GET BETTER AT PHYSICS · MARK SCHEME

Stress, Strain & Young Modulus: tiered multiple choice

Edexcel IAL Physics · Unit 1 (WPH11) · Specification points 28–31 · 5 questions · 5 marks

1 mark per correct letter | Worked reasoning for every question

How students did = from Pearson examiner reports, where available

Answer key

Q1	Q2	Q3	Q4	Q5
C	B	C	C	B

Easy

Questions 1–5

1 **C**

Reading elastic limit and plastic region from a stress–strain graph · Edexcel IAL June 2019 · Unit 1 · Q6

The elastic limit is roughly where the straight, steep part of the graph ends. A low elastic limit means the line bends over at a low stress; a large plastic region means the graph then continues a long way to the right before breaking. Curve C does both.

How students did: 84% of students got this right in June 2019.

2 **B**

Young modulus from a stress–strain graph · Edexcel IAL January 2025 · Unit 1 · Q1

Young modulus = stress ÷ strain in the linear region, which is the gradient of the stress–strain graph.

Watch out: The area under a stress–strain graph is energy per unit volume, not the Young modulus.

3 **C**

Comparing two stress–strain graphs · Edexcel IAL January 2024 · Unit 1 · Q9

The yield point is where the material starts to stretch a lot with little or no increase in stress (the first peak on these curves). P reaches its yield point at a higher stress than Q, so P has the greater yield stress. Q breaks at a higher stress and strain, and P's initial gradient (Young modulus) is not smaller than Q's.

4 **C**

Extension of two different wires · Edexcel IAL October 2025 · Unit 1 · Q8

From $E = FL/(A\Delta x)$, $\Delta x = FL/(AE)$. For Q the length is the same, the area is halved and E is doubled, so AE is unchanged. The extension of Q is therefore also Δx.

5 **B**

Getting a larger extension before breaking · Edexcel IAL June 2024 · Unit 1 · Q9

Both wires are the same material, so they break at the same strain. Extension = strain × original length, so a longer wire stretches further before it breaks. Changing the diameter changes the breaking force, not the breaking strain.

End of mark scheme. Answers from Pearson's published mark schemes; explanations written for this pack. Pearson Edexcel material is © Pearson Education Ltd. More free packs and 1-to-1 tuition: **www.getbetteratphysics.co.uk**

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