FREE REVISION PACK

SUVAT & Free Fall

Pearson Edexcel International Advanced Level Physics · Unit 1 (WPH11) · Specification points 1, 11

Easy | Hard | Multiple choice · past-paper questions

5	5	≈ 10 min
QUESTIONS	TOTAL MARKS	SUGGESTED TIME*

Contents

Q	LEVEL	FOCUS	SOURCE	MARKS
1	Easy	Effect of air resistance on a falling ball	Edexcel IAL January 2024 · Unit 1 · Q5	1 mark
2	Easy	Why a value of g came out too large	Edexcel IAL June 2024 · Unit 1 · Q8	1 mark
3	Easy	Conditions for measuring g by free fall	Edexcel IAL January 2023 · Unit 1 · Q4	1 mark
4	Easy	Distance during uniform acceleration	Edexcel IAL January 2023 · Unit 1 · Q5	1 mark
5	Hard	Distances fallen in equal time intervals	Edexcel IAL October 2019 · Unit 1 · Q9	1 mark

Key ideas to have ready

- For uniform acceleration: $v = u + at$, $s = ut + \frac{1}{2}at^2$, $v^2 = u^2 + 2as$, $s = \frac{1}{2}(u + v)t$.
- In free fall (no air resistance) the acceleration is $g = 9.81\ \text{m s}^{-2}$ downwards, even at the top of the path.
- From rest, distance fallen $\propto t^2$: in equal time intervals the distances go 1 : 3 : 5 …
- Measuring g: $g = 2s/t^2$, so timing errors matter a lot.

How to use this pack

1. The questions are grouped into levels (Easy and Hard). 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 Pearson's examiner reports where that information exists, plus our own difficulty rating. *About 1.5 minutes per question.

Questions are reproduced from Pearson Edexcel International Advanced Level past papers; Pearson Edexcel material is © Pearson Education Ltd. Question numbers have been changed to suit this pack. Get Better At Physics is an independent tutor and is not affiliated with or endorsed by Pearson. Free for personal revision and classroom use.

Easy

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

Questions 1–4

Choose **one** answer for each question and put a cross in the box next to it.

Edexcel IAL January 2024 · Unit 1 · Q5

1 A student dropped a table tennis ball. The ball fell for time t and had velocity v just before it hit the ground.

The student used the equations of motion to calculate t and v. These equations ignore air resistance.

Which row of the table shows how the actual values compared with the student's calculated values for t and v?

	t	v
☒ **A**	Less than calculated	Less than calculated
☒ **B**	Less than calculated	Greater than calculated
☒ **C**	Greater than calculated	Less than calculated
☒ **D**	Greater than calculated	Greater than calculated

Edexcel IAL June 2024 · Unit 1 · Q8

2 A student is determining the acceleration of free-fall, g.

The student uses a stopwatch to measure the time taken for a ball bearing to fall a measured distance.

The student calculates a value of g that is greater than $9.81\,\text{m s}^{-2}$.

Which of the following could be an explanation for the student's result?

☒ **A** The ball bearing is moving downwards when the student starts the stopwatch.

☒ **B** The ball bearing is moving upwards when the student starts the stopwatch.

☒ **C** The student starts the stopwatch before the ball bearing is dropped.

☒ **D** The student stops the stopwatch after the ball bearing lands.

Edexcel IAL January 2023 · Unit 1 · Q4

3 A student measures the time taken for a steel ball bearing to fall a measured distance in air. The student uses these measurements to determine the acceleration due to gravity.

Which of the following conditions is needed to determine an accurate value for the acceleration due to gravity?

☒ **A** The air flow around the ball bearing should be laminar.

☒ **B** The time taken to achieve terminal velocity should be short.

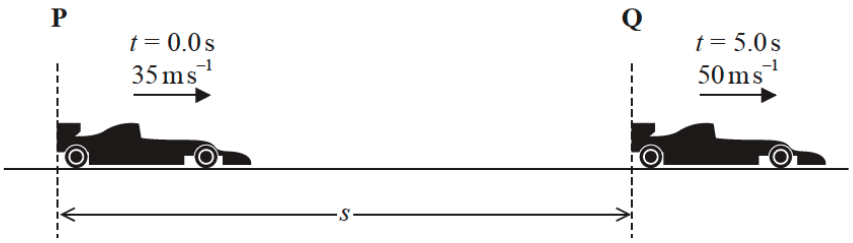
☒ **C** The ball bearing should begin to fall before the timer is started.

☒ **D** Air resistance and upthrust should both be negligible.

Edexcel IAL January 2023 · Unit 1 · Q5

4 A racing car passes point P at a speed of $35\,m\,s^{-1}$.

The car accelerates uniformly and after 5.0 s passes point Q at a speed of $50\,m\,s^{-1}$, as shown.



Which of the following expressions gives the distance s, in metres, between the two points?

☒ **A** $\dfrac{50^2 - 35^2}{2 \times 5}$

☒ **B** $(35 \times 5) + (0.5 \times 9.81 \times 5^2)$

☒ **C** $0.5 \times (35 + 50) \times 5$

☒ **D** $35 + (9.81 \times 5)$

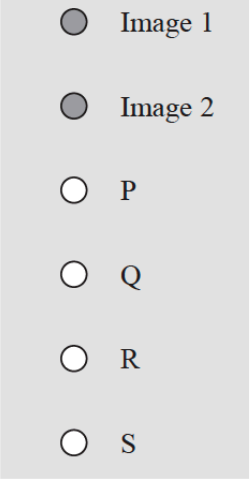
Hard Several steps, often with a trap built in. Fewer than 3 in 10 students get these right. **Question 5**

Edexcel IAL October 2019 · Unit 1 · Q9

5 A student used a falling sphere to determine the acceleration of free fall.

A camera produced images of the sphere at constant time intervals as it fell.

The positions of the sphere in the first two images are shown. Image 1 shows the sphere's position at the instant it was released.



Which of the positions P, Q, R or S will the sphere be at in Image 3?

☒ **A** P

☒ **B** Q

☒ **C** R

☒ **D** S

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