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Examiners' Report

October 2025

Pearson Edexcel International Advanced Subsidiary level In Physics
WPH11/01A

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Introduction

The WPH11 unit centres on building an understanding of the physics behind mechanics and the properties of materials, along with being able to apply this knowledge. This exam assessed how well candidates could use these ideas in both familiar and unfamiliar contexts.

The paper examined a broad set of skills, including recalling essential information, applying principles to new scenarios, performing calculations, and giving clear explanations. It also assessed candidates' grasp of techniques and understanding gained through the core practical work.

A large proportion of candidates demonstrated solid mathematical skills, and most correctly included units in their answers. However, some questions showed that many candidates struggle to use physical reasoning before moving on to the maths. For example, in question 17, where many candidates incorrectly handled positive and negative signs when dealing with downward acceleration and upward initial velocity or confused initial and final velocities when substituting values into equations of motion.

Explanatory questions were especially challenging for some, with many candidates finding it difficult to describe or explain situations in which Newton's laws of motion should be applied.

Overall, most candidates presented their physics knowledge clearly, even if their written English was sometimes flawed. With the exception of the * question, where the organisation of the response formed part of the assessment, issues with written English were ignored as long as answers remained clear and unambiguous.

Comments on Individual Items

Section A: Multiple Choice

	Subject	Correct response	Explanation
1	Scalars and vectors	**C**	Velocity is a vector
2	Hooke's law	**D**	$1.5\text{ N} = k \times 0.030\text{ m}$ $k = \frac{1.5\text{ N}}{0.030\text{ m}} = 50\text{ N m}^{-1}$
3	Scalars and vectors	**B**	Time taken is a scalar quantity
4	Equations of motion	**B**	$s = ut + \frac{1}{2}at^2$ $u = 0$ and $a = g$ $\therefore\ s = \frac{1}{2}gt^2$ $\therefore 2s = gt^2$ $y = mx\ (+c)$ So: • $y = 2s$ • $m = g = gradient$ • $x = t^2$
5	Vectors	**D**	In a vector diagram, vectors are drawn 'tip to tail' and the resultant vector starts at the beginning of the first arrow and ends at the end of the final arrow.
6	Projectile motion	**C**	Air resistance is negligible, so horizontal component of velocity is constant.
7	Force-extension graphs	**B**	Work done to stretch a wire is equal to area underneath the graph. A triangle drawn from the origin to (e_1, F_1) has area $0.5F_1e_1$. The area under the graph is greater than the area of a triangle drawn from the origin to (e_1, F_1) Therefore $W > 0.5F_1e_1$
8	Projectile motion	**D**	At maximum height, velocity is zero, so no air resistance acts. The only force acting is weight, so the acceleration is only due to gravity, and acts downwards.

9	Newton's third law	**B**	The forces in a Newton's third law pair act between two different bodies.
10	Conservation of energy	**D**	$\Delta mgh = \Delta\frac{1}{2}mv^2$ $\therefore\ v = \sqrt{2 \times g \times \Delta h}$ $= \sqrt{(2 \times g \times (75\text{m} - 30\text{m})}$ $= \sqrt{2 \times 45\text{m} \times g}$ $= \sqrt{90\text{m} \times \text{g}}$

Question 11(a)

Most candidates were able to gain some credit on this question, with the vast majority of these gaining the first marking point for showing all three downward forces.

Only about a third of candidates also included the upwards force of the pivot on the plank.

A small proportion of candidates incorrectly showed the weight of the plank acting at the pivot instead of through the centre of gravity of the plank.

Question 11(b)

The majority of candidates were able to correctly apply the principle of moments and arrive at the correct answer.

For those who did not gain full marks, a common error was to miscalculate the distance from the pivot to the centre of gravity of the plank.

Question 12

Around 60% of candidates scored full marks for this question.

12(a) Some candidates made errors with the trigonometry, but the majority were able to answer this question correctly.

12(b) A small proportion of candidates did not realise that they could use their answer to question 12a (or the 'show-that' value), and re-calculated it, sometimes making an error in this second calculation.

A noticeable minority either got the useful output energy and total input energy the wrong way round in the efficiency equation or made errors when re-arranging this equation.

Question 13

Over half of all candidates gained full marks on this question.

13(a) the conditions needed for Stokes' law to apply were well known. A small proportion referred to a 'laminar fluid' or just mentioned 'laminar', neither of which was sufficient to gain the mark.

13(b) This question was generally well answered, but there were some common errors shown by a number of candidates. A correct unit was needed to gain the fourth marking point, but some did not include this. Some candidates did not subtract the upthrust from the weight to determine the drag force, instead substituting either the weight or the upthrust directly into the Stokes' law equation.

Candidates could take a variety of approaches to answering the question. As long as an appropriate value was calculated and compared with the given equivalent value in the question (e.g. using the data given to calculate the terminal velocity, and then comparing this calculated value with 0.50 m s^{-1}), full marks could be awarded for these approaches.

Question 14

Many candidates were able to make a good attempt at answering this question that links velocity-time graphs with acceleration, with about 70% of candidates gaining some credit, and approximately a quarter scoring four marks or above.

Surprisingly, one of the more common indicative points that was omitted by candidates was to describe the link between the gradient and acceleration.

Some referred to 'resistance' (rather than referring to oil resistance, fluid resistance, resistive forces, or drag, for example) which was not clear enough.

A number of candidates referred to the area under the graph, which did not answer the question, although discussing this did not prevent them from scoring any marks.

A few showed some confusion when describing the 'oil' graph line, describing a deceleration (i.e. slowing down) instead of a decreasing acceleration (i.e. having a lower acceleration).

Question 15(a)

A high proportion of candidates just quoted the equation from the equation sheet, which, on its own, was not sufficient to gain the mark.

Question 15(b)

Over 90% of candidates were able to make a start at this question to determine the Young Modulus, with over a third gaining full marks.

15(b)(i) Some candidates made errors in converting from mm^2 to m^2.

A small minority recognised that the value of 0.230 occurred twice in the results and then discarded one of these two values when calculating the mean diameter.

15(b)(ii) While this calculation was generally done well by candidates, a common error was seen in those who did not multiply the gradient by *g*, so that only the second marking point was scored.

The unit also caused some problems: the unit Pa s was often seen. This is not acceptable as a plural for pascals, and is always taken to mean pascal seconds, the unit for viscosity.

Question 15(b)(iii)

For candidates who recalled that the young modulus is a property of a material, rather than a property of a sample of that material, this question was straightforward. However, it was clear that many did not appreciate this, and nearly 60% did not score either mark.

Question 16(a)

This 'show-that' question was generally well answered, with many candidates successfully calculating the speed of the water. Some candidates did not give their answer to enough significant figures, so failed to score the final mark. Some tried to use a conservation of energy approach, which did not help them to answer the question.

Question 16(b)

Only about 30% of candidates gained any credit on this question, with many responses left completely blank.

Most of those who did attempt the question mentioned Newton's third law but often did not specify which objects were involved in exerting forces on each other.

Question 16(c)

This question was not well answered, with a large number of candidates demonstrating a misconception that the Newton's third law pair of forces in question 16b only acts when the pump is initially switched on, rather than acting al all times when the water was being pumped. A common incorrect statement was to suggest that the resultant force would decrease so the speed would decrease, rather than linking resultant force to acceleration. Only about 3 in 10 candidates scored any marks.

Question 17(a)(i)

Nearly 60% of candidates were able to show the initial trajectory of the water at 30°. Those who did not gain the mark usually drew the initial trajectory at too steep an angle.

Question 17(a)(ii)

About two thirds of candidates were able to correctly apply an equation of motion and arrive at the correct answer.

However, some candidates mixed up values for initial and final velocity or used a positive value for vertical acceleration. Using signs consistently and using the correct values for initial and final velocity is important, so even though doing this may have led to an answer of the correct magnitude, if incorrect physics was used, full marks were not awarded.

Question 17(b)(ii)

About 40% of candidates were able to apply equations of motion in two directions to arrive at a correct answer.

A fair proportion of candidates did not attempt this question. Those who did attempt it but did not gain full marks often made errors with trigonometry or confused the vertical and horizontal components of velocities.

Question 18(a)

It was pleasing to see such a large proportion of candidates, about 80%, able to work through this conservation of momentum calculation correctly.

A few candidates multiplied the masses by the wrong velocities.

Question 18(b)

The majority of candidates attempted to use conservation of energy to answer this question, although those who used the equations of motion to determine the frictional force could still gain full credit, with approximately 30% scoring full marks.

Those who took the equations of motion approach were more likely to make errors in their working.

A common error in both methods was to use trigonometry to determine the wrong side of the triangle.

Question 19(a)

Most were able to score two or three marks when drawing this free body force diagram. Those who did not gain full marks often did not label their force arrows appropriately or did not make the total length of the upwards arrows the same as the total length of the downwards arrow.

Question 19(b)(i)

Very few candidates scored all three marks on this question, although about 60% were able to gain some credit for applying Newton's third law to this context.

A fair proportion of candidates did not mention that the force on the balance increases, so did not score the final marking point.

Question 19(b)(ii)

This question was well answered, with the majority of candidates able to correctly determine the mass of the sphere and gain full marks.

For those who did not achieve full marks, a noticeable number determined an upthrust but forgot that they needed to work out a mass rather than a force.

Question 19(b)(iii)

Those candidates who attempted this question tended to give a good answer to explain the change in the reading on the balance, but many did not attempt to answer at all.

Some recognised that the upthrust would decrease, but then incorrectly concluded that the downwards force would then increase, which contradicted their initial point and meant they did not gain the first marking point.

Concluding Remarks

Candidates showed a broad range of knowledge and skills on this paper. It was encouraging to see some excellent answers and particularly pleasing to see a large number of candidates able to correctly work through some of the multi-step calculations.

Newton's third law caused some candidates particular problems, and perhaps studying more examples of Newton's third law may help candidates to apply this to different situations.

Drawing vector diagrams, free-body force diagrams and other diagrams where arrows represent vectors is an area where candidates may benefit from using a ruler when drawing their diagrams to ensure that the arrows are of the correct length.

The recommendations for improving candidate performance remain consistent with those from previous series, including:

- When giving a final answer, double-check whether the last digit should be rounded up or down.
- Always include the correct units in your calculations, and be mindful of unit prefixes (kilo, mega, milli, etc.) and powers of ten. Conversions involving mm^2 or cm^2 to m, such as in question 15b, are often challenging, so extra practice in this area can be helpful.
- Encourage candidates to read each question thoroughly and review their responses to avoid mistakes or misunderstandings.
- Offer practice in applying fundamental ideas, such as Newton's laws of motion, across a range of situations so that learners build confidence and strengthen their problem-solving skills.
- Emphasise the need for candidates to accurately remember and understand essential physics terms and quantities, such as the young modulus.