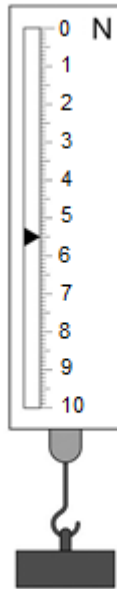


0 2

A newtonmeter measures the weight of objects.

Look at **Figure 3**.**Figure 3****0 2****1**What is the weight of the object in **Figure 3**?**[1 mark]**

Weight = _____ N

0 2**2**

The spring inside the newtonmeter behaves elastically.

What happens to the length of the spring when the object is removed from the newtonmeter?

[1 mark]Tick **one** box.The spring gets longer The spring gets shorter The spring stays the same length

0 2 . **3** A student carried out a practical to investigate the extension of a spring.

Write a method the student could have used.

[4 marks]

0 2 . **4** What could be done to improve the accuracy in this investigation?

[2 marks]

Tick **two** boxes.

Use a pointer from the spring to measure the length.

Use a stronger spring in the practical.

Use a new spring between each reading.

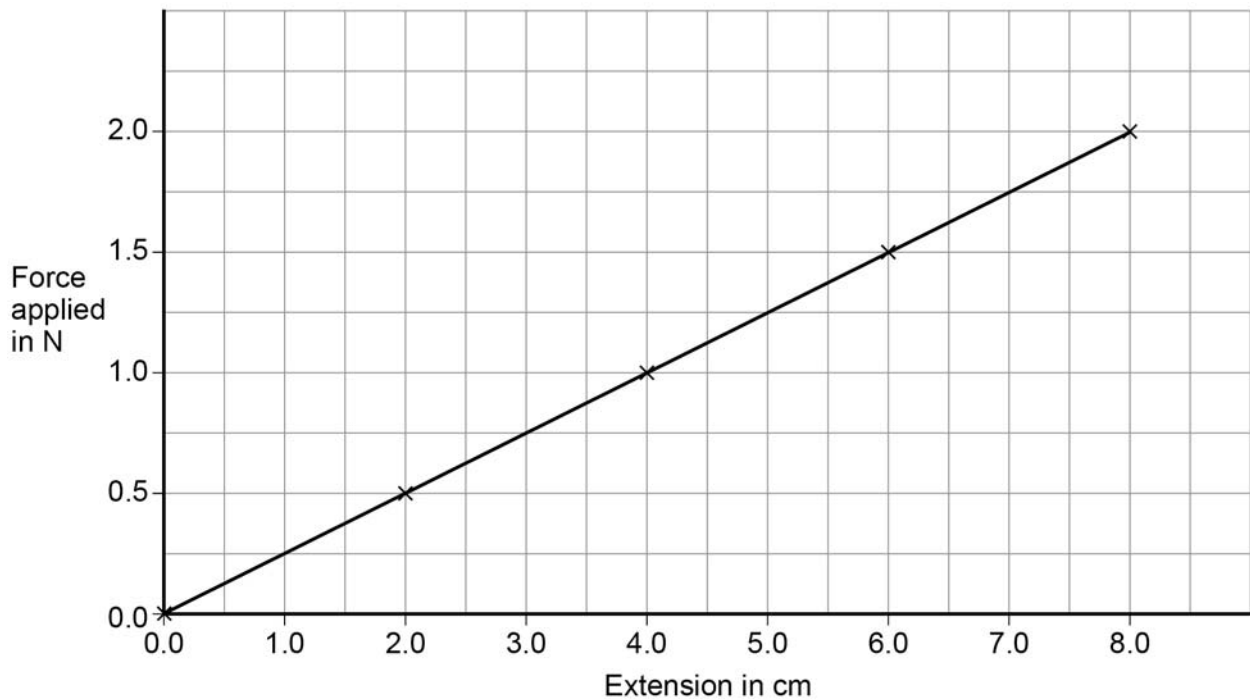
Make sure the spring is stationary before measuring length.

Use a longer rule when measuring length.

The student added weights to a spring and measured the extension of the spring.

Figure 4 shows his results.

Figure 4



0 2 . **5** What is the relationship between force applied and extension?

[1 mark]

Tick **one** box.

Extension is inversely proportional to force

Extension increases by smaller values as force increases

Extension is directly proportional to force

0 2 . **6** Use **Figure 4** to determine the additional force needed to increase the extension in the spring from 5.0 cm to 7.0 cm.

[1 mark]

Force needed = _____ N

0 2 . **7** **Table 1** shows some results with a different spring.

Table 1

Force applied in N	Extension in m
0.0	0.000
0.5	0.025
1.0	0.050
1.5	0.075

What would the extension be with a force of 2.0 N?

[1 mark]

Tick **one** box.

0.080 m

0.090 m

0.095 m

0.100 m

0 2 . **8** The spring constant for the spring in **Table 1** is 20 N/m.

Calculate the work done in stretching the spring until the extension of the spring is 0.050m

Use the correct equation from the Physics Equation Sheet.

[2 marks]

Work done = _____ J

Question 2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	5.5 (N)		1	AO2/2 6.5.3 WS2.6
02.2	The spring gets shorter		1	AO1/1 6.5.3
02.3	Level 2: A detailed and coherent description of the experiment. The response provides a logical sequence.	3–4	4	AO1/2 6.5.3
	Level 1: Simple description of the experiment with some steps missing. The response may not be in a logical sequence and may not lead to the collection of valid results.	1–2		
	No relevant content.	0		
	Indicative content <ul style="list-style-type: none"> • set up a clamp stand with a clamp and hang a spring on it • use another clamp and boss to fix a half metre rule alongside the spring • record the metre rule reading that is level with the bottom of the spring • hang a weight from the bottom of the spring • record the new reading on the rule and the extension on the spring • remove the weight and check the length of the spring • repeat by adding more weights and record the readings on the rule 			

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.4	Use a pointer from the spring to measure the length.		1	AO3/3b 6.5.3
	Make sure the spring is stationary before measuring length.		1	
02.5	Extension is directly proportional to force	if more than one box ticked apply list principle	1	AO3/2b 6.5.3 WS3.5
02.6	0.5 (N)		1	AO2/1 6.5.3
02.7	0.100 m	if more than one box ticked apply list principle	1	AO3/2a 6.5.3 WS3.5
02.8	0.5 x 20 x (0.050) ² = 0.025 (J)	allow 0.025 (J) with no working for 2 marks	1	AO2/1
			1	6.5.3
Total			13	