

(Chromatography (R_f values, separation techniques))

Q1. a). (2018)

start line drawn in ink

(so) ink dissolves

or

ink runs in solvent / water

water used (as solvent)

or

water in beaker

(so) colours will not dissolve /
move

Q1. b). (2018)

any **two** from:

- the flowers have no colours in common
- A / B contain one colour
- C contains two colours
- (the colour in) B is most soluble

Q1. c). (2018)

$$(\text{distance moved}) = \frac{3.2}{0.65}$$

$$(\text{distance moved}) = 4.9 \text{ (cm)}$$

Q2. a). (2020)

$$0.60 = \frac{5.7}{\text{distance moved by solvent}}$$

$$(\text{distance moved by solvent}) = \frac{5.7}{0.60}$$

$$= 9.5 \text{ (cm)}$$

Q2. b). (2020)

some of the compounds are
colourless (in solution)

or

dyes / compounds have the
same R_f values

Q2. c). (2020)

allow the solvent front to travel
further

use a different solvent

Q2. d). (2020)

so that the (shade of) green is
the same

Q3. (2020)

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

Q4. (2021)

Method

- draw (pencil) start line on (chromatography) paper
- place spot of food colouring on start line
- use of suitable solvent
- place solvent in beaker / container
- place (chromatography) paper in beaker / container
- so (chromatography) paper is in solvent
- but solvent is below start line
- use a lid
- wait for solvent to travel up the (chromatography) paper (until near top)
- mark solvent front
- dry the (chromatography) paper

Measurements

- measure distance between start line and centre of spot
- measure distance between start line and solvent front
- use of measurements to determine R_f value

Q5. (2021)

different solvent used

Q6. (2021)

paper

Q7. a).(2023)

the start line is drawn in ink

the start line is below the water level

Q7. b). (2023)

$$0.60 = \frac{\text{distance moved by dye}}{12.0}$$

(distance moved by dye =)
 0.60×12.0

= 7.2 (cm)

Q7. c). (2023)

the R_f value is smaller for Paper **A**

(because the red dye) is more attracted to Paper **A** (than to Paper **B**)

(so the red dye) spends a greater (proportion of the) time distributed in Paper **A** (than in Paper **B**)

Q7. d). (2023)

use a different solvent

Q8. a). (2024)

the yellow dye travels further

(because the yellow) dye has a
weaker attraction to the
(chromatography) paper

Q8. b). (2024)

(in Experiment **2**) the yellow dye
travels further

(because) the solvents are
different

(and) the yellow dye is more
soluble in ethanol (than water)

or

(and) the yellow dye is more
attracted to ethanol (than water)

Q8. c). (2024)

A is an impure (substance)

and

B is a pure (substance)

(because) **A** contains two dyes

and

B contains one dye

Q8. d). (2024)

$$0.48 = \frac{5.4}{\text{distance moved by solvent}}$$

(distance moved by solvent =)

$$\frac{5.4}{0.48}$$

$$= 11.25 \text{ (cm)}$$

Q9. (2024)

the ratio / proportion of
spot distance (moved) to solvent
distance (moved) is fixed /
constant