Mark schemes

Q1.

(a) the yellow dye travels further

allow converse argument

allow stationary phase for paper

1

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

if no other mark awarded

*allow for **1** mark*

the weaker the attraction to the (chromatography) paper the greater the distance travelled (by the dye)

1

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

allow mobile phase for solvent

1

(because) the solvents are different

1

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

allow the yellow dye is less soluble in water (than ethanol)

or

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

allow the yellow dye is less attracted to water (than ethanol)

OR

(in Experiment **1**) the yellow dye does not travel as far (1)

(because) the solvents are different (1)

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

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

(and) the yellow dye is less attracted to water (than ethanol) (1)

or

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

1

(c) **A** is an impure (substance)

and

B is a pure (substance)

*allow **A** is a mixture*

and

***B** is a pure (substance)*

1

(because) **A** contains two dyes
and
B contains one dye

allow (because) ***A*** *produces two spots*
and
B *produces one spot*
if no other mark awarded allow ***1*** *mark for*
A *contains two dyes (so) is impure (substance)*
or
A *contains two dyes (so) is a mixture*
or
B *contains one dye (so) is pure (substance)*

1

(d)

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

1

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

1

=11.25 (cm)

allow 11.25 correctly rounded to
at least 2 significant figures

1

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

allow the distance travelled by the spot relative to the distance travelled by the solvent is constant
allow the distance travelled by the spot is (directly) proportional to the distance travelled by the solvent

1

(f) any **two** from:

- (more) sensitive
- (more) accurate
- fast(er)

allow small(er) sample
allow greater resolution

2

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Q2.

(a) the start line is drawn in ink

allow the start line should be drawn in pencil

1

the start line is below the water level

allow the start line should be above the water level

1

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

1

(distance moved by dye =) 0.60 × 12.0

1

= 7.2 (cm)

1

(c) the R_f value is smaller for Paper **A**

1

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

1

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

1

allow converse

*if no other mark awarded allow **1** mark for the dye has a different attraction to each paper*

(d) use a different solvent

allow use ethanol (as the solvent)

1

[9]