AQA GCSE Physics | 8463

SPECIFICATION POINT 4.5.6.1.1

Distance and displacement

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**3**
Available paper years	**2021–2024**

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 2021 | 8463/2F | Original Q2

Question 2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	friction		1	AO1 4.5.1.2
02.2	air resistance		1	AO1 4.5.1.2
02.3	**A = B**		1	AO1 4.5.6.2.2
02.4	$M = 150 \times 0.24$ $M = 36$ (Nm)		1 1	AO2 4.5.4
02.5	chain		1	AO2 4.5.4
02.6	5.8 m/s		1	AO2 4.5.6.1.5
02.7	$a = \frac{5.8}{20}$ $a = 0.29$ (m/s^2)	allow their v from question **02.6** allow a correctly calculated value using their v from question **02.6**	1 1	AO2 4.5.6.1.5
02.8	Deceleration		1	AO3 4.5.6.1.5
02.9	straight arrow drawn between home and school pointing towards school.		1	AO1 4.5.6.1.1
Total			**11**	

4.5.6.1.1 Distance and displacement

Answer 02 · Mark scheme

June 2023 | 8463/2F | Original Q10

Question 10

Question	Answers	Extra information	Mark	AO / Spec. Ref.
10.1	7.1 (cm) 497 (m)	allow 7.0 to 7.3 (cm) allow 70 × their measurement of displacement	1 1	AO2 4.5.6.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
10.2	0 (N)		1	AO2 4.5.1.4

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

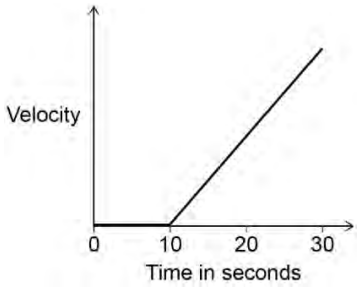
Question	Answers	Extra information	Mark	AO / Spec. Ref.
10.4	any **one** from: • tension • normal contact (force) • upthrust	allow lift, thrust and water resistance allow normal reaction (force) ignore drag	1	AO1 4.5.1.2

4.5.6.1.1 Distance and displacement

Answer 02 · Mark scheme

June 2023 | 8463/2F | Original Q10

Question	Answers		Mark	AO / Spec. Ref.
10.5	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.
10.6	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) allow a value correctly extrapolated from their line allow 2 marks for a correct mathematically extrapolated value	1	

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

Total Question 10	**10**

4.5.6.1.1 Distance and displacement

Answer 03 · Mark scheme

June 2024 | 8463/2F | Original Q5

Question 5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	distance speed		1 1	AO1 4.5.6.1.1 4.5.6.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.2	3200 (m)		1	AO2 4.5.6.1.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.3	average speed = $\frac{3200}{2000}$ = 1.6 (m/s)	allow ecf from question **05.2**	1 1	AO2 4.5.6.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.4	B It has the smallest gradient	 MP2 is dependent on MP1	1 1	AO3 AO1 4.5.6.1.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.5	gravity		1	AO3 4.5.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.6	3.0 m/s		1	AO1 4.5.6.1.2

Total Question 5	**9**

4.5.6.1.1 Distance and displacement

Answer 02 · Examiner comments June 2023 | 8463/2F | Original Q10

10.1

Only 9% 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. A small minority didn't attempt the question.

10.2

27% of students gained the mark for the resultant force. Some missed out a force, others did not know how to combine the forces.

10.3

6% of students, who calculated the resultant force correctly, also scored this mark. Very few correctly described the motion using simplistic descriptions like moving forwards or moving slowly, rather than describing the motion in terms of velocity speed and acceleration. It was common to see the aircraft was "stationary", even though the question says it is moving.

10.4

Some students confused energy and force. It was common to see non-contact forces given. 20% of students could name an additional contact force.

4.5.6.1.1 Distance and displacement

Answer 02 · Examiner comments

10.5

6% of students scored 1 mark, usually for drawing an upward line/curve from 10s. Only 23 % of students scored 2 marks.

10.6

A minority of students attempted to draw a smooth curve and extrapolate this to the 10km line. Those who did generally obtained full marks by using the graph correctly, with 12% of students scoring both marks. A number of students miscalculated the scale on the graph and quoted incorrect values from their line. It was more common to see a straight line, which often allowed the award of 1 mark for a correct reading of the value.

10.7

50% of students knew that as the height of the aeroplane above the ground increased, the average density of the air decreased.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.

4.5.6.1.1 Distance and displacement

Answer 03 · Examiner comments June 2024 | 8463/2F | Original Q5

05.1
37% of students identified two scalar quantities from the list, and. 40% could identify one.

05.2
87% of students were able to read the correct value from the distance-time graph.

05.3
Most students correctly used their answer from 05.2 to calculate the average speed.

05.4
Only 2% of students scored both marks, as many found it difficult to explain why they had chosen the correct section of the graph.

05.5
Many students scored this mark about doing work against gravity.

05.6
79% of students scored this mark for recalling the typical running speed of a person.