FREE REVISION PACK

SUVAT & Free Fall

AQA A-level Physics · 7407 / 7408 · Specification 3.4.1.3

Easy | Medium | Multiple choice · past-paper questions

6	6	≈ 10 min
QUESTIONS	TOTAL MARKS	SUGGESTED TIME*

Contents

Q	LEVEL	FOCUS	SOURCE	MARKS
1	Easy	Prefixes: which journey is 1 mm?	AQA June 2023 · A-level Paper 1 · Q7	1 mark
2	Easy	Estimating take-off speed in a jump	AQA June 2023 · A-level Paper 1 · Q8	1 mark
3	Easy	Drops falling from a tap	AQA November 2020 · A-level Paper 1 · Q21	1 mark
4	Medium	Average speed and average velocity	AQA June 2016 · AS Paper 2 · Q20	1 mark
5	Medium	Pellet stopping in a block	AQA June 2023 · AS Paper 2 · Q33	1 mark
6	Medium	Golf on the Moon	AQA June 2016 · AS Paper 2 · Q21	1 mark

Key ideas to have ready

- The suvat equations only apply when the acceleration is **constant**: $v = u + at$, $s = \frac{1}{2}(u + v)t$, $s = ut + \frac{1}{2}at^2$, $v^2 = u^2 + 2as$.
- In free fall (no air resistance) every object has acceleration $g = 9.81\ m\ s^{-2}$ downwards, whatever its mass.
- Choose a positive direction and stick to it. Upward and downward quantities then have opposite signs.
- Average speed = total distance ÷ total time. Average velocity = total displacement ÷ total time.

How to use this pack

1. The questions are grouped into levels (Easy and Medium). Work through them in order, and check your answers at the end of each level before moving on.
2. Every question is multiple choice with one correct answer. Write down your working anyway; that is how you find mistakes.
3. The separate mark scheme uses the same numbers and explains every answer.

Levels are based on how students did in AQA's examiner reports where that information exists, plus our own difficulty rating. *About 1.5 minutes per question.

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Easy

Definitions and one-step ideas. Most students get these right.

Questions 1–3

Only **one** answer per question is allowed. For each question, completely fill in the circle alongside the appropriate answer.

AQA June 2023 · A-level Paper 1 · Q7

1 Which combination of an object's speed and journey time gives a distance travelled of $1\ \text{mm}$?

[1 mark]

	Speed	Journey time	
A	$10\ \mu\text{m s}^{-1}$	$100\ \text{s}$	⬭
B	$10\ \text{km s}^{-1}$	$0.01\ \mu\text{s}$	⬭
C	$1\ \text{nm s}^{-1}$	$1\ \text{Gs}$	⬭
D	$0.1\ \text{Mm s}^{-1}$	$100\ \text{ns}$	⬭

AQA June 2023 · A-level Paper 1 · Q8

2 A person jumps as high as she can from a standing position.

What is a reasonable estimate of her speed just after she leaves the ground?

[1 mark]

A $2\ \text{m s}^{-1}$ ⬭

B $4\ \text{m s}^{-1}$ ⬭

C $8\ \text{m s}^{-1}$ ⬭

D $10\ \text{m s}^{-1}$ ⬭

AQA November 2020 · A-level Paper 1 · Q21

3 Small water drops leave a tap with zero velocity at intervals of $0.20\ \text{s}$.
They then fall freely $0.80\ \text{m}$ to reach a horizontal surface.

How far has a drop fallen when the previous drop hits the surface?

[1 mark]

A $0.16\ \text{m}$ ⬭

B $0.20\ \text{m}$ ⬭

C $0.40\ \text{m}$ ⬭

D $0.60\ \text{m}$ ⬭

Medium

Two or three steps. Roughly a third to a half of students get these right.

Questions 4–6

AQA June 2016 · AS Paper 2 · Q20

4 A girl jogs at $2.0\ \text{m s}^{-1}$ in a straight line for 30 seconds, turns around and returns to her starting point 20 seconds later.

What is her average velocity and average speed?

[1 mark]

	Average velocity/m s^{-1}	Average speed/m s^{-1}	
A	$0\ \text{m s}^{-1}$	$2.4\ \text{m s}^{-1}$	⬭
B	$0\ \text{m s}^{-1}$	$2.5\ \text{m s}^{-1}$	⬭
C	$1.0\ \text{m s}^{-1}$	$2.0\ \text{m s}^{-1}$	⬭
D	$2.5\ \text{m s}^{-1}$	$2.5\ \text{m s}^{-1}$	⬭

AQA June 2023 · AS Paper 2 · Q33

5 A pellet of mass $25\ \text{g}$ travelling horizontally at $40\ \text{m s}^{-1}$ enters a fixed wooden block. The pellet stops after travelling a horizontal distance of $2.5\ \text{cm}$ in the block.

What is the average resistive force acting on the pellet?

[1 mark]

A $20\ \text{N}$ ⬭

B $800\ \text{N}$ ⬭

C $1600\ \text{N}$ ⬭

D $8000\ \text{N}$ ⬭

AQA June 2016 · AS Paper 2 · Q21

6 A golf ball was hit from the surface of the Moon. The time of flight was $4.0\ \text{s}$.

What is the best estimate for the maximum height reached by the ball?

[1 mark]

acceleration due to gravity on the Moon = $1.6\ \text{m s}^{-2}$

A $3\ \text{m}$ ⬭

B $15\ \text{m}$ ⬭

C $40\ \text{m}$ ⬭

D $80\ \text{m}$ ⬭

End of questions. Check your answers with the matching mark scheme. More free packs and 1-to-1 tuition:
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