AQA GCSE Physics | 8463

SPECIFICATION POINT 4.5.6.1.1

# Distance and displacement

## Mark schemes and examiner comments

| | |
|---|---|
| Tier | **Higher** |
| Question groups | **3** |
| Available paper years | **2008–2023** |

## Using this booklet

1. Booklet answer numbers match the question booklet.
2. Use the original question number within marking tables.
3. Examiner comments are included where available.

**Name:** _____ **Date:** _____

Where a precise marking extract is unavailable, the full source document is included in an appendix. Any missing mark scheme is explicitly identified.

### 4.5.6.1.1 Distance and displacement

**Answer 01 · Mark scheme**

November 2008 | PHY1BP | Original Q9 | Legacy

| | | | | |
|---|---|---|---|---|
| Nine | **3** | **4** | **2** | **3** |

4.5.6.1.1 Distance and displacement

Answer 02 · Mark scheme

November 2021 | 8463/1H | Original Q4

## Question 4

| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| **04.1** | balance / scales | | 1 | AO1<br>4.3.1.1<br>RPA5 |
| **04.2** | density = $\frac{\text{mass}}{\text{volume}}$<br>**or**<br>$\rho = \frac{m}{V}$ | | 1 | AO1<br>4.3.1.1<br>RPA5 |
| **04.3** | $0.68 = \frac{85}{V}$<br>$V = \frac{85}{0.68}$<br>$V = 125\ (cm^3)$ | | 1<br>1<br>1 | AO2<br>4.3.1.1<br>RPA5 |
| **04.4** | repeat readings (of volume) need taking (of each fruit) to show that the readings are close together | allow ‘the same’ for ‘close together’ | 1 | AO3<br>4.3.1.1<br>RPA5 |
| **Total** | | | **6** | |

4.5.6.1.1 Distance and displacement

Answer 03 · Mark scheme

June 2023 | 8463/2H | Original Q2

## Question 2

| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| **02.1** | 7.1 (cm)<br><br>497 (m) | allow 7.0 to 7.3 (cm)<br><br>allow 70 × their incorrect measurement of displacement | 1<br><br>1 | AO2<br>4.5.6.1.1 |

| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| **02.2** | 0 (N) | | 1 | AO2<br>4.5.1.4 |

| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| **02.3** | constant velocity | allow constant speed (in a straight line)<br><br>do **not** accept stationary<br><br>allow constant acceleration if a **mathematical error** in 02.2 gives a non-zero value for resultant force | 1 | AO1<br>4.5.6.2.1 |

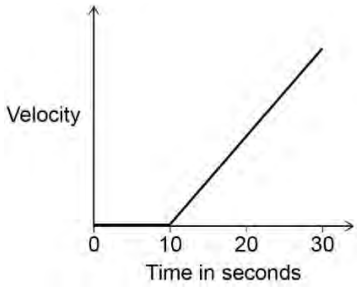
| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| **02.4** | any **one** from:<br>• tension<br>• normal contact (force)<br>• upthrust | allow lift, thrust and water resistance<br>allow normal reaction (force)<br><br>ignore drag | 1 | AO1<br>4.5.1.2 |

4.5.6.1.1 Distance and displacement

Answer 03 · Mark scheme

June 2023 | 8463/2H | Original Q2

| Question | Answers | | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| 02.5 | horizontal line drawn to 10s along the *x*-axis | | 1 | AO3 4.5.6.1.4 |
| | line with a positive gradient starting from 10 s | allow an upward curving line with increasing gradient starting from 10 s | 1 | |




| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| 02.6 | line of best fit drawn and extrapolated to 10 km | do **not** accept a straight line | 1 | AO2 4.5.5.2 |
| | 28 (kPa) | allow 26 to 32 (kPa)<br><br>allow a value correctly extrapolated from their line<br><br>allow 2 marks for a correct mathematically extrapolated value | 1 | |

| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| 02.7 | the average density of the air above the aeroplane decreases | | 1 | AO3 4.5.5.2 |

| Total Question 2 | 10 |
|---|---|

4.5.6.1.1 Distance and displacement

Answer 02 · Examiner comments

November 2021 | 8463/1H | Original Q4

**Question 4**

Question **04.1** was poorly answered with many incorrect answers seen. A common incorrect answer was ‘scale’, as opposed to ‘scales’. Since all measuring instruments have a scale, this answer did not score. Students should be encouraged to not give multiple answers, as was common here, as examiners apply the ‘list principle’ when this happens. Questions **04.2** and **04.3** were well answered, but students found **04.4** difficult with most students not understanding that ‘precision’ refers to the spread of repeat readings, rather than the resolution of an instrument or its accuracy.

4.5.6.1.1 Distance and displacement

Answer 03 · Examiner comments

June 2023 | 8463/2H | Original Q2

**02.1**

58% of students calculated the displacement correctly. Those who did not gain the mark simply measured the route taken by the aircraft and scaled that distance up, showing that many students do not appreciate the difference between displacement and distance.

**02.2**

82% of students successfully calculated the resultant force to be zero.

**02.3**

Having successfully calculated the resultant force to be zero, few students stated that the plane was moving at a constant speed. Many said it was stationary or accelerating, not appreciating the lack of resultant force.

**02.4**

Students did not appear to understand the concept of a contact force, often quoting gravity as one. In addition, they gave forces already quoted in the question as answers.

**02.5**

This was successfully done by the majority of students, with 64% correctly linking distance and velocity and drawing correct graphs.

**02.6**

The minority attempted to draw a smooth curve and extrapolate this to the 10km line. Those who did generally used the graph correctly, with 44% of students gaining both marks. A number of students misread the scale on the graph and quoted incorrect values from their line. It was common to see a straight line, which often allowed the award of 1 mark for a correct reading of the value.

**02.7**

84% of students knew that as the height of the aeroplane above the ground increased, the average density of the air decreased.