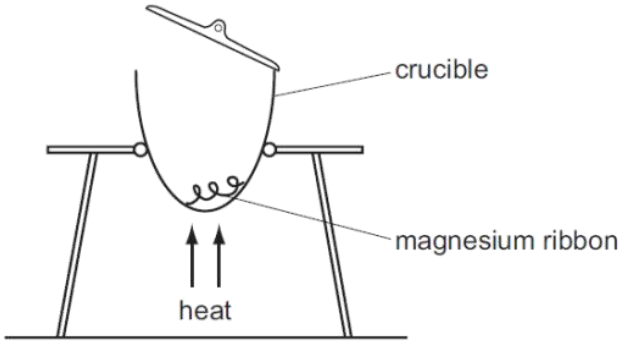
Which pieces of apparatus are needed to obtain solid lead iodide from 20 cm^3 of aqueous lead nitrate?

1 2 3 4 5

A 1, 2 and 4 **B** 1, 3 and 5 **C** 1, 4 and 5 **D** 2, 4 and 5

0620_s/13/qp11

2 The diagram shows an experiment to find the formula of magnesium oxide.



Which piece of apparatus would be needed in addition to those shown?

A a balance

B a measuring cylinder

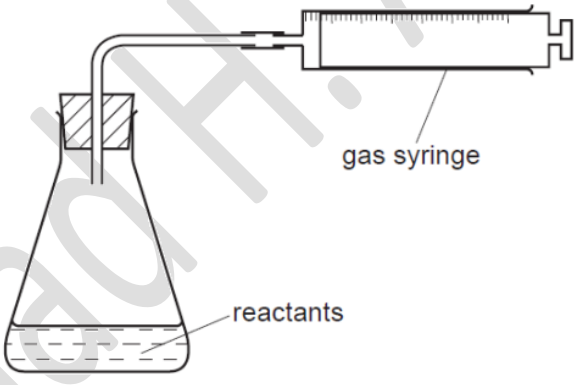
C a spatula

D a thermometer

0620_s/13/qp12

---

13 The apparatus shown is used to measure the speed of a reaction.



Which equation represents a reaction where the speed can be measured using this apparatus?

A $Mg(s) + 2HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$

B $HCl(aq) + NaOH(aq) \rightarrow NaCl(aq) + H_2O(l)$

C $Fe(s) + CuSO_4(aq) \rightarrow Cu(s) + FeSO_4(aq)$

D $2Na(s) + Br_2(l) \rightarrow 2NaBr(s)$

0620_s/12/qp11

3 A student investigates how the concentration of an acid affects the speed of reaction with a 0.5 g mass of magnesium at 30 °C.

The student has a beaker, concentrated acid, water and the apparatus below.

P a balance

Q a clock

R a measuring cylinder

S a thermometer

Which pieces of apparatus does the student use?

A P, Q and R only

B P, Q and S only

C Q, R and S only

D P, Q, R and S

0620_s/12/qp11

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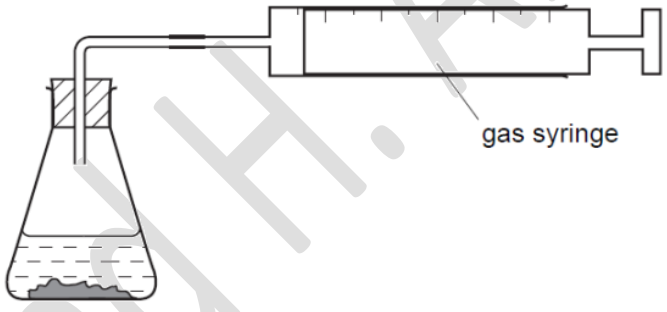
15 The apparatus shown can be used to measure the rate of some chemical reactions.



For which two reactions would the apparatus be suitable?

reaction 1 $AgNO_3(aq) + HCl(aq) \rightarrow AgCl(s) + HNO_3(aq)$

reaction 2 $2H_2O_2(aq) \rightarrow 2H_2O(l) + O_2(g)$

reaction 3 $MgO(s) + 2HCl(aq) \rightarrow MgCl_2(aq) + H_2O(l)$

reaction 4 $ZnCO_3(s) + 2HCl(aq) \rightarrow ZnCl_2(aq) + CO_2(g) + H_2O(l)$

A 1 and 2 **B** 1 and 3 **C** 2 and 4 **D** 3 and 4

0620_s/11/qp11

3 A student carries out an experiment to find how fast 3 cm pieces of magnesium ribbon dissolve in 10 cm^3 samples of sulfuric acid at different temperatures.

Which piece of apparatus does the student **not** need?

A balance

B measuring cylinder

C stop-clock

D thermometer

0620_s/10/qp11

---

2 A student takes 2 g samples of calcium carbonate and adds them to 20 cm^3 samples of dilute hydrochloric acid at different temperatures. She measures how long it takes for the effervescence to stop.

Which apparatus does she use?

	balance	clock	filter funnel	measuring cylinder	thermometer
A	✓	✓	✓	✓	✗
B	✓	✓	✗	✓	✓
C	✓	✗	✓	✓	✓
D	✗	✓	✓	✗	✓

0620_s/09/qp11

---

2 A student is asked to measure the time taken for 4.00 g of magnesium carbonate to react completely with 25.0 cm^3 (an excess) of dilute hydrochloric acid.

Which pieces of apparatus does the student need?

A balance, clock, pipette

B balance, clock, thermometer

C balance, pipette, thermometer

D clock, pipette, thermometer

0620_s/08/qp1

26 The table shows the densities of some Group I metals.

Which of these metals sinks in benzene (density = 0.88 g / cm^3) but floats in nitrobenzene (density = 1.2 g / cm^3)?

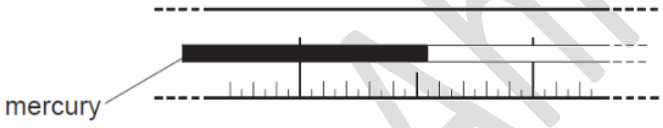
	metal	density, in g / cm^3
A	lithium	0.53
B	sodium	0.97
C	potassium	0.86
D	rubidium	1.53

0620_s/07/qp1

---

3 The boiling point of liquid X is lower than that of water. To test a student, a teacher covers up the numbers on a thermometer. The student places the thermometer in boiling liquid X.

The diagram represents part of the stem of this thermometer.



What could the temperature on the thermometer be?

A 75.5 °C **B** 84.5 °C **C** 104.5 °C **D** 105.5 °C

0620_s/07/qp1

---

2 A student investigates if, at 30 °C, the concentration of acid affects how rapidly it reacts with a known mass of magnesium.

The student has a beaker, concentrated acid, water and the apparatus below.

P a balance
Q a clock
R a measuring cylinder
S a thermometer

Which of these pieces of apparatus does the student use?

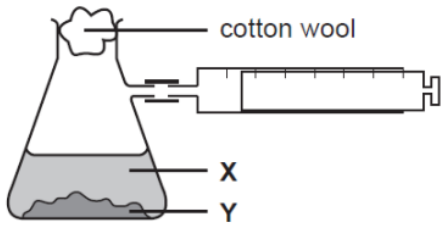
A P, Q and R only
B P, Q and S only
C Q, R and S only
D P, Q, R and S

0620_s/07/qp1

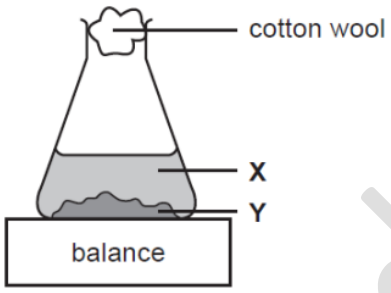
16 A liquid **X** reacts with solid **Y** to form a gas.

Which **two** diagrams show suitable methods for investigating the speed of the reaction?

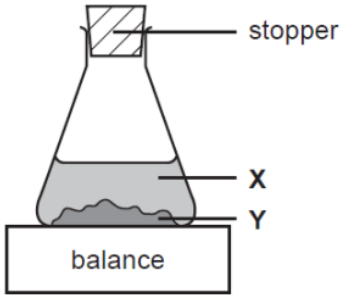
1



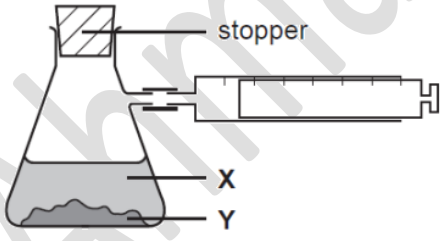
2



3



4



A 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

0620_s/05/qp1

---

2 A student mixes 25 cm^3 samples of dilute hydrochloric acid with different volumes of aqueous sodium hydroxide. Each time, the student measures the change in temperature to test if the reaction is exothermic.

Which piece of apparatus is **not** needed?

A

burette

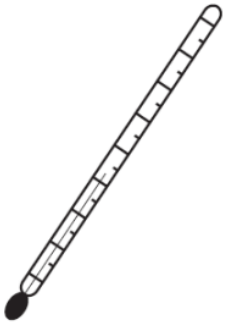
B

clock

C

pipette

D



thermometer

0620_s/05/qp1

3 In an experiment, a student needs to measure out 36.50 cm^3 of a solution.

Which piece of apparatus would measure this volume most accurately?

A beaker

B burette

C measuring cylinder

D pipette

0620_s/05/qp1

Kinetic Particle Theory

1 A few drops of perfume were spilt on the floor. A few minutes later the perfume could be smelt a few metres away.

Which two processes had taken place?

A distillation and condensation

B distillation and diffusion

C evaporation and condensation

D evaporation and diffusion

0620_w/14/qp13

---

1 Which statement is an example of diffusion?

A A kitchen towel soaks up some spilt milk.

B Ice cream melts in a warm room.

C Pollen from flowers is blown by the wind.

D The smell of cooking spreads through a house.

0620_w/14/qp11

---

1 A gas jar of bromine vapour and a gas jar of air are set up as shown in diagram 1.

The glass slide is removed. Diagram 2 shows the appearance of the gas jars after one hour.

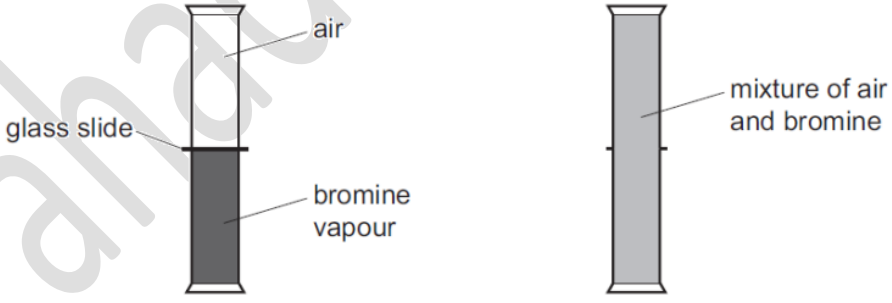


diagram 1 diagram 2

Which statement explains why the bromine and air mix together?

A Bromine is denser than air.

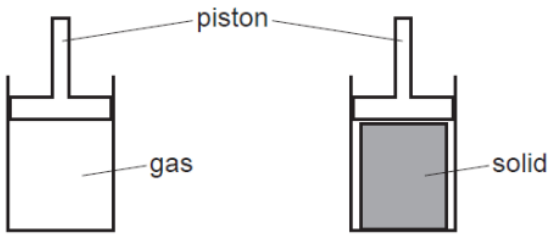
B Bromine is lighter than air.

C Bromine molecules moved upwards and molecules in air moved downwards.

D Molecules in bromine and air moved randomly.

0620_w/13/qp13

1 An attempt was made to compress a gas and a solid using the apparatus shown.



Which substance would be compressed and what is the reason for this?

	substance	reason
A	gas	the gas particles are close together
B	gas	the gas particles are far apart
C	solid	the solid particles are close together
D	solid	the solid particles are far apart

0620_w/13/qp11

---

1 'Particles moving **very slowly** from an area of high concentration to an area of low concentration.'

Which process is being described above?

A a liquid being frozen

B a solid melting

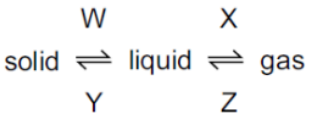
C a substance diffusing through a liquid

D a substance diffusing through the air

0620_w/12/qp13

---

1 What are the processes W, X, Y and Z in the following diagram?



	W	X	Y	Z
A	condensing	boiling	freezing	melting
B	condensing	freezing	melting	boiling
C	melting	boiling	freezing	condensing
D	melting	freezing	condensing	boiling

0620_w/12/qp11

---

1 In which substance are the particles close together and slowly moving past each other?

A air

B ice

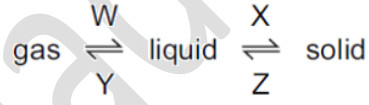
C steam

D water

0620_w/11/qp11

---

1 In which changes do the particles move further apart?

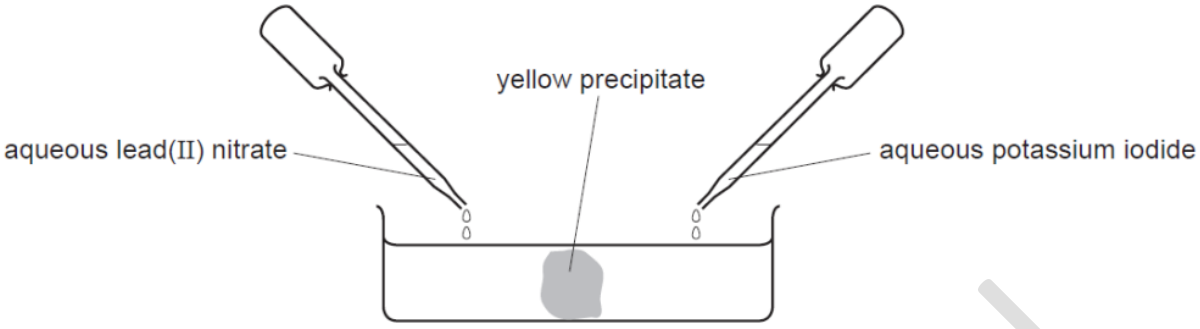


A W and X **B** W and Z **C** X and Y **D** Y and Z

0620_w/10/qp11

---

1 Aqueous lead(II) nitrate and aqueous potassium iodide are added to a dish containing water, as shown.



A yellow precipitate forms after a few minutes.

Which process occurs before the precipitate forms?

A diffusion

B distillation

C fermentation

D filtration

0620_w/09/qp11

---

1 In which substance are the particles furthest apart at room temperature?

A ethanol

B methane

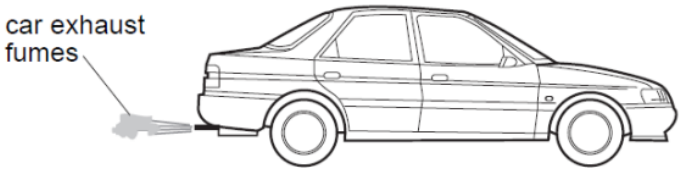
C salt

D sugar

0620_w/08/qp1

---

1 Oxides of nitrogen from car exhausts can spread through the atmosphere.



This occurs because gas molecules move from a region of ……1…… concentration to a region of ……2…… concentration by a process called ……3…… .

Which words correctly complete the gaps?

	1	2	3
A	high	low	diffusion
B	high	low	evaporation
C	low	high	diffusion
D	low	high	evaporation

0620_w/07/qp1

---

1 In which change of state do the particles become more widely separated?

A gas to liquid

B gas to solid

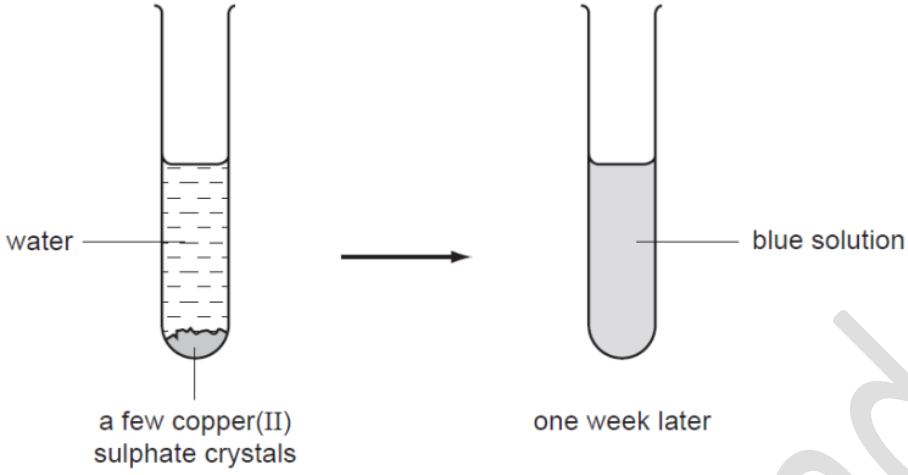
C liquid to gas

D liquid to solid

0620_w/06/qp1

---

1 Blue copper(II) sulphate crystals are soluble in water.



What has happened after one week?

A crystallisation

B diffusion

C distillation

D filtration

0620_w/05/qp1

---

2 The melting points and boiling points of four substances are shown.

Which substance is liquid at 100 °C?

substance	melting point / °C	boiling point / °C
A	–203	–17
B	–25	50
C	11	181
D	463	972

0620_w/04/qp1

---

1 When steam at 100 °C condenses to water at 25 °C, what happens to the water molecules?

A They move faster and closer together.

B They move faster and further apart.

C They move slower and closer together.

D They move slower and further apart.

0620_w/04/qp1

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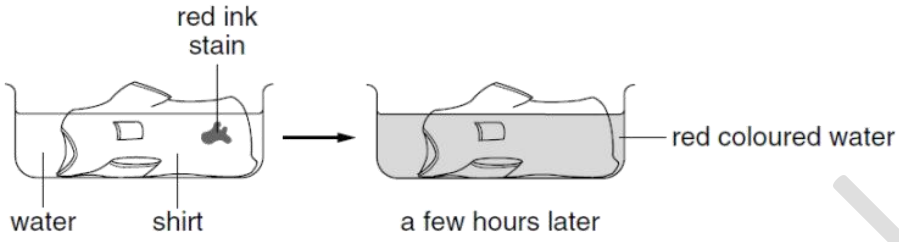
1 A shirt is stained with red ink from a pen.

The shirt is left to soak in a bowl of water.



Which process causes the red colour to spread?

A diffusion

B evaporation

C melting

D neutralisation

0620_w/03/qp1

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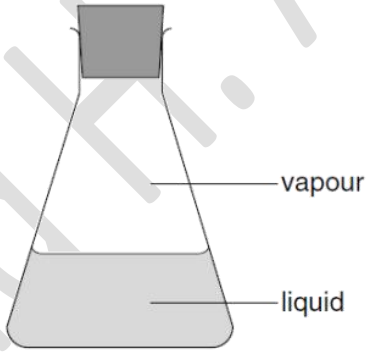
2 A sealed conical flask contains a liquid and its vapour, as shown.



What happens when a molecule in the vapour enters the liquid?

	the molecule stops moving	the molecule becomes smaller
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

0620_w/03/qp1

1 Heating a liquid causes it to become a vapour.

What happens to the molecules of the liquid during this process?

	the molecules become bigger	the molecules move further apart
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

0620_w/02/qp1

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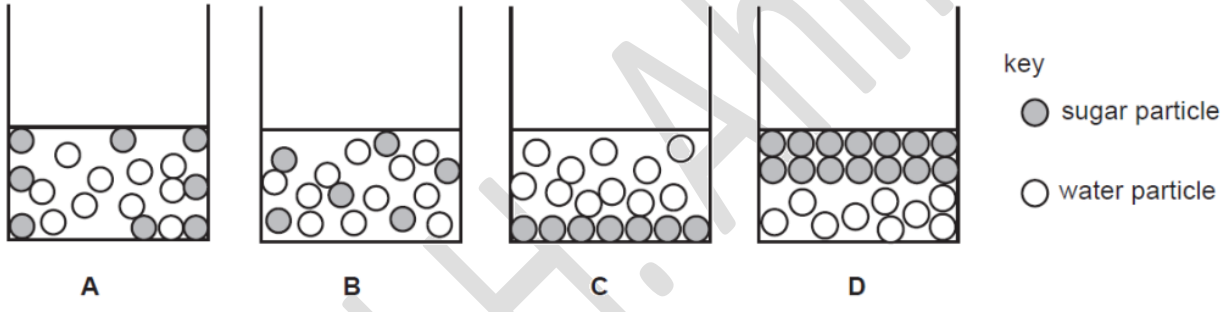
2 Some sugar is dissolved in water.

Which diagram shows how the particles are arranged in the solution?



0620_w/02/qp1

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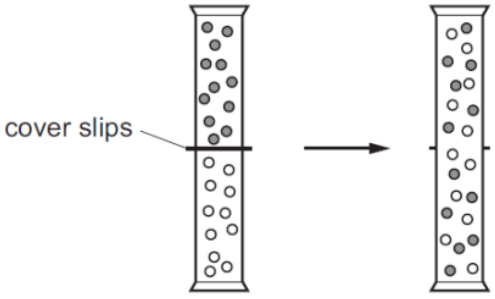
1 Two gas jars each contain a different gas. The gas jars are connected and the cover slips are removed.

The diagram shows what happens to the particles of the gases.



Which process has occurred?

A chemical reaction

B condensation

C diffusion

D evaporation

0620_s/14/qp12

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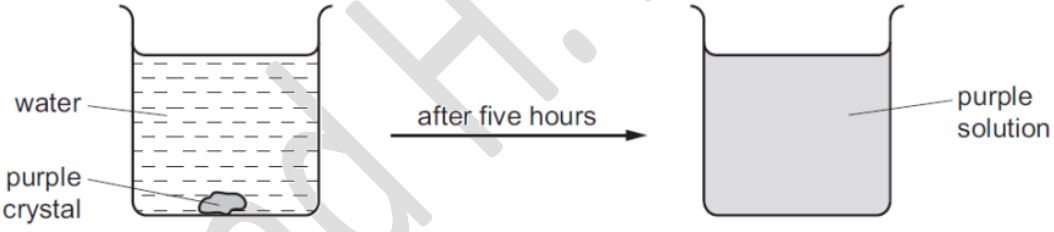
1 The diagram shows the result of dropping a purple crystal into water.



Which processes take place in this experiment?

	chemical reaction	diffusing	dissolving
A	✓	✓	✓
B	✓	✗	✓
C	✗	✗	✓
D	✗	✓	✓

0620_s/14/qp11

1 The diagram shows a cup of tea.

Which row describes the water particles in the air above the cup compared with the water particles in the cup?

	moving faster	closer together
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

0620_s/13/qp12

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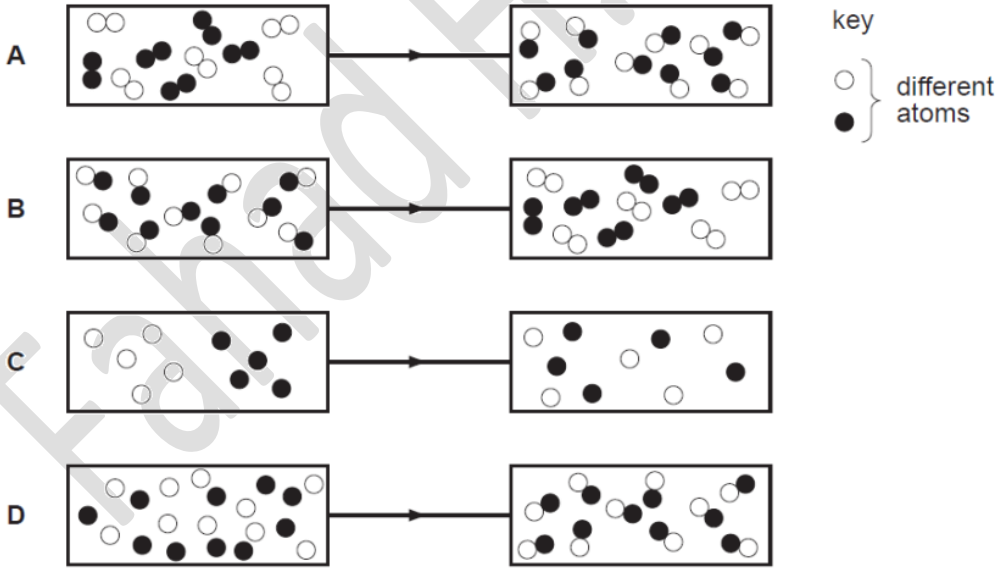
1 Which diagram shows the process of diffusion?



0620_s/12/qp11

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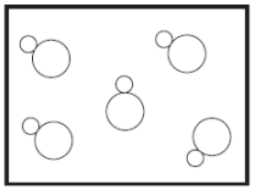
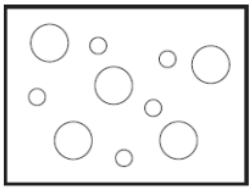
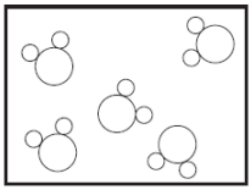
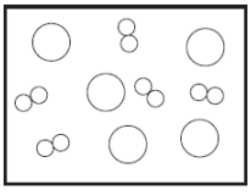
6 In the diagrams, circles of different sizes represent atoms of different elements.

Which diagram represents hydrogen chloride gas?

A 

B 

C 

D 

0620_s/11/qp11

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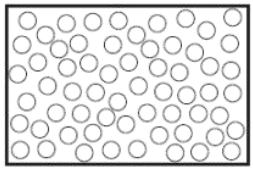
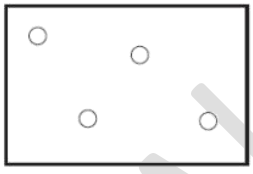
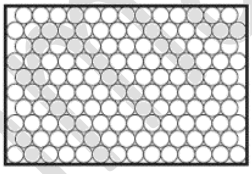
1 The diagrams show the arrangement of particles in three different physical states of substance X.



state 1



state 2



state 3

Which statement about the physical states of substance X is correct?

A Particles in state 1 vibrate about fixed positions.

B State 1 changes to state 2 by diffusion.

C State 2 changes directly to state 3 by condensation.

D The substance in stage 3 has a fixed volume.

0620_s/11/qp11

---

1 The diagram shows a cup of tea.

Which row describes the water particles in the air above the cup compared with the water particles in the cup?

	moving faster	closer together
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

0620_s/10/qp11

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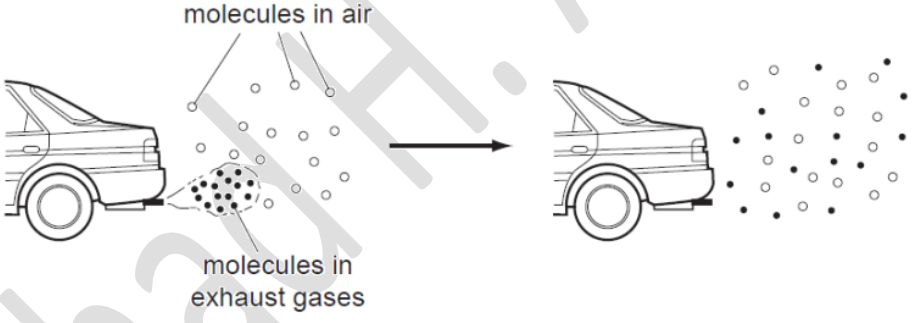
1 The diagram shows how the molecules in the exhaust gases diffuse into the air.



Which statement describes what happens to these molecules next?

A The molecules fall to the ground because they are heavier than air molecules.

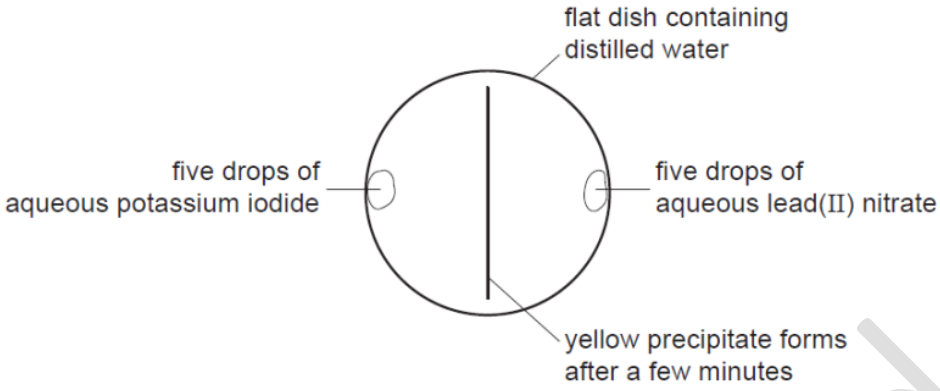
B The molecules go back together as they cool.

C The molecules spread further into the air.

D The molecules stay where they are.

0620_s/09/qp11

1 A yellow precipitate is formed in the experiment shown.



How is the precipitate formed?

A Particles collide, diffuse and then react.

B Particles collide, react and then diffuse.

C Particles diffuse, collide and then react.

D Particles diffuse, react and then collide

0620_s/08/qp1

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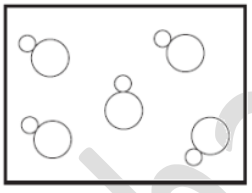
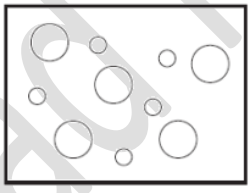
9 In the diagrams, circles of different sizes represent atoms of different elements.

Which diagram can represent hydrogen chloride gas?

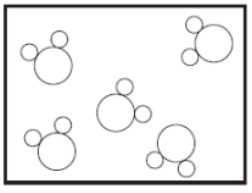
A



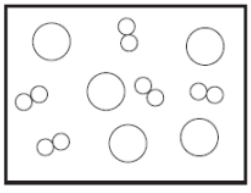
B



C



D



0620_s/07/qp1

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1 When there is no wind, the scent of flowers can be detected more easily on a warm evening than on a cold evening.

This is because the molecules of the scent ……1…… ……2…… than in colder conditions.

Which words correctly complete gaps 1 and 2?

	gap 1	gap 2
A	condense	nearer to the flowers
B	condense	further from the flowers
C	diffuse	nearer to the flowers
D	diffuse	further from the flowers

0620_s/07/qp1

1 At room temperature, in which substance are the particles furthest apart?

A H_2 **B** H_2O **C** Mg **D** MgO

0620_s/06/qp1

---

1 In which of the following are the particles arranged in a regular pattern?

A a gas

B a liquid

C a metal

D a solution

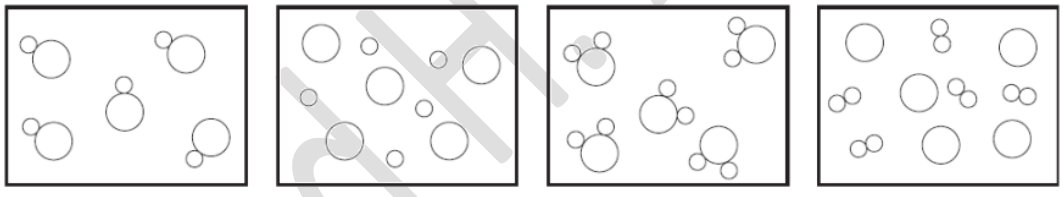
0620_s/05/qp1

---

7 In the diagrams, circles of different sizes represent atoms of different elements.

Which diagram can represent hydrogen chloride gas?

A **B** **C** **D**



0620_s/04/qp1

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1 Some students are asked to describe differences between gases and liquids.

Three of their suggestions are:

1	gas molecules are further apart;
2	gas molecules are smaller;
3	liquid molecules vibrate around fixed positions.

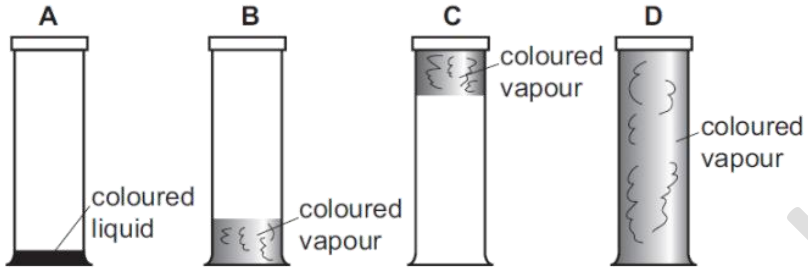
Which suggestions are correct?

A 1 only **B** 2 only **C** 3 only **D** 1, 2 and 3

0620_s/04/qp1

2 A coloured liquid vaporises easily at room temperature. Some of the liquid is placed at the bottom of a sealed gas jar.

Which diagram shows the appearance of the jar after several hours?



0620_s/04/qp1

3 Measurements are made on some pure water.

its boiling point, b.p.

its freezing point, f.p.

its pH

Sodium chloride is now dissolved in the water and the measurements repeated.

Which measured values change?

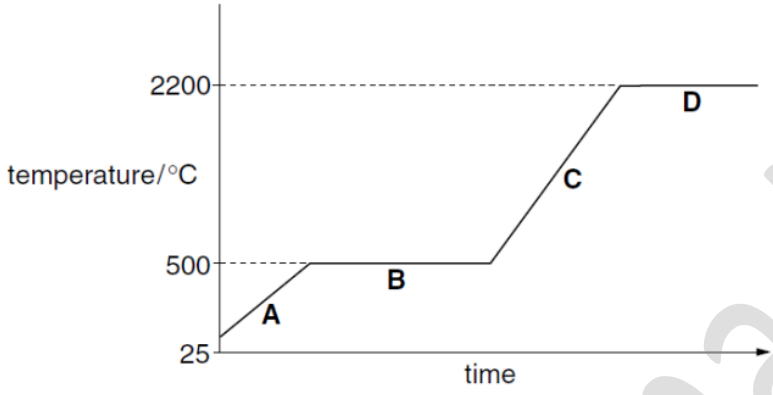
	b.p.	f.p.	pH
A	✓	✓	✓
B	✓	✓	✗
C	✗	✗	✓
D	✗	✗	✗

0620_s/04/qp1

2 A solid metal is heated until it turns to vapour.

The graph shows the temperature of the metal during this process.

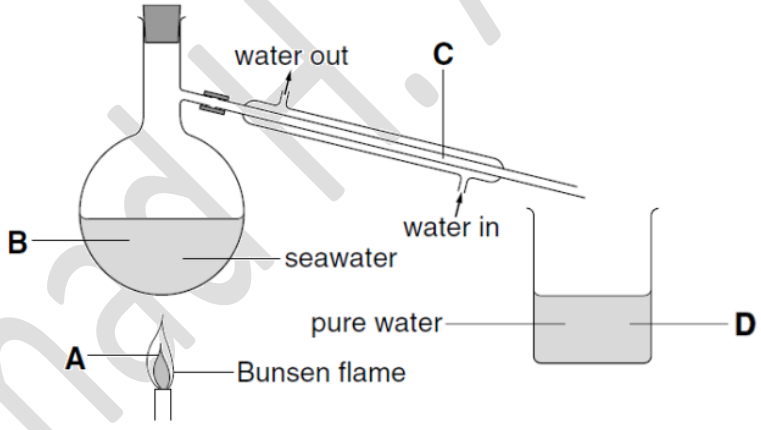
Which part of the graph shows the melting of the metal?



0620_s/03/qp1

1 The diagram shows how to obtain pure water from seawater.

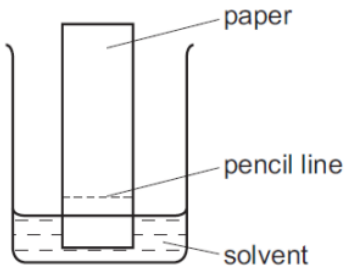
Where do water molecules lose energy?



0620_s/03/qp1

Separation Techniques

3 A student is investigating a coloured mixture using chromatography.



Where should he place the coloured mixture?

A in the solvent

B just above the pencil line

C just below the pencil line

D on the pencil line

0620_w/14/qp13

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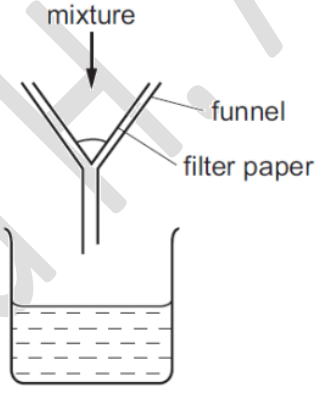
2 A mixture is separated using the apparatus shown.



What is the mixture?

A aqueous copper chloride and copper

B aqueous copper chloride and sodium chloride

C ethane and methane

D ethanol and water

0620_w/14/qp11

3 Ethanol is made by fermentation.

How is ethanol obtained from the fermentation mixture?

A chromatography

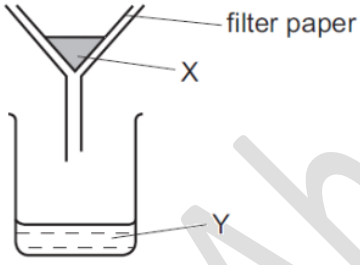
B crystallisation

C electrolysis

D fractional distillation

0620_w/14/qp11

2 The diagram shows a method for separating a substance that contains X and Y.



Which types of substance can be separated as shown?

A compounds

B elements

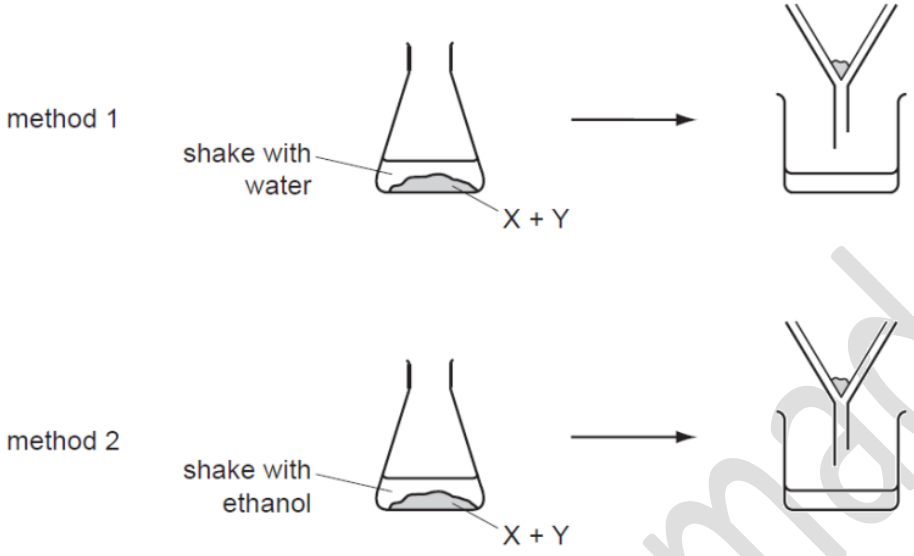
C mixtures

D molecules

0620_w/13/qp13

8 A solid mixture contains an ionic salt, X, and a covalent organic compound, Y.

Two students suggest methods of separating the mixture as shown.



Which methods of separation are likely to work?

	1	2
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

0620_w/13/qp11

3 Diagram 1 shows the paper chromatogram of substance X.

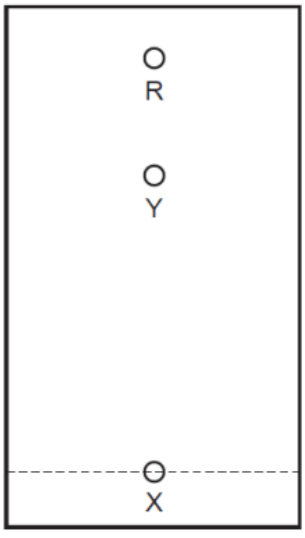


diagram 1

Diagram 2 shows the cooling curve for substance Y.

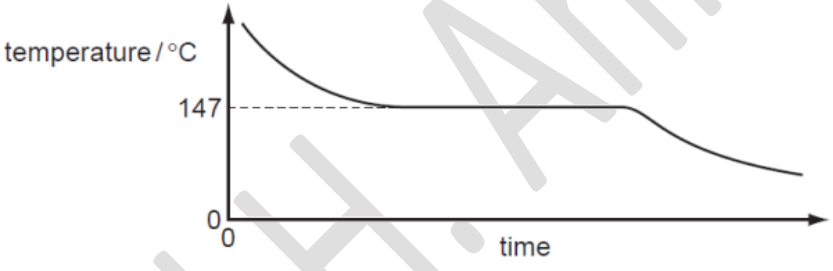


diagram 2

Which statement about X and Y is correct?

A X is a mixture and Y is a pure substance.

B X is a pure substance and Y is a mixture.

C X and Y are mixtures.

D X and Y are pure substances.

2 Solid W melts at exactly 54 °C and boils at exactly 302 °C.

Solid X, when dissolved in water and examined using paper chromatography, shows a blue colour and a red colour.

Which row is correct?

	contains only one substance	contains more than one substance
A	W and X	–
B	W	X
C	X	W
D	–	W and X

0620_w/12/qp13

---

2 A mixture of sulfur and iron filings needs to be separated. The solubilities of sulfur and iron filings in water and carbon disulfide are shown in the table below.

	solubility in water	solubility in carbon disulfide
sulfur	✗	✓
iron filings	✗	✗

What are possible methods of separating the sulfur and iron filings?

	using water	using carbon disulfide	using a magnet
A	✓	✓	✗
B	✗	✓	✓
C	✓	✗	✓
D	✗	✓	✗

0620_w/12/qp11

---

3 Mixture 1 contains sand and water.

Mixture 2 contains salt and water.

Which method of separation could be used to obtain each of the required products from each mixture?

	mixture 1		mixture 2	
	to obtain sand	to obtain water	to obtain salt	to obtain water
A	crystallisation	distillation	filtration	filtration
B	crystallisation	filtration	filtration	distillation
C	filtration	distillation	crystallisation	filtration
D	filtration	filtration	crystallisation	distillation

0620_w/11/qp11

---

22 A salt is made by adding an excess of an insoluble metal oxide to an acid.

How can the excess metal oxide be removed?

A chromatography

B crystallisation

C distillation

D filtration

0620_w/10/qp11

---

3 A mixture of ethanol and methanol are separated by fractional distillation.

This method of separation depends on a difference in property X of these two alcohols.

What is property X?

A boiling point

B colour

C melting point

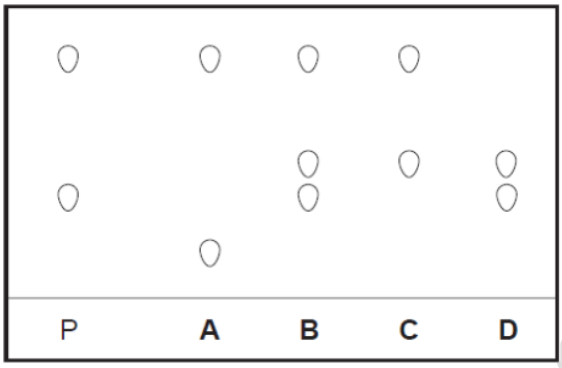
D solubility

0620_w/10/qp11

2 Chromatography is used to find out if a banned dye, P, is present in foodstuffs.

The results are shown in the diagram.

Which foodstuff contains P?



0620_w/10/qp11

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3 A student separates salt from a mixture of salt and sand.

What is the correct order of steps for the student to take?

A filter → evaporate → shake with water

B filter → shake with water → evaporate

C shake with water → evaporate → filter

D shake with water → filter → evaporate

0620_w/09/qp11

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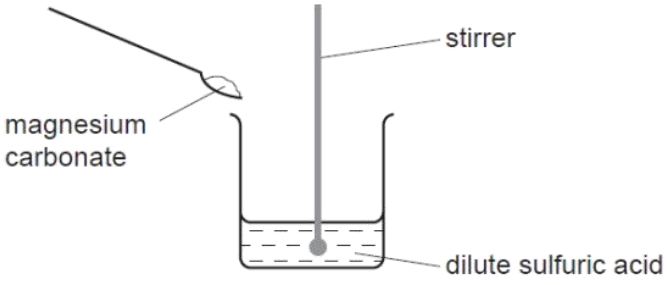
2 A student carries out an experiment to prepare pure magnesium sulfate crystals.

The diagram shows the first stage of the preparation.



He adds magnesium carbonate until no more reacts.

Which process should he use for the next stage?

A crystallisation

B evaporation

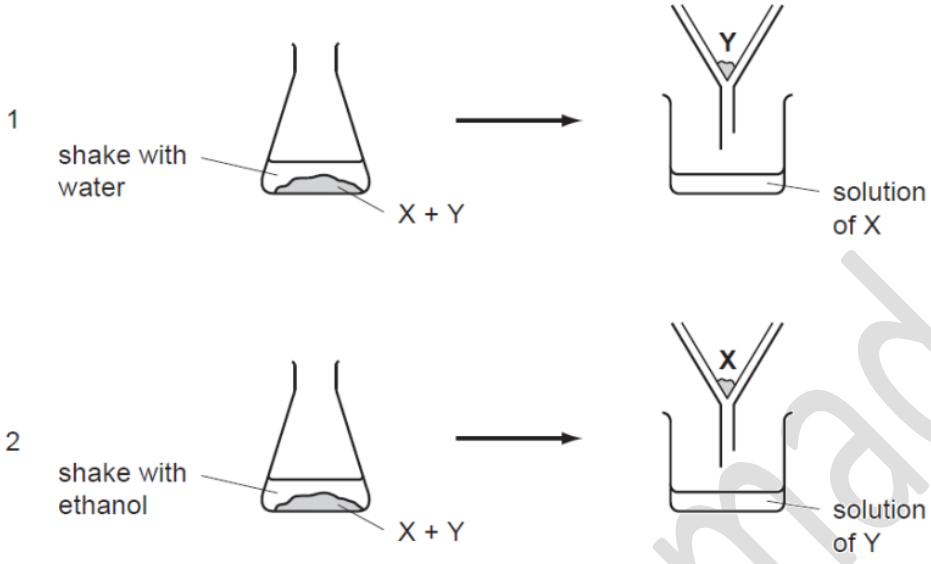
C filtration

D neutralisation

0620_w/09/qp11

4 A solid mixture contains an ionic salt, X, and a covalent organic compound, Y.

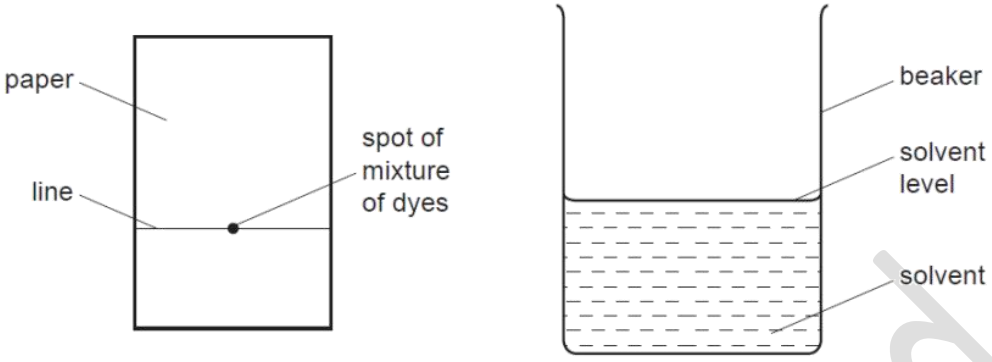
Two students suggested methods of separating the mixture as shown.



Which methods of separation are likely to work?

	1	2
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

2 An experiment is carried out to separate a mixture of two dyes. A line is drawn on a piece of chromatography paper and a spot of the dye mixture placed on it. The paper is dipped into a solvent and left for several minutes.



Which statement about this experiment is correct?

A The dyes must differ in their boiling points.

B The dyes must differ in their solubilities in the solvent.

C The line must be drawn in ink.

D The line must be placed below the level of the solvent.

0620_w/08/qp1

---

4 A sample of a drug is analysed by using a chemical test for aspirin and measuring its melting point.

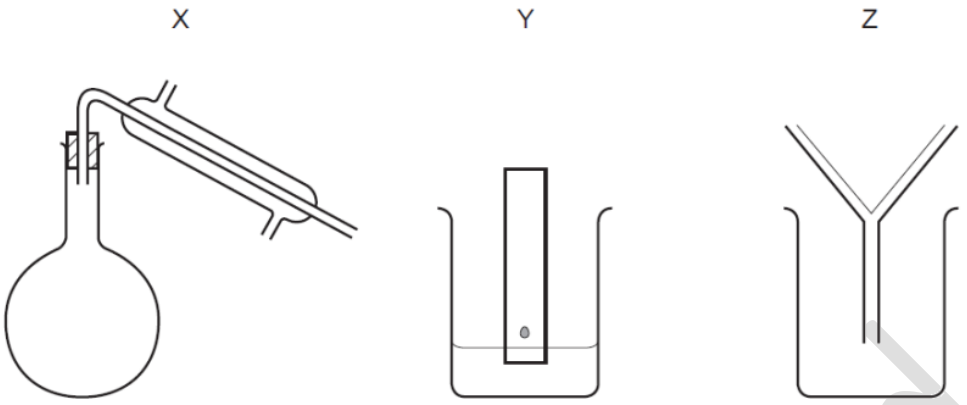
The chemical test is positive but the melting point is 130 °C not 135 °C as it should be.

What is correct?

	the sample contains aspirin	the sample has an impurity
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

0620_w/07/qp1

3 The outline diagrams show three methods of separation.

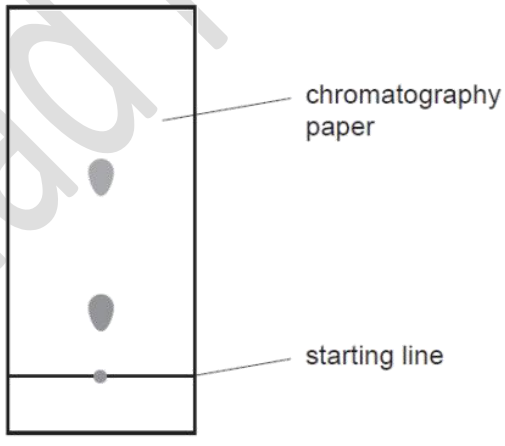


What are the three methods called?

	X	Y	Z
A	chromatography	distillation	filtration
B	distillation	chromatography	filtration
C	distillation	filtration	chromatography
D	filtration	chromatography	distillation

0620_w/07/qp1

3 A coin is dissolved in an acid. Chromatography is used to test the solution formed. The diagram shows the chromatogram obtained.



What is the coin made from?

A a metal element

B a non-metal element

C a mixture of metals

D a mixture of non-metals

0620_w/05/qp1

3 Which mixture can be separated by adding water, stirring and filtering?

A barium chloride and sodium chloride

B calcium carbonate and sodium chloride

C copper and magnesium

D ethane and ethene

0620_w/03/qp1

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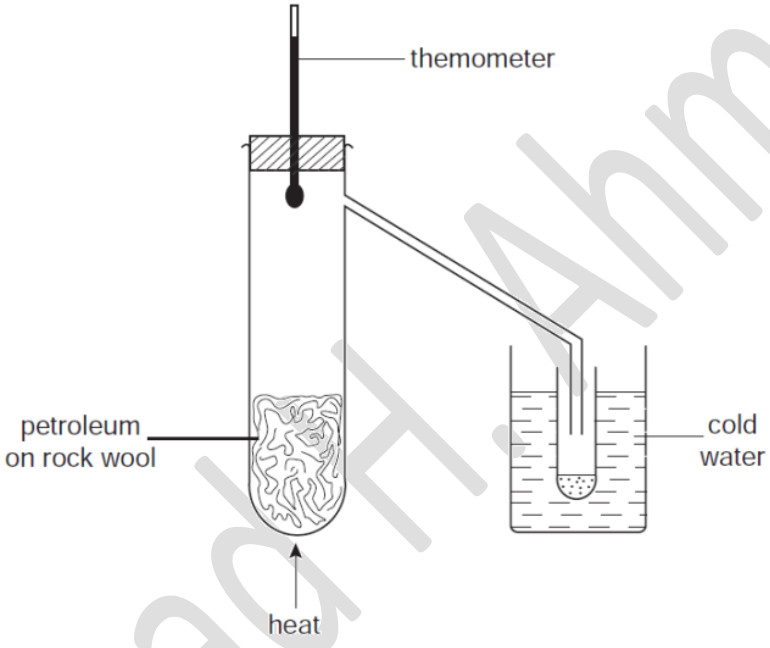
37 A student sets up the apparatus shown to separate petroleum into its different liquid parts.



Why does this method of separation work?

The liquids in petroleum have different

A boiling points,

B densities,

C functional groups,

D melting points.

0620_w/02/qp1

3 Which stages occur in distillation?

A condensation then evaporation

B condensation then filtration

C evaporation then condensation

D filtration then evaporation

0620_w/02/qp1

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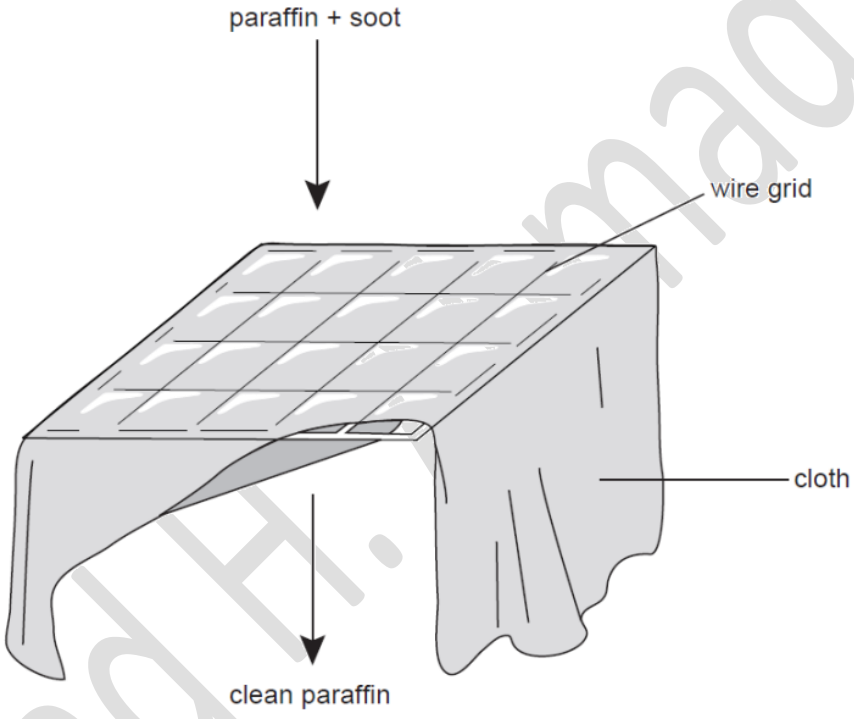
4 Some paraffin is contaminated with soot (carbon). The soot is removed as shown.



Which method is used to remove the soot?

A cracking

B crystallisation

C diffusion

D filtration

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3 Which two methods can be used to separate a salt from its solution in water?

1 crystallisation

2 decanting

3 distillation

4 filtration

A 1 and 2 **B** 1 and 3 **C** 2 and 3 **D** 3 and 4

0620_s/14/qp12

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3 Alcohol and water are completely miscible. This means when mixed together they form only one liquid layer.

Which method is used to separate alcohol from water?

A crystallisation

B filtration

C fractional distillation

D precipitation

0620_s/14/qp11

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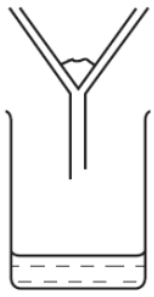
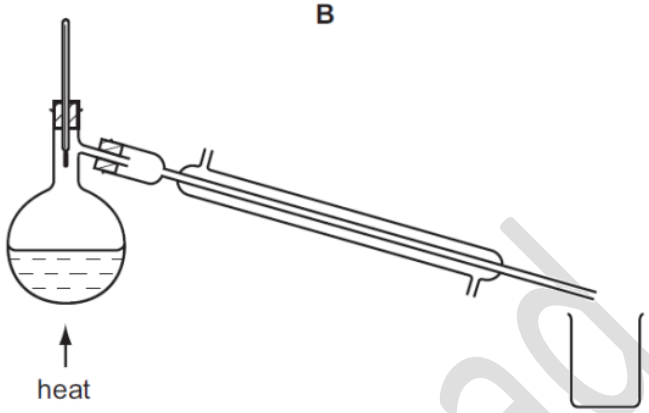
3 Methanol, CH_3OH, and ethanol, C_2H_5OH, are miscible liquids.

Which diagram shows apparatus that is used to obtain methanol from a mixture of ethanol and methanol?

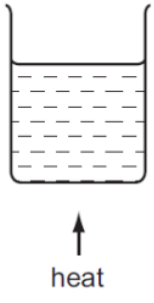
A



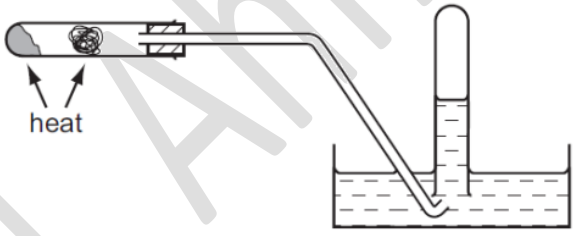
B



C



D



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2 Which method is most suitable to obtain zinc carbonate from a suspension of zinc carbonate in water?

A crystallisation

B distillation

C evaporation

D filtration

0620_s/12/qp11

2 An aqueous solution is coloured.

Which method of separation would show that the solution contains ions of different colours?

A chromatography

B crystallisation

C distillation

D filtration

0620_s/11/qp11

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3 The table gives the solubility of four substances in ethanol and in water.

A mixture containing all four substances is added to ethanol, stirred and filtered.

The solid residue is added to water, stirred and filtered.

The filtrate is evaporated to dryness, leaving a white solid.

Which is the white solid?

	solubility in	
	ethanol	water
A	insoluble	insoluble
B	insoluble	soluble
C	soluble	insoluble
D	soluble	soluble

0620_s/11/qp11

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2 A fruit drink coloured orange contains a dissolved mixture of red and yellow colouring agents. One of these colouring agents is suspected of being illegal.

Which method could be used to show the presence of this illegal colouring agent?

A chromatography

B distillation

C evaporation

D filtration

0620_s/10/qp11

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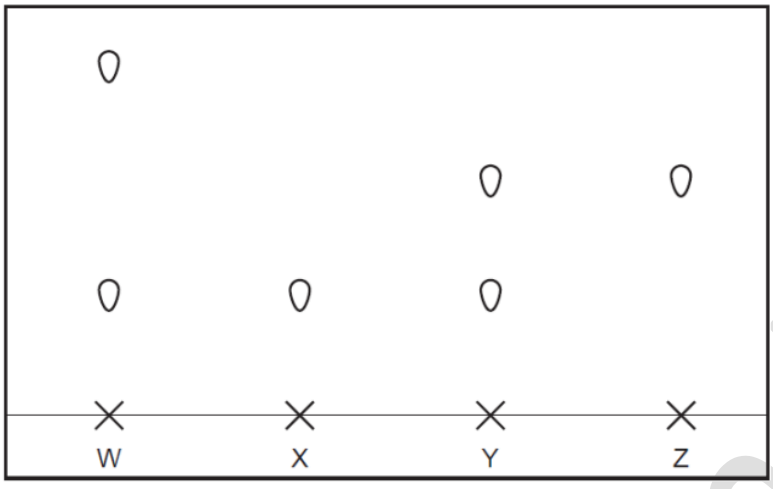
3 The diagram shows the paper chromatograms of four substances, W, X, Y and Z.



Which two substances are pure?

A W and X **B** W and Y **C** X and Y **D** X and Z

0620_s/09/qp11

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3 Chromatography and fractional distillation can be used to separate compounds.

In which type of separation is a thermometer needed for checking that complete separation has occurred?

A chromatographic separation of two colourless solids

B chromatographic separation of two solids of different colours

C fractional distillation of two colourless liquids

D fractional distillation of two liquids of different colours

0620_s/08/qp1

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4 Which mixture can be separated by adding water, stirring and filtering?

A barium chloride and sodium chloride

B copper and magnesium

C diamond and graphite

D silver chloride and sodium nitrate

0620_s/07/qp1

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2 Which method can be used to obtain crystals from aqueous copper(II) sulphate?

A chromatography

B electrolysis

C evaporation

D neutralisation

0620_s/06/qp1

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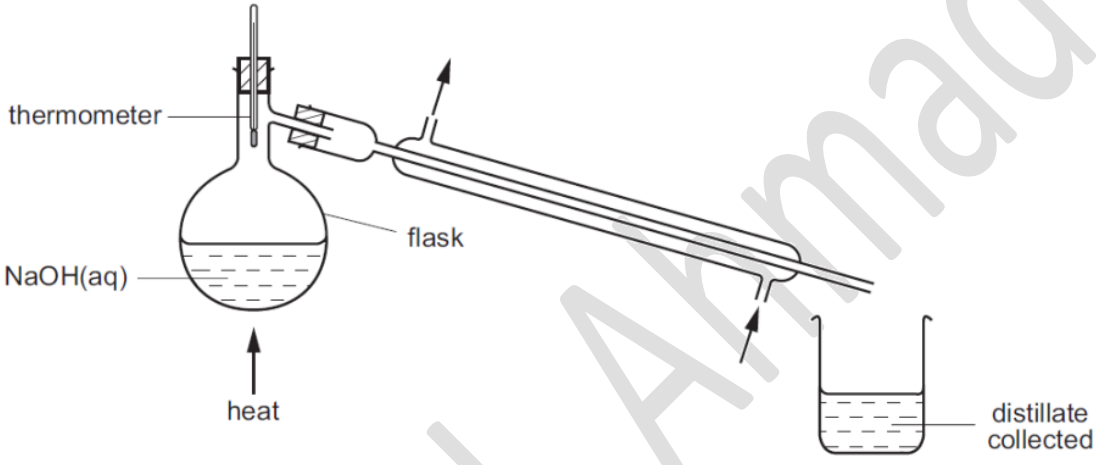
30 The pH of some aqueous sodium hydroxide is measured. The solution is then distilled as shown.



How do the pH values of the distillate and of the solution left in the flask compare with the original?

	pH of the distillate	pH of the solution left in the flask
A	higher	higher
B	higher	lower
C	lower	higher
D	lower	lower

0620_s/04/qp1

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4 The diagram shows a chromatogram obtained from three sweets, X, Y and Z.

● yellow ● red	● red ● yellow	● red ● yellow ● red
sweet X	sweet Y	sweet Z

How many different red dyes are present in the sweets?

A 1 **B** 2 **C** 3 **D** 4

0620_s/04/qp1

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3 Some chemical compounds are purified by recrystallisation.

What can be used to test the purity of the crystals?

A melting point

B colour of crystals

C size of crystals

D solubility

0620_s/03/qp1

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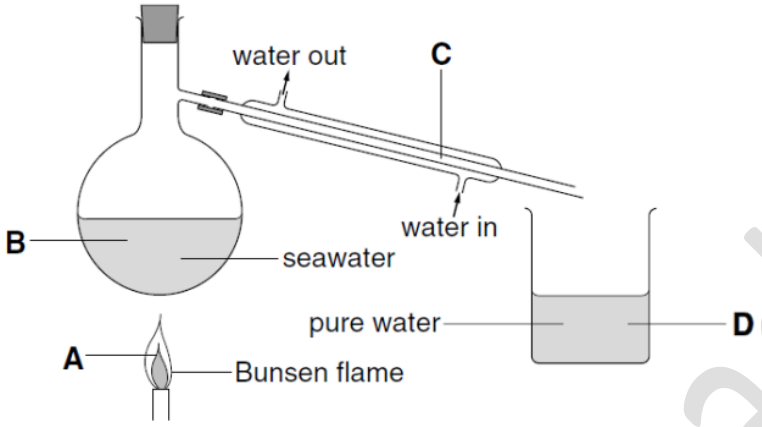
4 What could be the melting point and boiling point of water containing a dissolved impurity?

	melting point / °C	boiling point / °C
A	+3	96
B	+3	104
C	–3	96
D	–3	104

0620_s/03/qp1

1 The diagram shows how to obtain pure water from seawater.

Where do water molecules lose energy?



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