

# Purity Formulations + Chromatography

## Question Paper

Level	GCSE (9-1)
Subject	Combined Science: Trilogy - Chemistry
Exam Board	AQA
Topic	5.8 Chemical Analysis
Sub-Topic	Purity Formulations + Chromatography
Difficulty Level	Gold Level
Booklet	Question Paper

Time Allowed: 30 minutes

Score: /28

Percentage: /100

Grade Boundaries:

**Q1.** Aqamed is a medicine for children.

- (a) The medicine is a formulation.

What is meant by a formulation?

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(1)

- (b) Children often do not like taking medicine.

Suggest a substance that could be added to Aqamed to increase the desire for children to take it.

Give a reason for your suggestion.

Substance .....

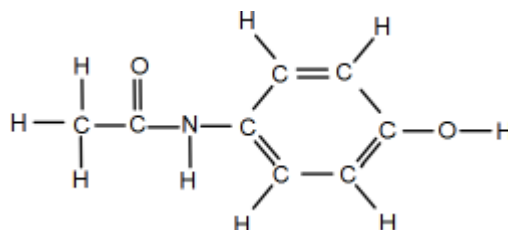
Reason .....

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(2)

- (c) The main ingredient in Aqamed is a painkiller called paracetamol.

The figure below represents a molecule of paracetamol.



Give the molecular formula of paracetamol.

Calculate its relative formula mass ( $M_r$ ).

Relative atomic masses ( $A_r$ ): H = 1; C = 12; N = 14; O = 16

Molecular formula .....

Relative formula mass .....

.....

$M_r = \dots\dots\dots$

(2)

- (d) Aspirin is a medicine for use by adults.

An aspirin tablet contains 300 mg of acetylsalicylic acid.

Calculate the number of moles of acetylsalicylic acid in one aspirin tablet.

Give your answer in standard form to three significant figures.

Relative formula mass ( $M_r$ ) of aspirin = 180

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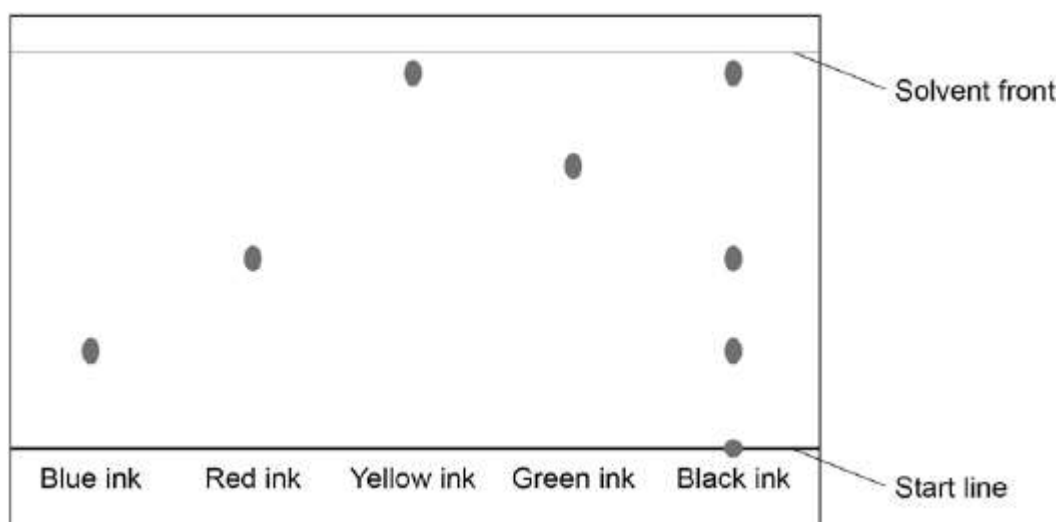
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Number of moles = .....

(4)

(Total 9 marks)

**Q2.** The figure below shows a paper chromatogram of five different inks.



- (a) Explain how paper chromatography separates substances.

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(3)

- (b) Analyse the chromatogram. Describe and explain the result for black ink.

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(4)

- (c) Use the figure above to calculate the  $R_f$  value of the blue ink.

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$R_f$  value = .....

(3)

(Total 10 marks)

**Q3.** This is part of an article about food additives.

**THE PERIL OF FOOD ADDITIVES**

Some orange drinks contain the additives E102 (Tartrazine), E104 (Quinoline Yellow) and E110 (Sunset Yellow). These three coloured additives are thought to cause hyperactivity in children.

- (a) State **two** reasons that a manufacturer might give to justify the use of these additives.

1 .....

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2 .....

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(2)

- (b) Some scientists asked 4000 twelve-year-old children to help them investigate if there is a link between these three coloured additives and hyperactivity.

How would the scientists use these 4000 children to investigate if there is a link between these three coloured additives and hyperactivity in children?

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(4)

- (c) A manufacturer used an independent scientist to show that their orange drink did not contain these three coloured additives.

- (i) Suggest why the manufacturer would use a scientist who was independent instead of using their own scientist.

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(1)

- (ii) The scientist had samples of E102, E104 and E110 and the orange drink. The scientist used paper chromatography for the test.

Describe how the scientist could use the results to show if the orange drink contained any of these three coloured additives.

You may include a diagram of the paper chromatography results.

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(2)

(Total 9 marks)