

Name:

Date:

C8 - Test 1
CHEMICAL ANALYSIS
Beginner

GCSE

CHEMISTRY

AQA - Combined Science

Mark

Grade

Materials

For this paper you must have:

- Ruler
- Pencil and Rubber
- Scientific calculator, which you are expected to use when appropriate

Instructions

- Answer all questions
- Answer questions in the space provided
- All working must be shown

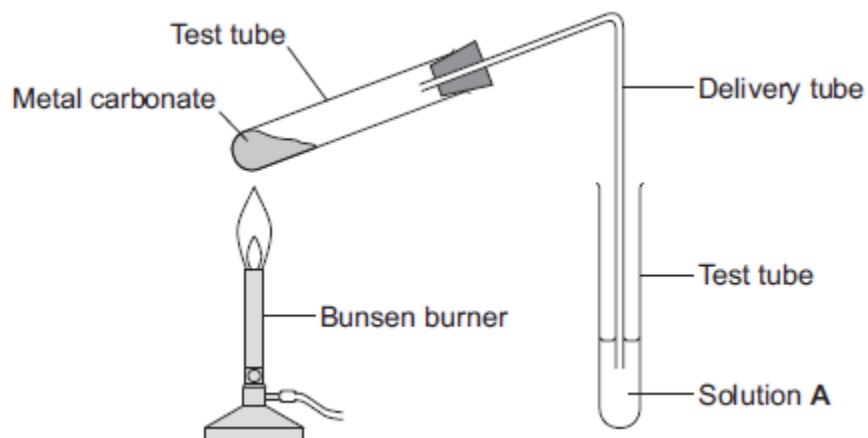
Information

- The marks for the questions are shown in brackets

1.

A student investigated heating metal carbonates.

The student used the apparatus in the figure below.



The student's results are shown in the table below.

Metal carbonate	Colour before heating	Colour after heating	Mass before heating in g	Mass after heating in g	Solution A
Copper carbonate	Green	Black	12.4	8.0	Turns cloudy
Potassium carbonate	White	White	13.8	13.8	Stays colourless
Zinc carbonate	White	White	12.5	8.1	Turns cloudy

(a) Use the correct answer from the box to complete the sentence.

black

green

white

The colour of copper oxide is _____ .

(1)

(b) Solution **A** is used to test for carbon dioxide.

Carbon dioxide turns Solution **A** cloudy.

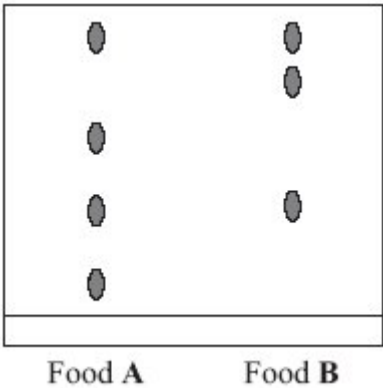
What is the name of Solution **A**?

(1)

(Total 2 marks)

2.

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	

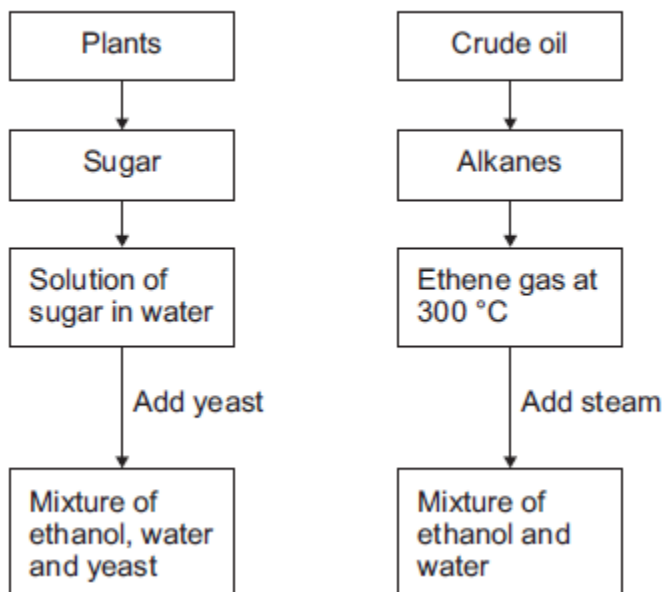
(1)

(Total 3 marks)

3.

Figure 1 shows how ethanol is made from plants and from crude oil.

Figure 1



(a) What is the name of the reaction to produce ethanol from sugar?

Tick (✓) **one** box.

fermentation

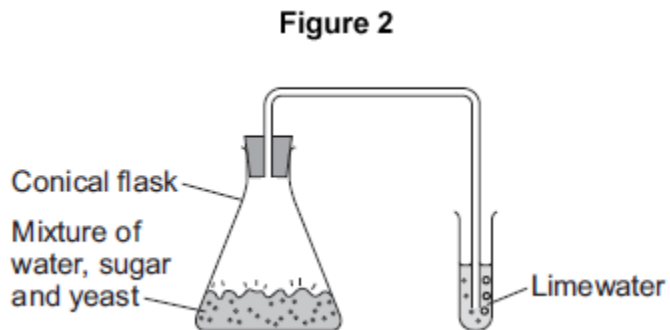
polymerisation

reduction

(1)

(b) A student made ethanol from sugar.

Figure 2 shows the apparatus used.



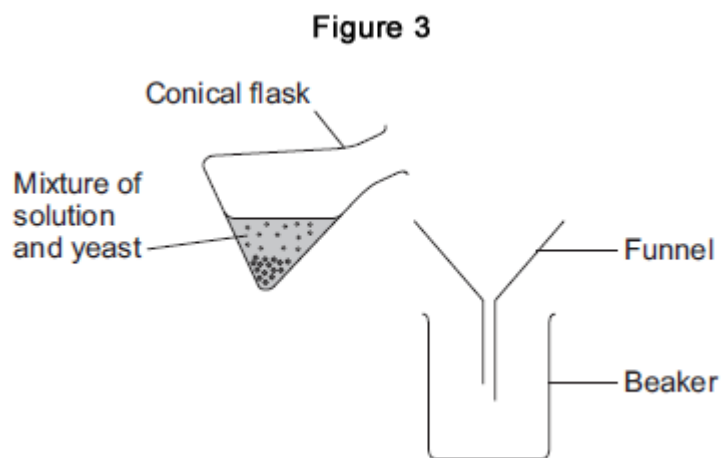
(i) What change is seen in the limewater?

Give a reason for your answer.

(2)

(ii) The student wanted to separate the solid yeast from the solution.

Figure 3 shows the apparatus used.



What is missing from the apparatus in **Figure 3**?

(1)

(Total 4 marks)

4.

This is part of an article about food additives.

THE PERIL OF FOOD ADDITIVES

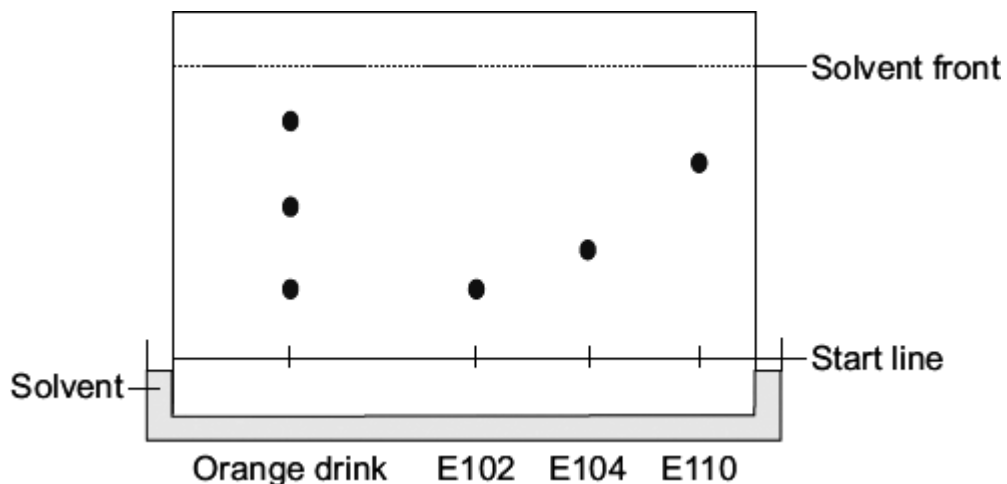
Some orange drinks contain the additives E102 (Tartrazine), E104 (Quinoline Yellow) and E110 (Sunset Yellow). These three additives are thought to cause hyperactivity in children.

- (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)

5.

Some students tested a red cabbage leaf for starch.

This is the method used.

1. Boil the leaf in ethanol.
2. Rinse the leaf in water.
3. Add the reagent to test the leaf for starch.

(a) Give **one** safety precaution the students should take in this test.

(1)

(b) Which reagent is used to test the boiled leaf for starch?

Tick **one** box.

Benedict's solution

Biuret solution

Iodine solution

Sodium chloride solution

(1)

(c) What colour will be seen if the test for starch is positive?

Tick **one** box.

Blue-black

Pale pink

Orange

Red

(1)

The students then used paper chromatography to investigate the coloured pigments in a red cabbage leaf.

(d) Complete the sentences.

Choose answers from the box.

distil	evaporate	filter	mobile	separate	solid
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Chromatography can be used to _____ mixtures.

In paper chromatography, the paper is part of the stationary phase.

The solvent is called the _____ phase.

(2)

Table 1 shows the students' results.

The distance each pigment moved was measured from the start line.

	Distance moved in mm	R_f value
Yellow-green pigment	17	X
Yellow pigment	46	0.42
Orange pigment	100	0.91

The R_f value is calculated using the equation:

$$R_f = \frac{\text{distance moved by pigment}}{\text{distance moved by solvent}}$$

- (e) The solvent moved 110 mm from the start line.

Calculate R_f value **X** in **Table 1**.

Give your answer to 2 significant figures.

R_f value **X** = _____

(2)

- (f) The known ranges of R_f values of some pigments are shown in **Table 2**.

Table 2

Pigment	R_f value range
Carotene	0.89 to 0.98
Chlorophyll a	0.24 to 0.30
Chlorophyll b	0.20 to 0.26
Xanthophyll	0.04 to 0.28

The R_f value for the orange pigment in red cabbage leaves is 0.91

What is this orange pigment most likely to be?

Tick **one** box.

Carotene

Chlorophyll a

Chlorophyll b

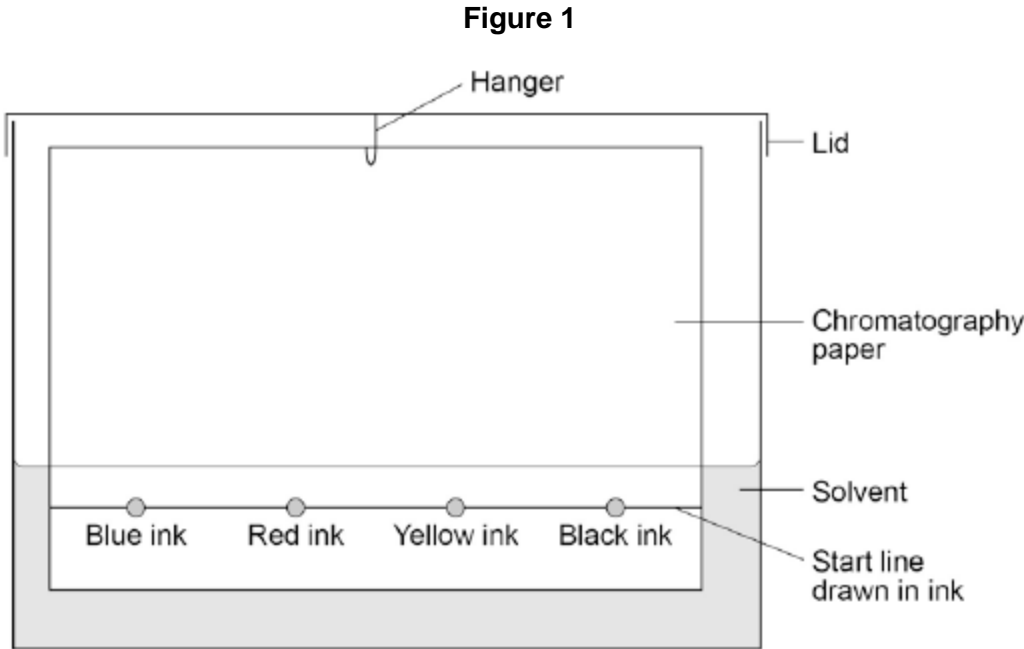
Xanthophyll

(1)
(Total 8 marks)

6.

A student used paper chromatography to investigate the colours in different inks.

Figure 1 shows the apparatus the student used.



(a) The student made **two** mistakes in setting up the apparatus.

Identify the **two** mistakes.

Describe the problem each mistake would cause.

Mistake 1 _____

Problem _____

Mistake 2 _____

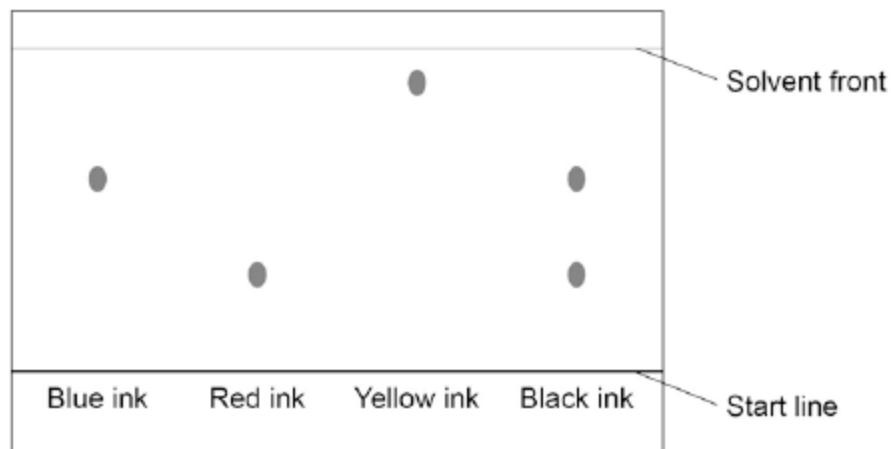
Problem _____

(4)

(b) The student then set up the apparatus without making any mistakes.

Figure 2 shows his results.

Figure 2



What colours are in the black ink?

(1)

(c) Which of the inks is the most soluble in the solvent?

Give a reason for your answer.

Ink _____

Reason _____

(2)

(d) Use **Figure 2** to complete the table below, then calculate the R_f value for red ink.

	Distance in mm
Distance moved by red ink	_____
Distance from start line to solvent front	_____

The R_f value for red ink is calculated using the equation.

$$R_f = \frac{\text{distance moved by red ink from the start line}}{\text{distance moved by solvent from the start line}}$$

Give your answer to two significant figures.

$$R_f \text{ value} = \underline{\hspace{2cm}}$$

(5)

(e) How can you tell from **Figure 2** that the R_f value for the blue ink is greater than the R_f value for the red ink?

(1)

(Total 13 marks)