

# Past-paper walk-through

## Gas/liquid chromatography ■ 37.2

eXercise

## Questions in this set

- 9701/41 N25 Q6 ■ 7 marks

## Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

## Question 6

9701/41 N25 ■ Q6 ■ 7 marks

- 6 (a)** Thin-layer and gas/liquid chromatography can be used to separate mixtures into their individual components.
- (i)** Define the following terms used in chromatography.

## Question 6

## Question 6

## Question 6

## Question 6

[2]

- (ii) Each type of chromatography makes use of a stationary phase and a mobile phase.

Complete Table 6.1 with a description of each of these.

**Table 6.1**

|                           | stationary phase | mobile phase |
|---------------------------|------------------|--------------|
| thin-layer chromatography |                  |              |
| gas/liquid chromatography |                  |              |

[1]

(b) A mixture of two substances A and B is analysed by thin layer chromatography.



## Question 6

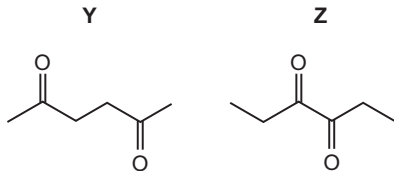
(b) A mixture of two substances **A** and **B** is analysed by thin-layer chromatography.

The  $R_f$  value of substance **A** is larger than that of substance **B**.

Suggest why substance **A** has a larger  $R_f$  value.

## Question 6

(c) The two isomeric compounds **Y** and **Z** are analysed by proton ( $^1\text{H}$ ) NMR spectroscopy.



(i) Complete Table 6.2 to predict the number of peaks observed in the proton ( $^1\text{H}$ ) NMR spectra for **Y** and **Z**.

**Table 6.2**

| compound | number of peaks observed |
|----------|--------------------------|
| <b>Y</b> |                          |

## Question 6

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## Question 6

|          |  |
|----------|--|
| <b>Z</b> |  |
|----------|--|

[1]

- (ii) Name **all** the different splitting patterns observed in the proton ( $^1\text{H}$ ) NMR spectra for **Y** and **Z**.

## Question 6

[2]

[Total: 7]

## Solution 6

### (a)(i)

#### Mark scheme

- M1: ( $R_f$  value) is distance moved by a component / spot / solute AND divided by distance moved by solvent
- OR ( $R_f$  value) is the ratio of distance moved by a component / spot / solute AND by distance moved by solvent
- M2: (retention time) is (the time) between injection and detection (of a component)
- 2
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## Solution 6

**(a)(ii)**

### Mark scheme

- thin-layer chromatography: polar solvent OR non-polar solvent OR named solvent
- gas-liquid chromatography: non-volatile liquid OR high boiling point liquid
- 1

## Solution 6

(b)

### Mark scheme

- A is more soluble in the mobile phase OR A has less adsorption to the stationary phase
- 1



## Solution 6

(c)(i)

Mark scheme

■ 1

## Solution 6

(c)(ii)

### Mark scheme

- M1: Y (two) singlet(s)
- M2: Z triplet AND quartet
- 2
- 9701/41
- October/November 2025