AQA - Purity, formulations and Chromatography – GCSE Chemistry
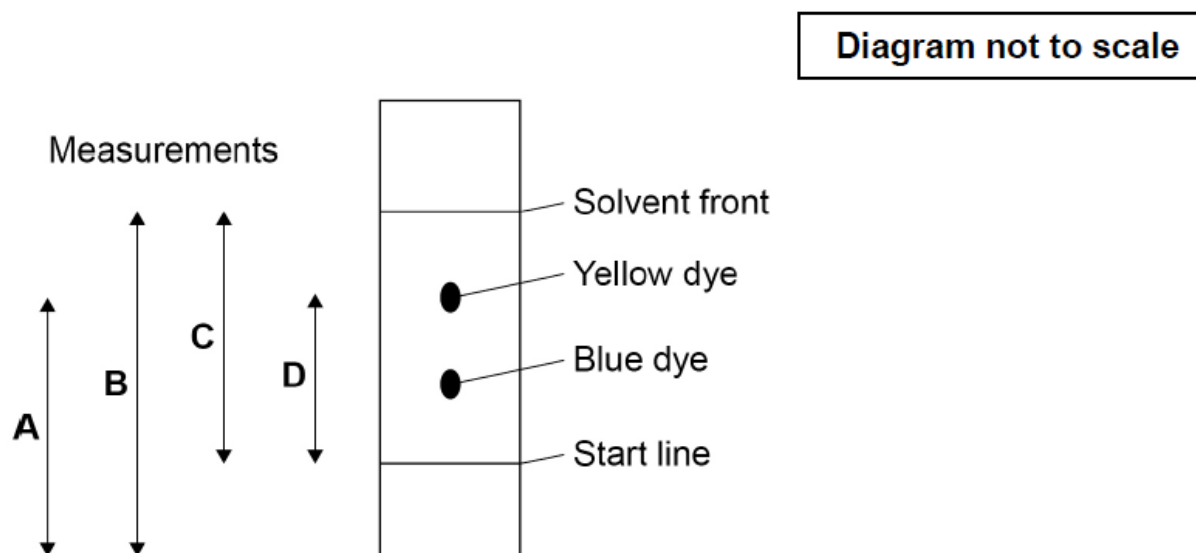
1. May/2020/Paper_8462/2F/No.4

   This question is about ink.

   A student investigated green ink using paper chromatography in a beaker.

   Figure 6 shows:

   - the results the student obtained

   - measurements **A**, **B**, **C** and **D** the student could make.

Figure 6

Diagram not to scale

The student calculated the R_f value of the blue dye.

The student measured:

- the distance moved by the blue dye = 2.7 cm

- the distance moved by the solvent = 9.0 cm

Calculate the R_f value of the blue dye.

Use the equation:

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

[2 marks]

_____

_____

_____

$R_f =$ _____

Which measurements on **Figure 6** are needed to calculate the R_f value of the yellow dye?

[1 mark]

Tick (✓) **one** box.

A and B ☐

A and C ☐

B and D ☐

C and D ☐

Paper chromatography has a stationary phase and a mobile phase.

Draw **one** line from each phase to the identity of that phase in the student's investigation.

[2 marks]

Phase	Identity

Phase   Identity

Beaker

| Mobile phase | | Ink |
|--------------| |-----|

Paper

| Stationary phase | | Solvent |
|------------------| |---------|

Start line

The green ink contains 85% yellow dye and 15% blue dye.

Determine the simplest whole number ratio of yellow dye : blue dye in the green ink.

[1 mark]

_____

_____

Yellow dye : Blue dye   = _____ : _____

Which word correctly describes the green ink?

[1 mark]

Tick (✓) **one** box.

Compound ☐

Element ☐

Formulation ☐

Solvent ☐

The student repeated the investigation using green ink containing 75% yellow dye and 25% blue dye.

What would happen to the R_f value of the yellow dye?

[1 mark]

Tick (✓) **one** box.

The R_f value would decrease. ☐

The R_f value would increase. ☐

The R_f value would stay the same. ☐

2. May/2020/Paper_8462/2H/No.4
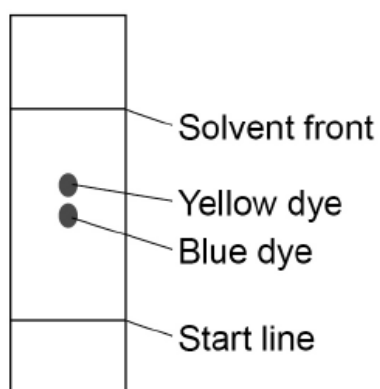
This question is about ink.

A student investigated green ink using paper chromatography in a beaker.

The student used water as the solvent.

Figure 2 shows the chromatogram obtained.

Figure 2

Diagram not to scale

- Solvent front
- Yellow dye
- Blue dye
- Start line

The R_f value of the yellow dye = 0.60

The distance moved by the yellow dye = 5.7 cm

Calculate the distance moved by the solvent.

[3 marks]

_____

_____

_____

_____

_____

Distance moved by the solvent = _____ cm

The green ink contains more than two compounds.

Suggest **one** reason why only two spots are seen on **Figure 2**.

[1 mark]

_____

_____

On the student's chromatogram, the yellow and blue spots are very close together.

Which **two** ways could increase the distance between the spots?

[2 marks]

Tick (✓) **two** boxes.

Allow the solvent front to travel further. ☐

Dry the chromatogram more slowly. ☐

Use a different solvent. ☐

Use a larger beaker. ☐

Use a larger spot of green ink. ☐

The manufacturers of the green ink always use the same proportions of yellow dye and blue dye.

Suggest **one** reason why.

[1 mark]

_____

_____

The R$_f$ value of a dye depends on:

- the solubility of the dye in the solvent

- the attraction of the dye to the paper.

Which will **definitely** produce a smaller R$_f$ value if the solvent and paper are both changed?

[1 mark]

Tick (✓) **one** box.

The dye is less soluble in the new solvent and less attracted to the new paper. ☐

The dye is less soluble in the new solvent and more attracted to the new paper. ☐

The dye is more soluble in the new solvent and less attracted to the new paper. ☐

The dye is more soluble in the new solvent and more attracted to the new paper. ☐

3. May/2019/Paper_8462/2F/No.1.5

How could pure water be produced from drinking water that contained dissolved solids?

[1 mark]

Tick (✓) **one** box.

Chromatography ☐

Cracking ☐

Distillation ☐

Sedimentation ☐

4. May/2019/Paper_8462/2H/No.2.2

Complete the sentence.

[1 mark]

Methane produces carbon monoxide when burning in a limited supply of

_____.