Mark scheme

Chromatography and Rf values

Chemistry 0620 · Paper 6 (Alternative to practical)

Total marks

60

MARKS FOR EACH QUESTION

1	2	3	4	5	6	7	8	9	10	Total
5	5	6	6	6	6	6	6	7	7	**60**

Question 1 [5]

1 **(a)** chromatography (1) [1]

(b) 3 dots above the line and must be vertical (1)
1 dot on base-line (1) [2]
allow: 1 mark for 4 dots above the base-line and must be vertical

(c) interferes with results / ink spreads / ink is soluble / owtte (1) [1]

(d) dyes would wash off / dissolves in propanone (1) [1]

Question 2 [5]

2(a)	**M1** three spots shown horizontally along the baseline	**1**
	M2 solvent level above / touching the bottom of the paper but below the base line and **not** touching any of the spots	**1**
2(b)	when the ethanol is almost at the top of the paper	**1**
2(c)	**any two from:** **MP1** dye 1 **and** dye 3 are pure substances / contain only 1 colour / substance **MP2** dye 2 contains dye 1 and dye 3 **MP3** all of the dyes were soluble	**2**

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Question 3 [6]

3(a)	chromatography;	**1**	
3(b)	(teat) pipette / capillary tube;	**1**	**A:** dropper / glass rod
3(c)	water / organic solvent;	**1**	
3(d)	compound Q is insoluble;	**1**	**R:** it reacts with the solvent
3(e)	between (4.7 and 5.1) divided by (6.2 or 6.3); answer: between 0.74 and 0.82;	**1** **1**	correct answer with no working scores 2

Question 4 [6]

4(a)	**M1** ink spots should be on baseline	1
	M2 water should reach the paper / water should be between bottom of paper and ink spots	1
4(b)	pencil / graphite	1
4(c)(i)	yellow **OR** blue	1
4(c)(ii)	orange	1
4(c)(iii)	yellow	1

Question 5 [6]

5 **(a)** chromatography (1) [1]

(b) line drawn on diagram below origin (1) [1]

(c) does not interfere with results/owtte (1) [1]

(d) difference
A has more/3 colours/**B** has less/2 colours/**B** contains **F** but **A** doesn't/**A** contains **C**/ **D** but **B** does not (1)

similarity
both contain same colour/**E** (1) [2]

(e) **C**, **D** and **E** (1) [1]

Question 6 [6]

6 **(a)** chromatography (1) [1]

(b) water (1) [1]

(c) origin/base line/datum (1) [1]
ignore references to start/initial/pencil

(d) sweet C has 4 colours (1)
sweet D has 3 colours (1)
allow C has one more colour/more colours than D for one mark
2 colours are the same (1) [3]

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Question 7 [6]

7 **(a)** **(i)** chromatography (1) [1]

(ii) to prevent loss / evaporation of solvent (1) [1]

(b) when the solvent is near the top of the paper / before the solvent reaches the top of the paper (1) [1]

(c) **(i)** 4 (1) [1]

(ii) yes, one artificial dye (1)
at same height / matches (1) [2]

Question 8 [6]

8	Any 6 from: • crush / grind root • with pestle / mortar • with water / solvent • place (drop of) liquid / colour on paper • conduct chromatography • (bottom of) paper placed in a suitable solvent / water • number of coloured substances = number of spots	**6**

Question 9 [7]

9(a)	to prevent evaporation / loss of solvent	**1**
9(b)(i)	solvent level above spots / hair dye samples	**1**
9(b)(ii)	dyes would mix / dissolve with solvent / wash off paper	**1**
9(c)	organic solvent / named organic solvent	**1**
9(d)	any **three** from: • R contains P / Q • R is a mixture / contains 2 colours • P is a single colour / pure substance • Q is a single colour / pure substance • P and Q are different colours	**max 3**

Question 10 [7]

10(a)	base line / origin clearly labelled on diagram;	**1**	
10(b)	any organic solvent / ethanol / alcohol / acetone;	**1**	**R** water / acids
10(c)	3;	**1**	
10(d)	1 and 3 present; 2 not present; unknown dye present;	**3**	**I** reference to properties of dyes 1, 2 and 3
10(e)	repeat the experiment / use a different solvent / measure R_f values;	**1**	

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