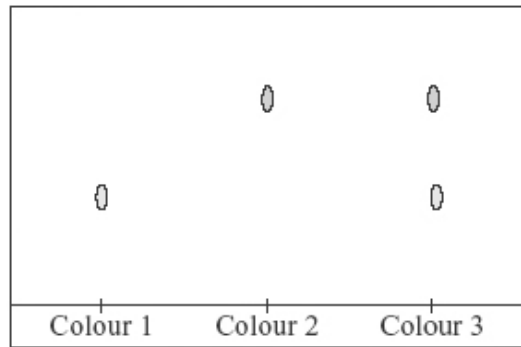


Q1. Chromatography was used to compare three of the colours used to coat the chocolate sweets.



What do these results tell you about these three colours?

.....

.....

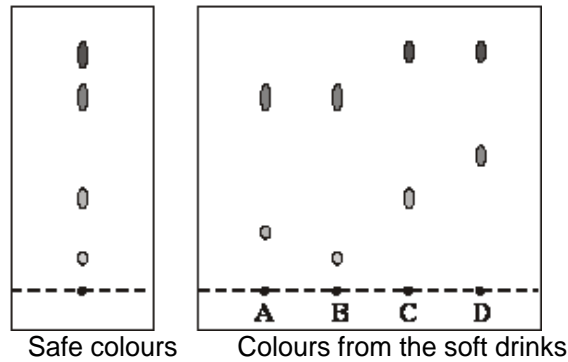
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.....

.....

(Total 3 marks)

Q2. Chromatography was carried out on a sample of soft drinks to check that they contained only colours that were safe. This is the result.



What conclusions about the safety of the colours in the soft drinks **A**, **B**, **C** and **D** can be made from the results shown by chromatography?

.....

.....

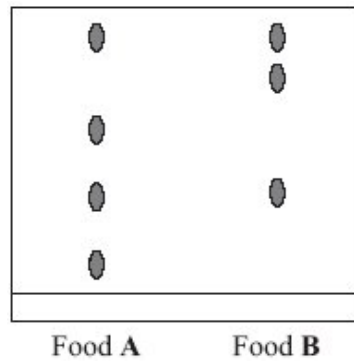
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.....

(Total 2 marks)

Q3. The result of a process used to detect and identify the colours in two foods, **A** and **B**, is shown.



(i) Describe the differences between the colours used in food **A** and food **B**.

.....

.....

.....

.....

(2)

- (ii) Tick (✓) the name of the process used to detect and identify colours in food.

Process	(✓)
chromatography	
extraction	
hardening	

(1)
(Total 3 marks)

Q4. Ethene can be identified using instrumental methods.

- (i) Name **one** instrumental method used to identify elements or compounds.

.....
.....

(1)


- (ii) Give **one** advantage of using instrumental methods compared with chemical tests.

.....
.....

(1)
(Total 2 marks)

Q5. Read the article about strawberry milkshakes.

'Strawberry milkshakes without strawberries!'



To make strawberry milkshakes at home, all you need is ice-cream, strawberries and milk.

Fast-food strawberry milkshakes could contain 60 additives but no strawberries. The fast-food strawberry milkshakes:

- are cheap
- keep for a long time
- have an enhanced flavour. For example they may taste sweet.

(a) (i) Suggest **one** reason why the strawberry milkshakes made at home may also contain additives.

.....
.....

(1)

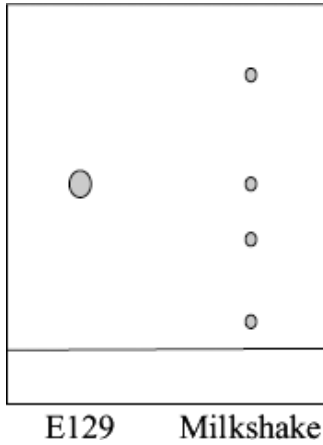
(ii) State **one** reason why some fast-food strawberry milkshakes do **not** contain strawberries.

.....
.....

(1)

- (b) The additive E129, allura red, is often added to enhance the colour of strawberry milkshakes.

A student used chromatography to test if a strawberry milkshake contained E129. The result is shown.



- (i) How many colours are in this milkshake?

.....

(1)

- (ii) The student concluded that the strawberry milkshake contained E129. What evidence did the student use to make this conclusion?

.....

.....

(1)

- (iii) Suggest why this conclusion may **not** be correct.

.....

.....

.....

(1)

(Total 5 marks)

Q6. This is part of an article about food additives.

THE PERIL OF FOOD ADDITIVES

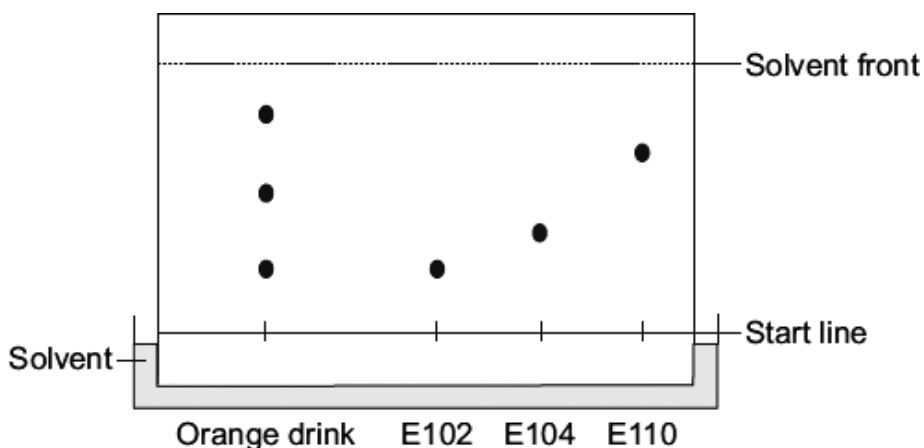
Some orange drinks contain the additives E102 (Tartrazine), E104 (Quinoline Yellow) and E110 (Sunset Yellow). These three additives are thought to cause hyperactivity in children.

(a) Tick (✓) **two** reasons why a manufacturer of orange drinks uses these additives.

Reason	Tick (✓)
to make the drink healthier	
to improve the appearance of the drink	
because they are permitted colours	
because they are expensive	

(2)

(b) A scientist tested an orange drink to find out if it contained these additives. The result of the test is shown.



(i) Draw a ring around the correct answer to complete the sentence.

The test that the scientist did is called

- chromatography.
- cracking.
- distillation.

(1)

(ii) How many coloured additives are there in the orange drink?

(1)

- (iii) The scientist concluded that the orange drink contained only **one** of the additives E102, E104 and E110.

Explain why.

.....

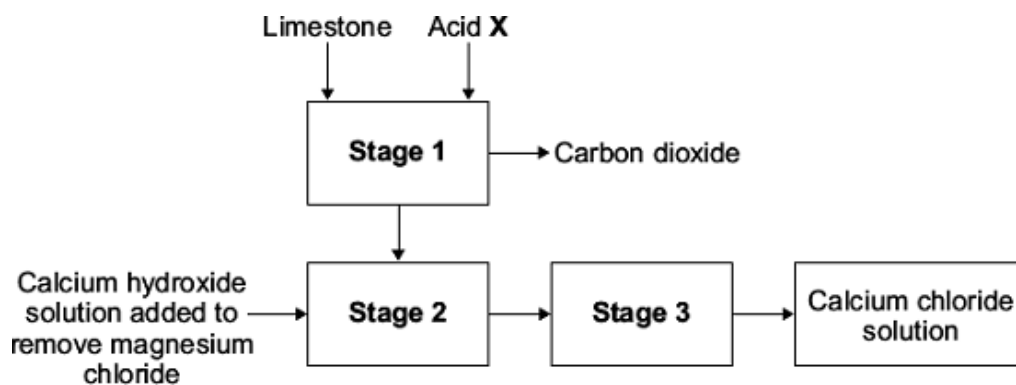
.....

.....

.....

(2)
(Total 6 marks)

- Q7.** (a) Calcium chloride is made from limestone. Limestone contains mainly calcium carbonate and a small amount of magnesium carbonate.



- (i) In **stage 1** calcium carbonate reacts with acid **X** to form calcium chloride.

Draw a ring around the name of acid **X**.

hydrochloric

nitric

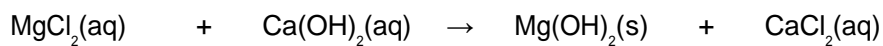
sulfuric

(1)

- (ii) **Stage 1** produces a concentrated solution of calcium chloride.
The solution also contains magnesium chloride.

Calcium hydroxide solution is added in **stage 2** to remove the magnesium chloride.

The equation for this reaction is:



Draw a ring around the correct answer to complete each sentence.

In **stage 2** a precipitate is made because magnesium hydroxide is

dissolved

insoluble

in water.

soluble

In **stage 3** the solid magnesium hydroxide can be separated from the calcium chloride

solution using

chromatography.

electrolysis.

filtration.

(2)

- (iii) What method can be used to change the calcium chloride solution into solid calcium chloride?

Draw a ring around your answer.

crystallisation

electrolysis

reduction

(1)

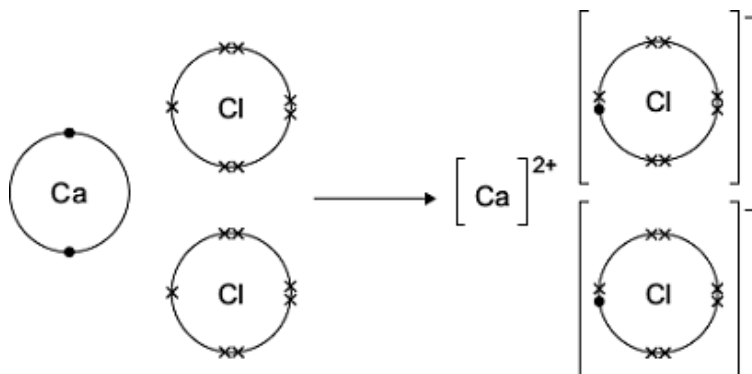
(b) Calcium chloride can also be made by reacting calcium with chlorine:



The diagram shows what happens to atoms of calcium and chlorine in this reaction.

The dots (•) and crosses (x) are used to represent electrons.

Only the outer electrons are shown.



Use the diagram to help you to answer this question.

Describe, as fully as you can, what happens when calcium reacts with chlorine to make calcium chloride.

.....

.....

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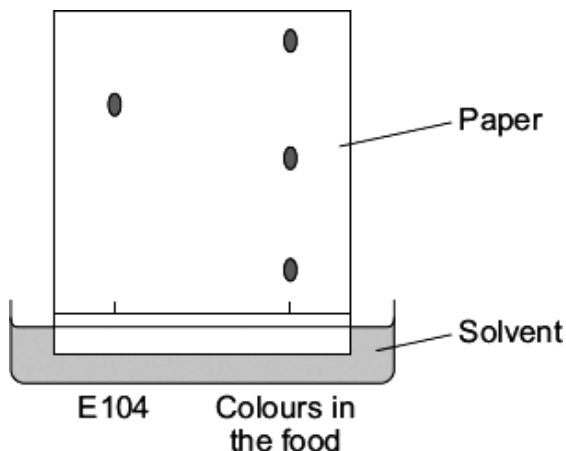
(4)
(Total 8 marks)

Q8. An article began:

Ban yellow additives

Quinoline yellow (E104) is suspected of causing hyperactivity, asthma and rashes in children.

- (a) A student tested a food to find out if it contained quinoline yellow (E104). The student's results are shown below.



- (i) Draw a ring around the correct answer to complete the sentence.

This method of detecting and identifying colours is called

chromatography.

distillation.

electrolysis.

(1)

- (ii) Using the student's results, how many different colours are in the food?

(1)

- (iii) Using the student's results, how can you tell that the food does **not** contain quinoline yellow (E104)?

.....
.....

(1)

(b) Quinoline yellow (E104) is used in foods such as sweets, drinks and ice cream.

(i) Give **one** reason why quinoline yellow (E104) is added to foods.

.....
.....

(1)

(ii) Suggest what should be done to decide if quinoline yellow (E104) should be banned.

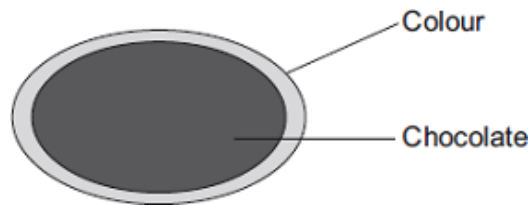
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(1)

(Total 5 marks)

Q9. Colours are used to coat some chocolate sweets.

Some of these colours are given E-numbers.



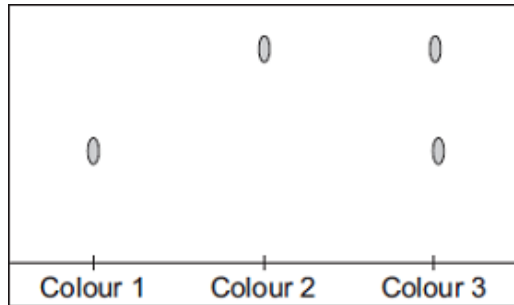
Use the correct word from the box to complete the sentence.

additive	element	fuel
-----------------	----------------	-------------

An E-number is used to identify a permitted food

(1)

- (b) Chromatography was used to compare three of the colours used to coat the chocolate sweets.



What do these results tell you about these three colours?

.....

.....

.....

.....

.....

.....

(3)
(Total 4 marks)

Q10. Thermosoftening polymers can be used to make plastic bottles and food packaging.

- (a) Why are thermosoftening polymers **not** suitable for storing very hot food?

.....

.....

(1)

- (b) The reaction to produce the polymers uses a catalyst.

Why are catalysts used in chemical reactions?

.....

.....

(1)

- (c) Compounds from food packaging must not get into food.

Gas chromatography can be used to separate compounds in food.

The output from the gas chromatography column can be linked to an instrument which can identify the compounds.

- (i) Name the instrument used to identify the compounds.

.....
.....

(1)

- (ii) Give **one** reason why instrumental methods of analysis are used to identify the compounds.

.....
.....

(1)

- (d) Poly(ethene) is a thermosoftening polymer.

Poly(ethene) can be made with different properties. The properties depend on the conditions used when poly(ethene) is made.

Suggest **two** conditions which could be changed when poly(ethene) is made.

.....
.....

(2)

(Total 6 marks)

Q11. This question is about the planet Mars.



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(a) Mars is a red colour in the sky at night.

The red colour of Mars is because of iron oxide.

Iron oxide is an ionic compound.

Draw a ring around the correct answer to complete each sentence.

Ionic compounds are made of

- | |
|-------------------|
| giant lattices. |
| polymer chains. |
| simple molecules. |

(1)

(b) Many spacecraft have been sent to Mars. Parts of these spacecraft are made from polymers.

(i) Polymers that behave like shape memory alloys are used in spacecraft.

The shape memory polymers are cooled and compressed. These polymers are stored on the spacecraft until needed.

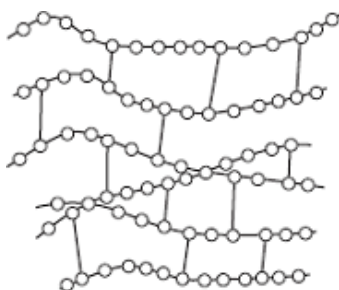
Suggest how the polymers could be made to return to their original shape.

.....

(1)

(ii) Thermosetting polymers are used for the tiles on the outside of spacecraft.

The diagram shows the structure of a thermosetting polymer.



Explain, in terms of structure, why some polymers are thermosetting.

.....
.....
.....
.....

(2)

(c) Instrumental methods such as GC-MS are used to analyse substances found on Mars.

In GC-MS, gas chromatography columns are linked to mass spectrometers.

(i) What does gas chromatography do to the substances?

.....
.....

(1)

(ii) Give **two** reasons for using instrumental methods for analysis.

1

.....

2

.....

(2)

(Total 7 marks)

