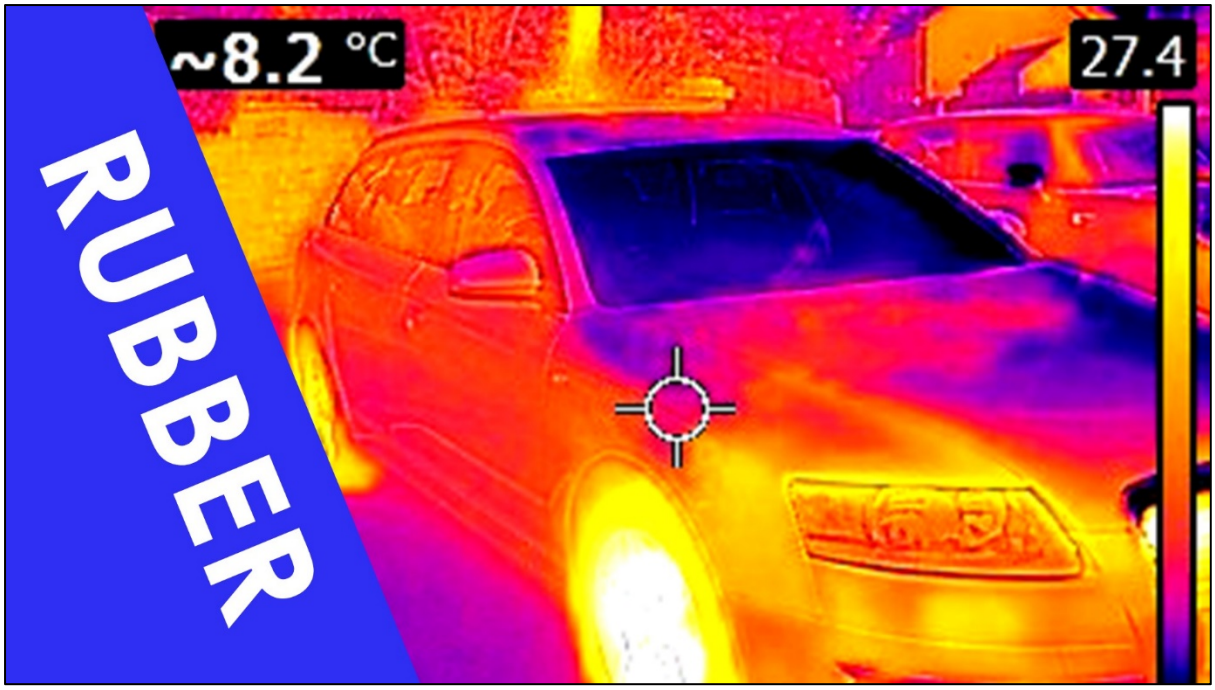
live

A Level Physics

1st Feb 2021 – Behaviour of Rubber Practical

Suitable for ALL exam boards



This session looks at what happens when rubber (rather than a metal spring) is extended – including calculations of stress and strain.

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Question taken from:

Edexcel IAL Physics - January 2016 - Paper 3 (WPH03) - Question 8

8 A student carried out an experiment to investigate the stretching of a length of rubber of rectangular cross-section. His results are shown below.

original length of rubber = 0.15 m

thickness of rubber = 1.05×10^{-3} m

width of rubber = 2.71×10^{-3} m

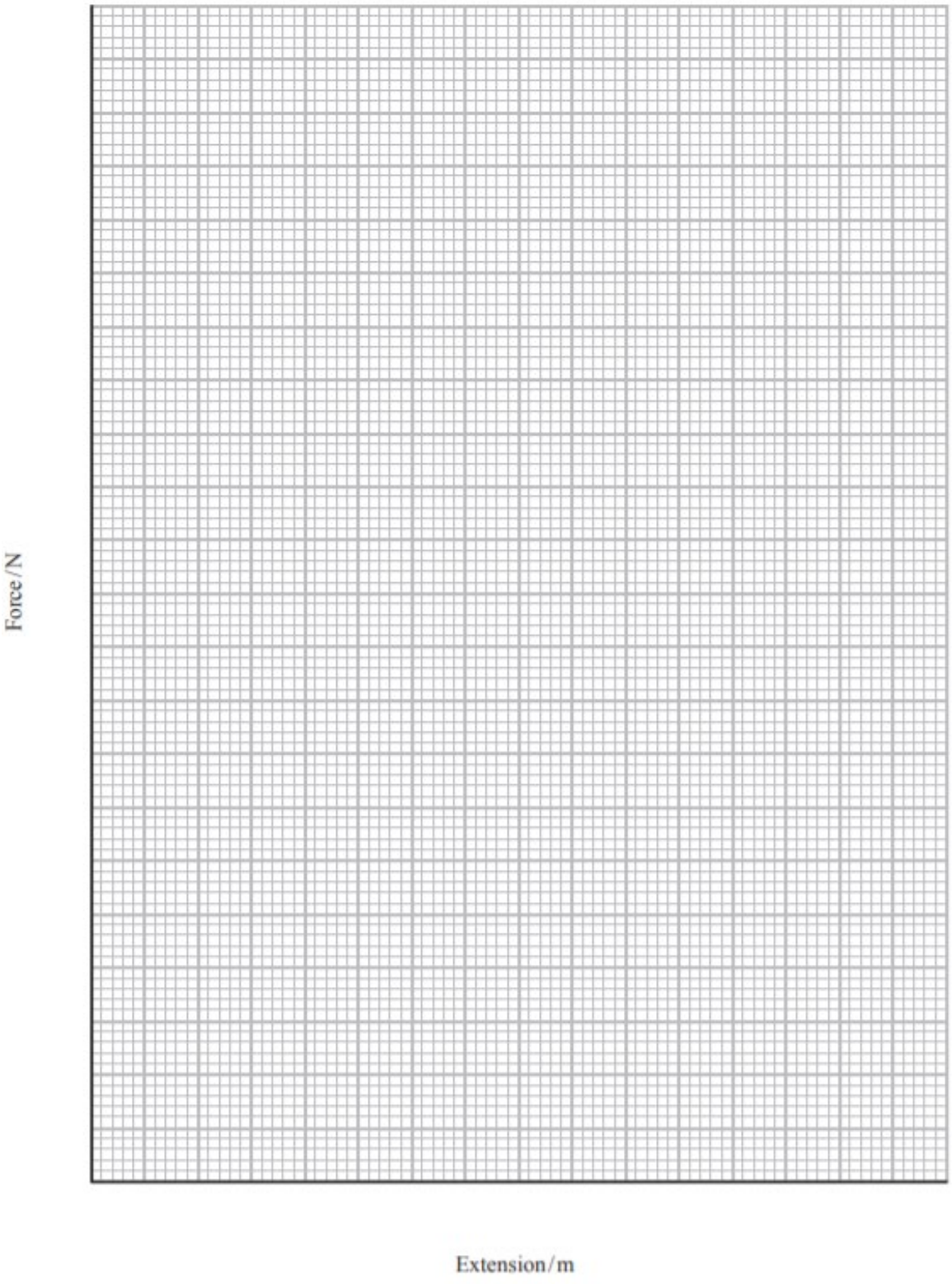
Extension / m	Force / N
0	0
0.0225	3.9
0.05	7.9
0.13	9.8
0.235	12.4
0.3	14.0
0.35	18.5

(a) Criticise these results.

(2)

(b) (i) Plot a graph of force on the *y*-axis and extension on the *x*-axis and draw a line of best fit.

(4)


Force / N
Extension / m

(ii) Comment on the shape of the graph.

(2)

(iii) The area under the graph represents the work done in stretching the rubber.
Determine the work done in stretching the rubber by 0.2 m.

(4)

Work done = _____

(c) For the last set of results in the table calculate the stress and strain. State an assumption you have made.

(6)

Stress = ...

Strain = ...

Assumption .....

(Total for Question 8 = 18 marks)