

Chromatography (required practical, R_f values)

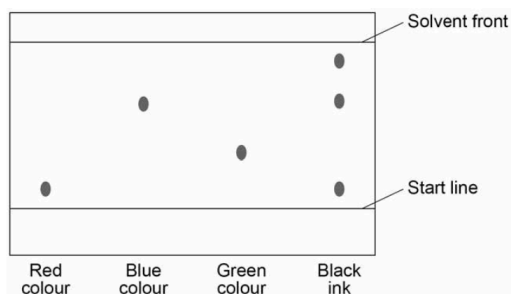
Q1. (2018)

0 2

A student used paper chromatography to identify the colours in a black ink.

Figure 5 shows the student's results.

Figure 5



A)

0 2 . 1

What colours are in the black ink?

[2 marks]

B)

0 2 . 2

Suggest which colour is least soluble in the solvent.

Give a reason for your answer.

[2 marks]

Colour _____

Reason _____

C)

0 2 . 3

Use Figure 5 to complete Table 2

Table 2

	Distance in mm
Distance moved by green colour	
Distance moved by solvent	

Calculate the R_f value for the green colour.

Use the equation:

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

[4 marks]

R_f value = _____

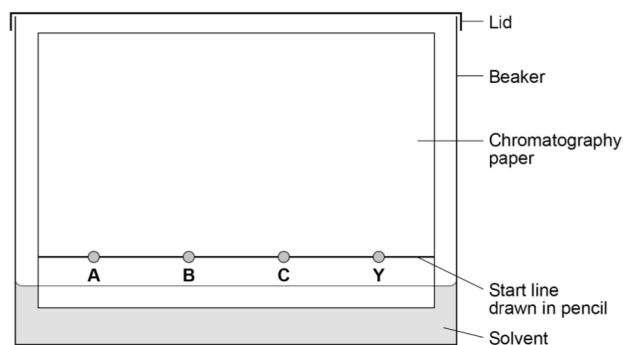
Q2. (2020)

A)

A student investigated a purple food colouring, **Y**, using chromatography.

The student compares **Y** with dyes **A**, **B** and **C**.

0 5 . 3 **Figure 8** shows the apparatus used.

Figure 8

Chromatography involves a stationary phase and a mobile phase.

Draw **one** line from each phase to what is used for that phase.

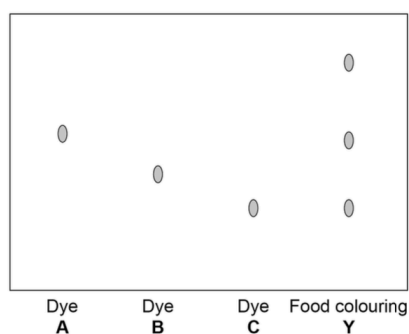
Use **Figure 8**.

[2 marks]

Phase	What is used
	Beaker
Mobile phase	Chromatography paper
	Food colouring
Stationary phase	Pencil line

B)

Figure 9 shows the student's results.

Figure 9

0 5 . 4 What **three** conclusions can you make about the dyes in food colouring Y?

[3 marks]

- 1 _____

2 _____

3 _____

C)

0 5 . 5 In a different experiment a student recorded these results:

Distance moved by dye **G** = 60 mm

Distance moved by solvent = 80 mm

Calculate the R_f value of dye **G**.

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

[2 marks]

$R_f =$ _____

Q3. (2022)

A)

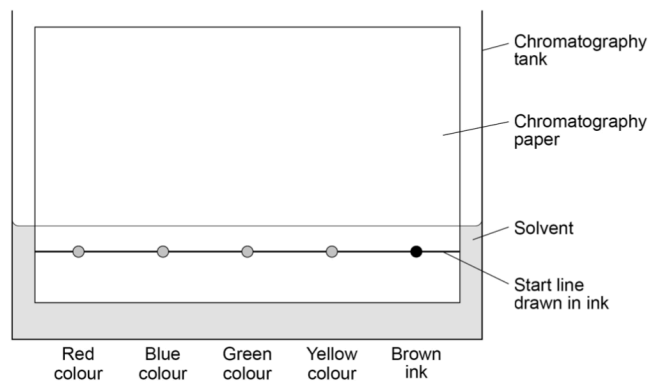
0 6

A student investigated the colours in a brown ink using chromatography.

0 6

1 Figure 10 shows the apparatus used.

Figure 10

Give **two** errors made by the student.

Describe the problem each error would cause.

[4 marks]

Error 1 _____

Problem 1 _____

Error 2 _____

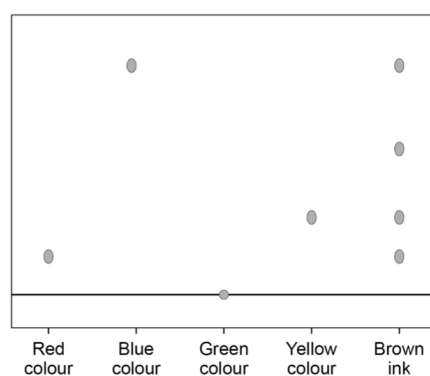
Problem 2 _____

B)

A different student set up the apparatus correctly.

Figure 11 shows the results.

Figure 11



- 0 6 . 2 Give **two** conclusions the student can make from **Figure 11** about the four colours in the brown ink. [2 marks]

1 _____

2 _____

C)

- 0 6 . 3 Why was the green colour still on the start line at the end of the experiment? [1 mark]
- Tick (✓) **one** box.

The experiment was left for too long.	☐
The green colour was insoluble in the solvent.	☐
The green spot contained too many colours.	☐
The green spot was too small.	☐

D)

- 0 6 . 4 A student calculated the R_f value of a colour to be 0.24

The colour moved 1.8 cm from the start line.

Calculate the distance the solvent moved.

Use the equation:

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

[3 marks]

Distance moved by solvent = _____ cm

Q4. (2023)

A)

Chromatography involves a mobile phase and one other phase.

- 0 6 . 1 What is the other phase in chromatography? [1 mark]
- Tick (✓) **one** box.

Moving phase	☐
Recycled phase	☐
Stationary phase	☐
Viscous phase	☐

B)

0 6 . 2 Why do the substances in the mixture separate in the mobile phase?

[1 mark]

Q5. (2023)

0 6 . 4 In a chromatography experiment, a blue colour moved 4.77 cm.

The solvent moved 5.30 cm.

Calculate the R_f value for the blue colour.

[2 marks]

R_f value = _____

Q6. (2023)

0 6 . 5 Black ink is a mixture of several colours.

Plan an experiment using paper chromatography to:

- separate the colours in black ink
- identify the colours from their R_f values.

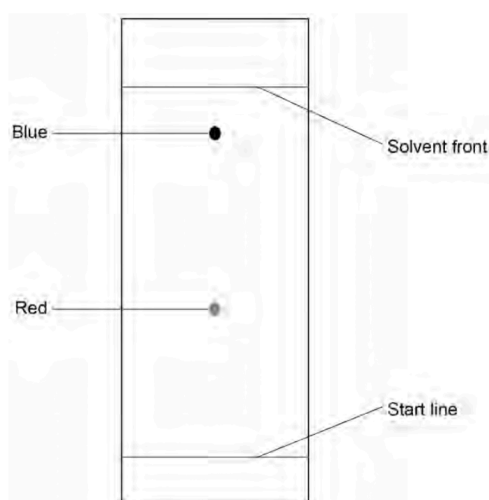
[6 marks]

Q7. (2024)

A student used chromatography to investigate the colours in a printer ink.

Figure 2 shows the chromatogram.

Figure 2



A)

0 3 . 2 The student used a ruler for the start line.

What would the student have used to draw the start line?

Give **one** reason for your answer.

[2 marks]

Reason _____

B)

0 3 . 3 Determine the R_f value of the **red** colour.

Use the equation:

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

[4 marks]

Distance moved by red colour _____

Distance moved by solvent _____

 $R_f =$ _____

C)

0 3 . 4 **Table 2** shows the R_f values of four blue colours.**Table 2**

Blue colour	R_f
Cerulean	0.40
Cobalt	0.15
Prussian	0.88
Ultramarine	0.68

The student determined that the R_f value of the blue colour in the printer ink was 0.86

Suggest which blue colour was used in the printer ink.

Give **one** reason for your answer.**[2 marks]**

Blue colour _____

Reason _____
