Q1. This question is about mixtures and analysis.

(a) Which **two** substances are mixtures?

Tick **two** boxes.

Air	☐
Carbon dioxide	☐
Graphite	☐
Sodium Chloride	☐
Steel	☐

(2)

(b) Draw **one** line from each context to the correct meaning.

Context	Meaning
	A substance that has had nothing added to it
Pure substance in chemistry	A single element or a single compound
	A substance containing only atoms which have different numbers of protons
Pure substance in everyday life	A substance that can be separated by filtration
	A useful product made by mixing

substances

(2)

(c) What is the test for chlorine gas?

Tick **one** box.

A glowing splint relights ☐

A lighted splint gives a pop ☐

Damp litmus paper turns white ☐

Limewater turns milky ☐

(1)

(d) A student tested a metal chloride solution with sodium hydroxide solution.

A brown precipitate formed.

What was the metal ion in the metal chloride solution?

Tick **one** box.

Calcium ☐

Copper(II) ☐

Iron(II) ☐

Iron(III) ☐

(1)
(Total 6 marks)

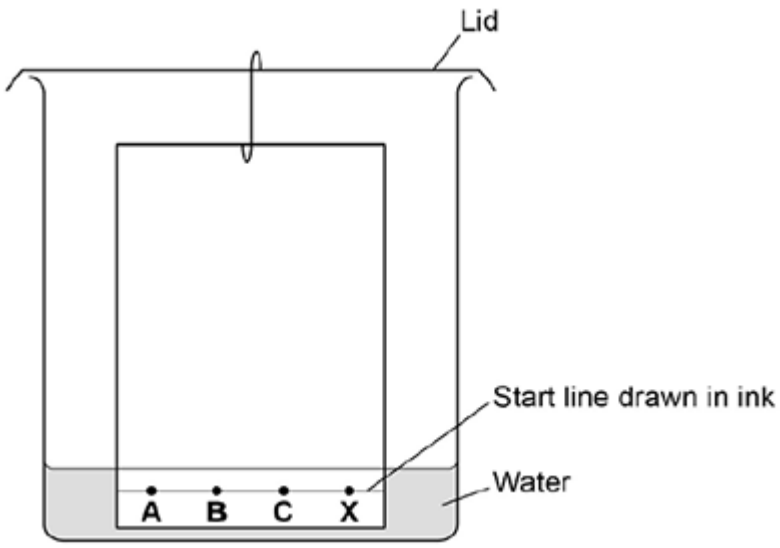
Q2.A student investigated a food colouring using paper chromatography.

This is the method used.

1. Put a spot of food colouring **X** on the start line.
2. Put spots of three separate dyes, **A**, **B** and **C**, on the start line.
3. Place the bottom of the paper in water and leave it for several minutes.

(a) **Figure 1** shows the apparatus the student used.

Figure 1



Give **two** mistakes the student made in setting up the experiment.

Tick **two** boxes.

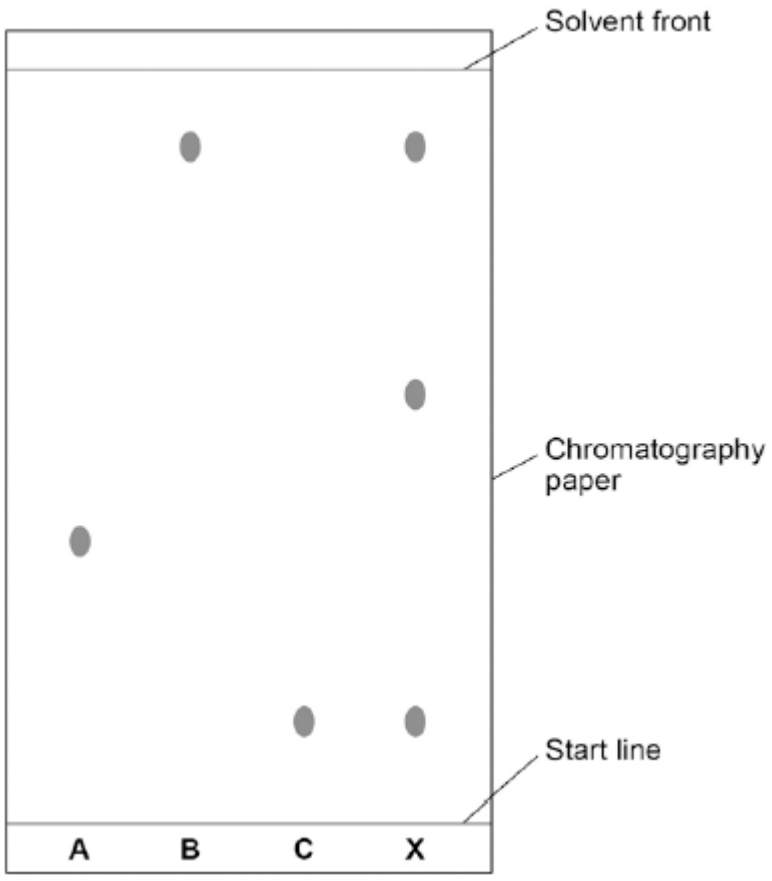
The lid was on the beaker.	☐
The paper did not touch the bottom of the beaker.	☐
The spots were too small.	☐
The start line was drawn in ink.	☐
The water level was above the spots.	☐

(2)

(b) Another student set the experiment up correctly.

Figure 2 shows the student's results.

Figure 2



How many dyes were in **X**?

Tick **one** box.

1		**3**		**4**		**6**	

(1)

(c) Which dye, **A**, **B** or **C**, is **not** in **X**?

Write your answer in the box.

(1)

(d) Use **Figure 2** to complete the table below.

Calculate the value for R_f for dye **A**.

	Distance in mm
Distance moved by dye **A**	.....
Distance from start line to solvent front	.....

Use the equation:

$$R_f = \frac{\text{distance moved by dye } \mathbf{A}}{\text{distance moved by solvent}}$$

Give your answer to two significant figures.

.....

.....

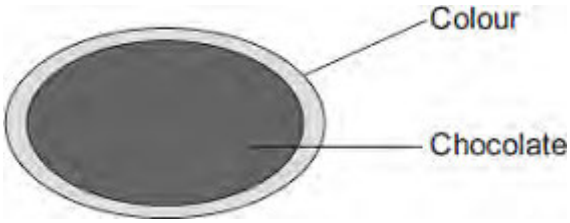
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R_f value = ...

(5)
(Total 9 marks)

Q3. Colours are used to coat some chocolate sweets.

Some of these colours are given E-numbers.



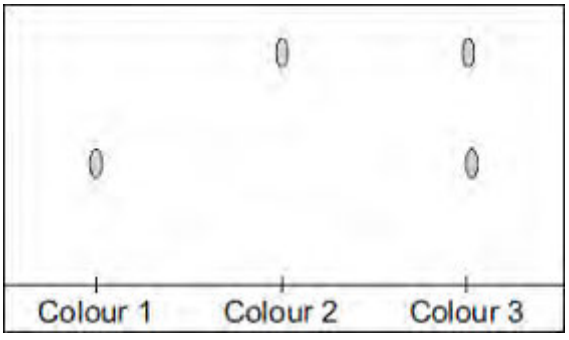
Use the correct word from the box to complete the sentence.

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?

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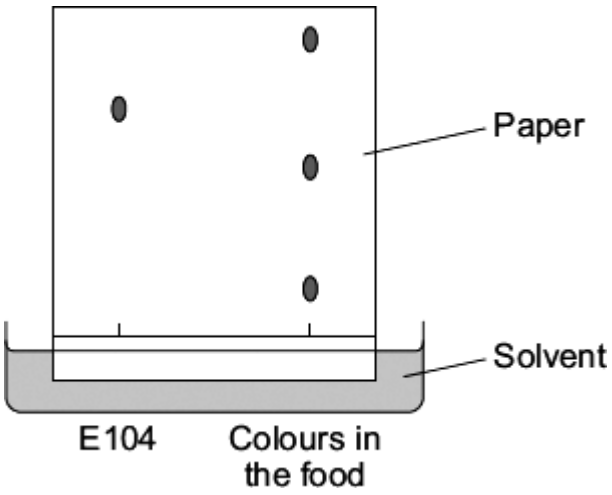
(3)
(Total 4 marks)

Q4. 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)

Q5. This is part of an article about food additives.

THE PERIL OF FOOD ADDITIVES

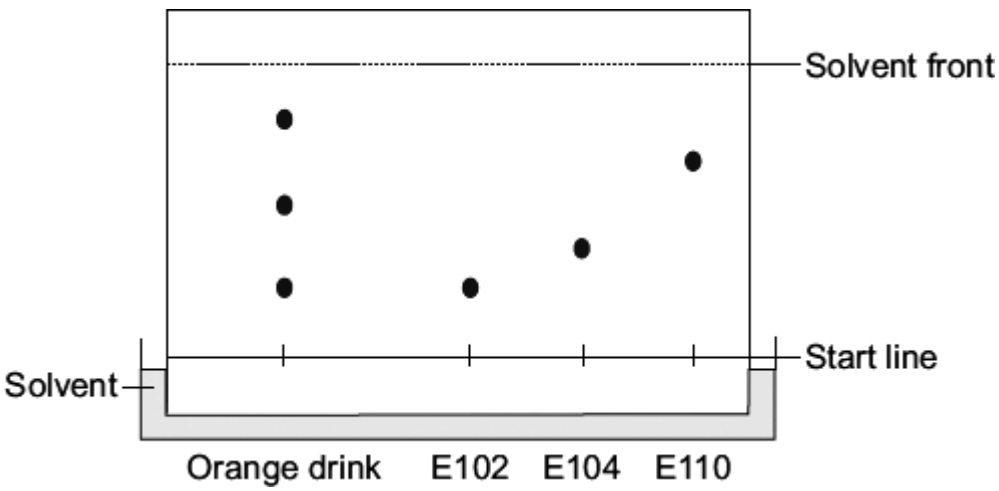
Some orange drinks contain the additives E102 (Tartrazine), E104 (Quinoline Yellow) and E110 (Sunset Yellow).
These three additives are thought to cause hyperactivity in children.

(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.

chromatography.

The test that the scientist did is called

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.

.....

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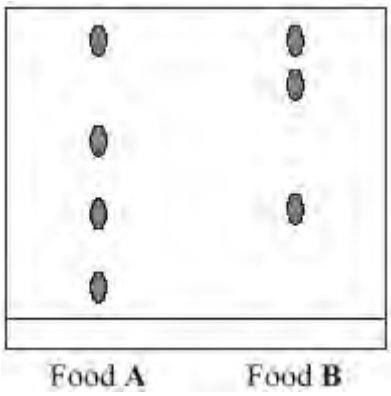
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(2)

(Total 6 marks)

Q6. 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**.

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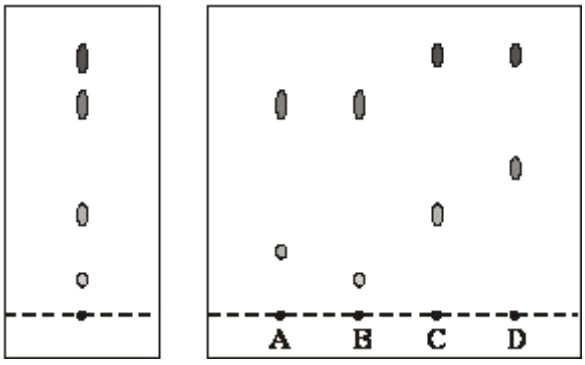
(2)

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

Process	**(✓)**
chromatography	
extraction	
hardening	

(1)
(Total 3 marks)

Q7. Chromatography was carried out on a sample of soft drinks to check that they contained only colours that were safe. This is the result.



Safe colours Colours from the soft drinks

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)