Chromatography (required practical, Rf values)

Q1. (2019)

A)

0 3 . 2 Explain how paper chromatography separates the dyes in a food colouring.

Do **not** give details of how to do the experiment.

[2 marks]

B)

0 3 . 3 Explain how the student could tell from the chromatogram that the food colouring contained more than one dye.

[2 marks]

C)

0 3 . 4 Explain how the student could use chromatography to identify unknown dyes in the food colouring.

[3 marks]

Q2. (2021)

The boiling point is used to check the purity of a sample of water.

0 3 . 2 In chemistry, what is meant by a 'pure substance'?

[1 mark]

Q3. (2021)

0 3 . 3 The boiling point of a 250 g sample of water was 100.60 °C.

The boiling point of pure water in a data book is 100.00 °C.

Each 1% of impurity increases the boiling point of water by 0.12 °C.

Calculate the mass of the impurity in the sample of water.

[3 marks]

Mass of the impurity = _____ g

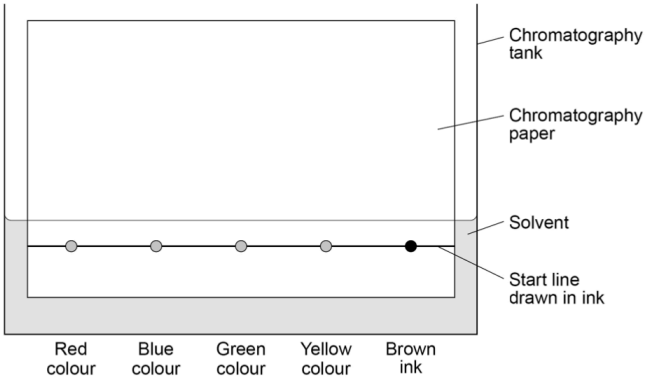
Q4. (2022)

A)

0 1 A student investigated the colours in a brown ink using chromatography.

0 1 . 1 **Figure 1** shows the apparatus used.

Figure 1



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

Describe the problem each error would cause.

[4 marks]

Error 1 _____

_____

Problem 1 _____

_____

Error 2 _____

_____

Problem 2 _____

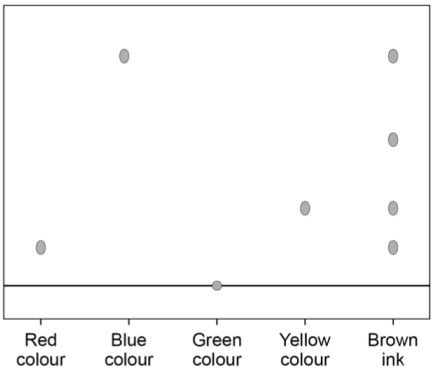
_____

B)

A different student set up the apparatus correctly.

Figure 2 shows the results.

Figure 2



0 1 . 2 Give **two** conclusions the student can make from **Figure 2** about the four colours in the brown ink.

[2 marks]

1 _____

_____

2 _____

_____

C)

0 1 . 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 1 . 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

Q5. (2023)

0 2 Chromatography is used to separate mixtures.

Chromatography involves a mobile phase and one other phase.

A)

0 2 . 1 What is the other phase in chromatography?

[1 mark]

Tick (✓) **one** box.

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

B)

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

[1 mark]

Q6. (2023)

0 2 . 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 = _____

Q7. (2023)

0 2 . 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]

Q8. (2024)

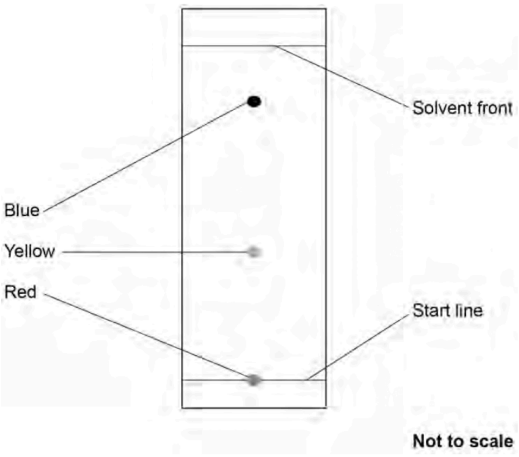
0 4 Printer ink is a mixture of chemicals.

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

The student put a spot of the printer ink on the start line.

Figure 4 shows the results.

Figure 4



A)

0 4 . 1 Explain why the red colour did **not** move from the start line.

[2 marks]

B)

0 4 . 2 The blue colour moved 6.4 cm up the chromatogram.

The R_f value of the blue colour is 0.87

Calculate the distance moved by the solvent.

Give your answer to 2 significant figures.

[4 marks]

Distance moved by the solvent (2 significant figures) = _____ cm

C)

There were four colours in the printer ink.

0 4 . 3 Suggest **one** reason why only three colours were visible on the chromatogram.

[1 mark]

D)

0 4 . 4 Suggest how the student could use chromatography to show there were four colours in the printer ink.

[1 mark]