FREE REVISION PACK

Hooke's Law & Springs

Pearson Edexcel International Advanced Level Physics · Unit 1 (WPH11) · Specification points 27–29

Easy | Multiple choice · past-paper questions

5	5	≈ 10 min
QUESTIONS	TOTAL MARKS	SUGGESTED TIME*

Contents

Q	LEVEL	FOCUS	SOURCE	MARKS
1	Easy	Force needed to compress a stiffer spring	Edexcel IAL October 2019 · Unit 1 · Q10	1 mark
2	Easy	Beyond the elastic limit	Edexcel IAL January 2025 · Unit 1 · Q4	1 mark
3	Easy	Extension of a stiffer spring with a larger force	Edexcel IAL January 2025 · Unit 1 · Q6	1 mark
4	Easy	Stiffness from a force–length graph	Edexcel IAL January 2024 · Unit 1 · Q7	1 mark
5	Easy	Stiffness from a length–force graph	Edexcel IAL June 2024 · Unit 1 · Q5	1 mark

Key ideas to have ready

- Hooke's law: $\Delta F = k\Delta x$, up to the limit of proportionality. Stiffness k = force ÷ extension.
- Beyond the elastic limit the material is permanently (plastically) deformed.
- Use extension (change in length), not the final length.
- On a force–extension graph, k is the gradient (if force is on the y-axis).

How to use this pack

1. The questions are grouped into levels (Easy). 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.

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Easy

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

Questions 1–5

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

Edexcel IAL October 2019 · Unit 1 · Q10

1 A force F was applied to compress a spring by a distance x.

A second spring of double the stiffness was compressed by the same distance x.

Which of the following gives the magnitude of the force applied to the second spring?

☒ **A** $4F$

☒ **B** $2F$

☒ **C** F

☒ **D** $\frac{F}{2}$

Edexcel IAL January 2025 · Unit 1 · Q4

2 A spring is stretched beyond its elastic limit. The applied force is then removed.

Which of the following describes the behaviour of the spring?

☒ **A** The extension of the spring is always proportional to the force applied.

☒ **B** Plastic deformation occurs until the spring reaches its elastic limit.

☒ **C** The spring only shows elastic deformation.

☒ **D** The spring does not return to its original length.

Edexcel IAL January 2025 · Unit 1 · Q6

3 When a force F is applied to a spring of stiffness k, the extension of the spring is Δx.

A force $2F$ is applied to a second spring of stiffness $3k$.

Which of the following expressions gives the extension of the second spring?

☒ **A** $\frac{2}{3}\Delta x$

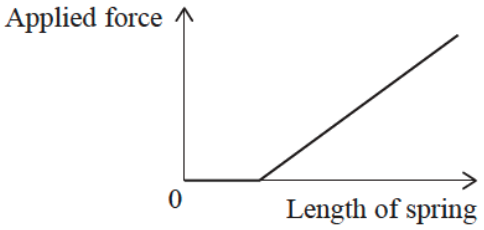
☒ **B** $\frac{3}{2}\Delta x$

☒ **C** $\frac{1}{6}\Delta x$

☒ **D** $6\Delta x$

Edexcel IAL January 2024 · Unit 1 · Q7

4 A force is applied to stretch a spring. The graph shows how the length of the spring varies with the applied force.



Which of the following gives the stiffness of the spring?

☒ **A** the area between the graph and the x-axis

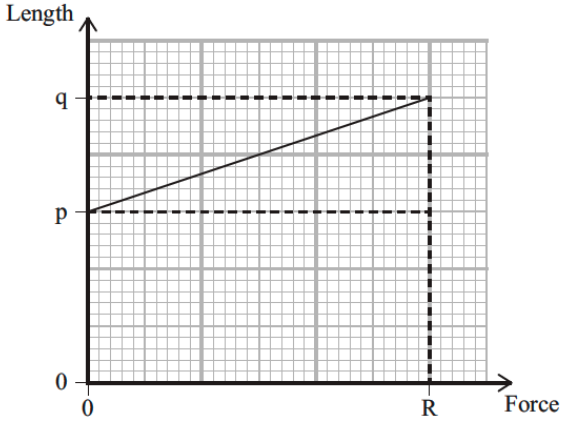
☒ **B** the area between the graph and the y-axis

☒ **C** the gradient of the graph

☒ **D** $\dfrac{1}{\text{gradient of the graph}}$

Edexcel IAL June 2024 · Unit 1 · Q5

5 A student stretches a spring of original length p to a length q by applying an increasing force. The graph shows how the length of the spring changes as the student increases the force from zero to a magnitude R.



Which of the following expressions gives the stiffness of the spring?

☒ **A** $\dfrac{q - p}{R}$

☒ **B** $\dfrac{q}{R}$

☒ **C** $\dfrac{R}{q}$

☒ **D** $\dfrac{R}{q - p}$

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