GCSE
CHEMISTRY
AQA - COMBINED SCIENCE
MARK SCHEME

C8
CHEMICAL ANALYSIS
TEST 3
Mark schemes

1 (a) (i) chromatography
(ii) 3 / three
(iii) the colour / E104 is not on the same level as any of the colours in the food
    accept E104 does not match

(b) (i) to improve the appearance of the food
    ignore adds yellow / colour
    ignore taste / flavour
(ii) further / or different tests (for harmful effects) or obtain more evidence
    (that it is harmful)
    allow do a survey / study

(a) only one spot (on the chromatogram)

2 (b) (distance moved by substance =) 4.2 (cm) and (distance moved by solvent =) 9.4 (cm)
    allow in range 4.0–4.4 (for substance)

    4.2(cm)
    9.4(cm)

    0.4468

    0.45
    allow answer in range 0.43 to 0.47

(c) (made of) three substances
    two are unknown
    one is cocaine
(i) any two from:

- A has four colours(*)
- B has three colours(*)

(*) if first two bullets not stated

accept A has more colours (than B) or B has less colours (than A) for 1 mark only

- A / B have two colours the same
- B has one different colour

(ii) chromatography

(a) red and blue

unknown

both needed for the mark

(b) red

ignore black

travels least far

dependent on correct colour allow closest to the start line

(c) distance moved by green colour = 12 mm

allow 10 to 14 mm

distance moved by solvent = 36 mm

allow 35 to 36 mm

\[
\frac{12}{36}
\]

allow correct substitution of student's measurements

R_f value = 0.33

allow correct answer from student's measurements for 2 marks
5. (a) \[ R_f = \frac{\text{distance moved by substance}}{\text{distance moved by solvent}} \]

5.1 ± 0.1 cm and 6.8 ± 0.1 cm

both measurements from figure

5.1
6.8

0.75

allow answer in range 0.72–0.77
allow erpf from incorrect measurements to final mark for 3 marks
an answer in range of 0.72–0.77 scores 4 marks

(b) drug D contains one of the substances in E

drug D contains drug B

(and) a compound not found in any of the other drugs

allow an unknown substance
if no other marks awarded allow 1 mark for it is a mixture/ impure or
it contains three substances

(c) A as it has travelled the furthest in the solvent

ignore A unqualified

(d) spot has stayed on the start line

(because) it is insoluble

[10]

6. (a) (i) prevent evaporation of solvent

allow prevent loss of solvent
allow to support the (chromatography) paper

1
(ii) ink dissolves in the solvent
   allow ink ‘runs’ / spreads  or pencil does not ‘run’ / spread
   allow ink would affect the result / mixes with colours

or

carbon / graphite does not dissolve in the solvent
   accept pencil for carbon / graphite

(b)  

(i) 4

(ii) no mark for ‘no / don’t know’ ,
   ignore numbers
any one from:
• because not all colours match
• not all colours are safe
• some colours could be unsafe
• some colours travelled higher (than safe colours)

(c)  

(i) any two from:
   ignore reliable / precise
   • rapid / quick
   • accurate
   • sensitive or detects very small quantities
   accept small sample

(ii) separates

(iii) identifies solvents / compounds / substances
   accept (relative) molecular mass
   accept formula mass
   accept \( M_r \)
   accept relative mass
   accept molecular ion peak