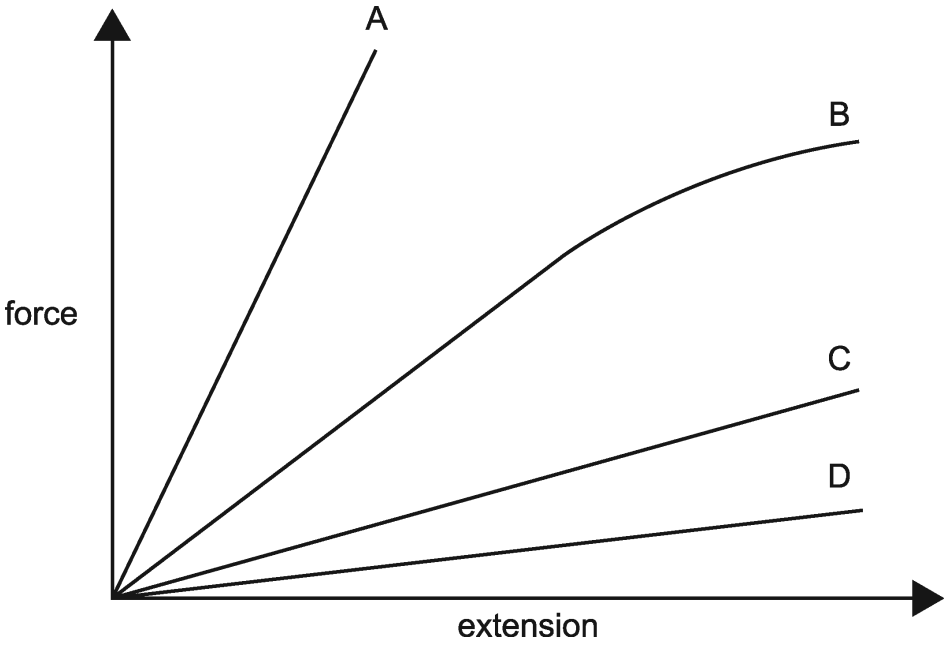
OCR
Oxford Cambridge and RSA

Gateway Science Physics A

J249/01 Physics A P1-P4 and P9 (Foundation Tier)

Question Set 21

21 The force–extension graphs for four different springs (**A**, **B**, **C** and **D**) are shown below.



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(a) Explain which of the springs (**A**, **B**, **C** or **D**) has the largest spring constant.

[2]

(b) Explain why the line for spring **B** has a different shape from the other lines.

[2]

(c) **(i)** A spring has a spring constant of 27 N / m.

The spring is stretched to an extension of 25 cm.

The energy transferred can be calculated using the formula:

energy transferred = 0.5 × spring constant × extension^2.

Calculate the energy transferred in stretching.

Answer = ...J

[2]

(ii) A student set up the apparatus shown in **Fig. 1.1**.

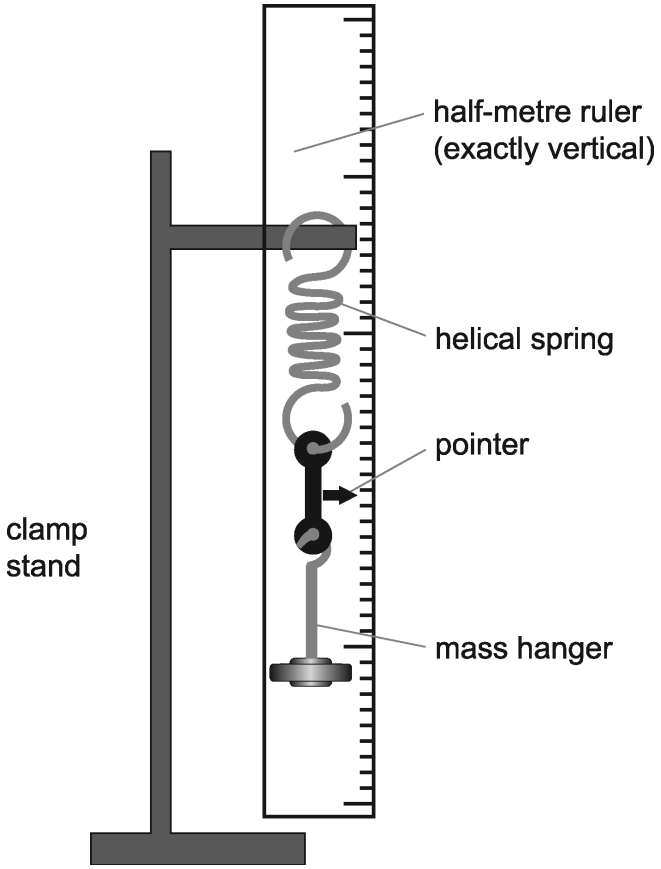

Fig. 1.1

The students want to plot a force–extension graph for this spring.

Describe how they could use this apparatus to collect data so that the graph could be plotted.

[4]

(iii) The spring in **Fig. 1.1** has a spring constant of 30 N / m.

This is replaced by a spring with a spring constant of 10 N / m.

What changes should the student make to this method to investigate this spring?

[2]

Total Marks for Question Set 21: 12