Practice Question Set For GCSE
**Subject : Physics**
**Paper-2 Topic : 15_Forces And Matter**

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**Name of the Student**:_____
**Max. Marks : 24 Marks** **Time : 24 Minutes**

**Q1.**

A different spring is extended.

A force of 0.50 N gives an extension of 13 mm.

Calculate the spring constant *k* in N/m.

**(3)**

spring constant *k* = ..... N/m

**(Total for question = 3 marks)**

**Q2.**

Figure 7 shows an athlete using a fitness device.

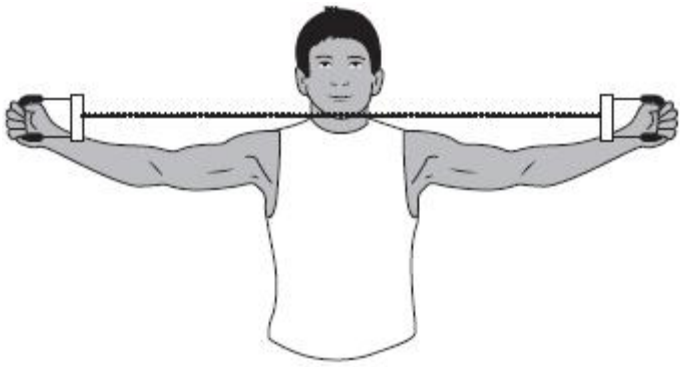

**Figure 7**

The athlete stretches the spring in the device by pulling the handles apart.

The spring constant of the spring is 140 N/m.

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The athlete does 45 J of work to extend the spring.

The athlete takes 0.6 s to expand the spring.

(i) Calculate the useful power output of the athlete when stretching the spring.

**(2)**

useful power output of the athlete = ..... W

(ii) Calculate the extension of the spring.

Use an equation selected from the list of equations from the relevant equation sheet.

**(3)**

extension of the spring = ..... m

**(Total for question = 5 marks)**

**Q3.**

A student investigates the stretching of a long piece of rubber.

Figure 8 shows the apparatus to be used.

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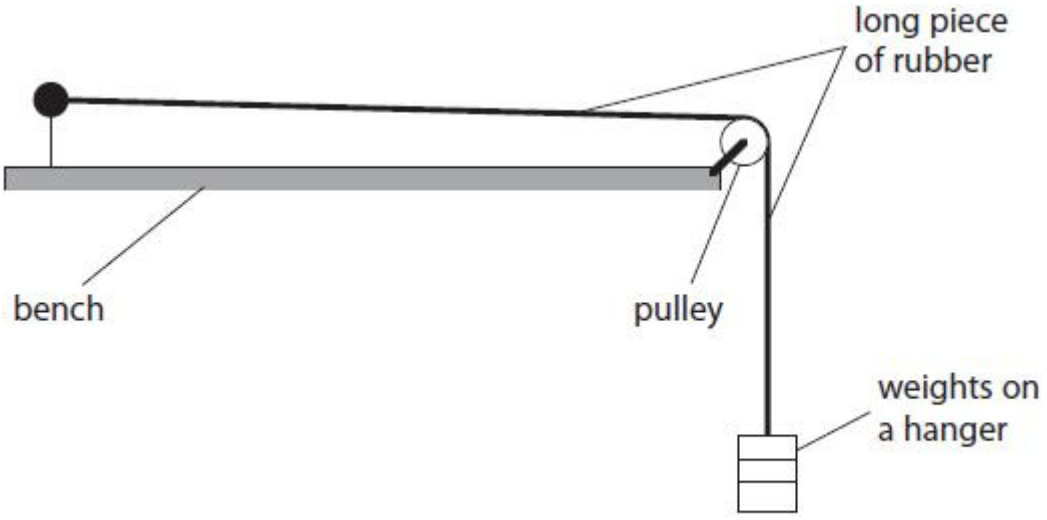


**Figure 8**

The student puts just enough weight on the weight hanger to make the piece of rubber just tight.

The student wants to plot a graph to show how the extension of the piece of rubber varies with the force used to stretch it.

The student adds a known weight to the weight hanger.

(i) Describe how the student could measure the extension of the rubber when he adds another weight to the weight hanger.

**(2)**

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(ii) The student obtains a series of values of force and extension while loading the piece of rubber and then unloading it.

Figure 9 shows the graph of the student's values.

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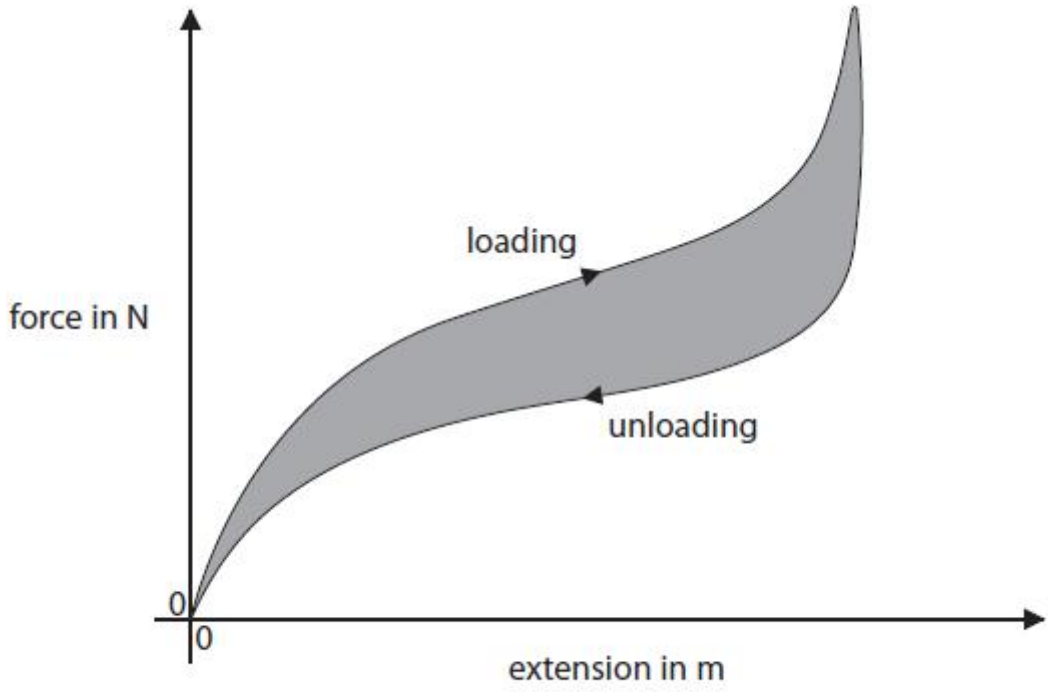


**Figure 9**

Explain how the shape of this graph shows that the distortion of the piece of rubber being stretched is different from the distortion of a spring being stretched.

**(2)**

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**(Total for question = 4 marks)**

**Q4.**

**Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.**

Figure 8 shows a different spring hanging from a hook fixed to the ceiling.

A block hangs from the other end of the spring.

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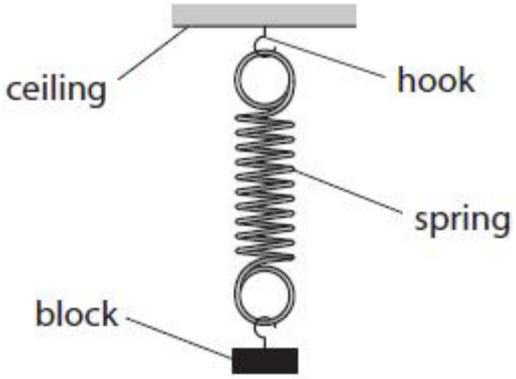


**Figure 8**

The weight of the spring is 1 N.
The weight of the block is 5 N.

The force exerted on the top of the spring by the hook is

**(1)**

- ☒ **A** 4 N down
- ☒ **B** 4 N up
- ☒ **C** 6 N down
- ☒ **D** 6 N up

**(Total for question = 1 mark)**

**Q5.**

A student uses a digital calliper to measure the length of a spring, as shown in Figure 10.

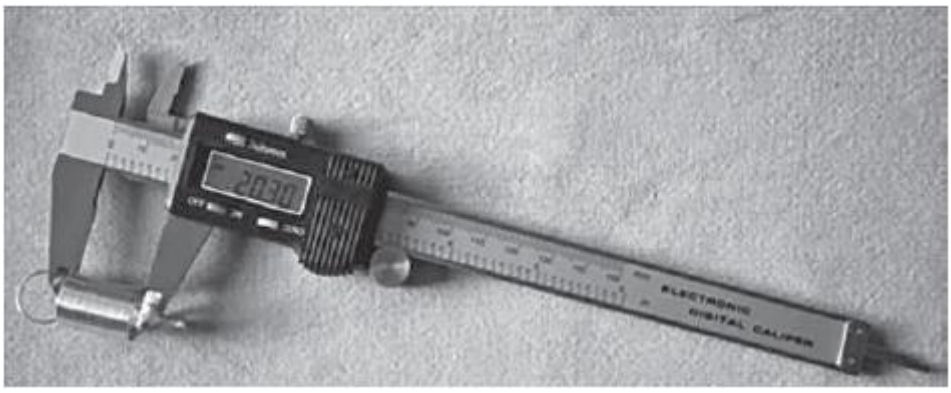

**Figure 10**

The spring is bendy and difficult to measure.

The student takes the six readings shown in Figure 11.

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**Figure 11**

(a) Calculate the average length of the spring.

**(2)**

average length = ..... mm

(b) The student investigates the stretching of a spring with the equipment shown in Figure 12.

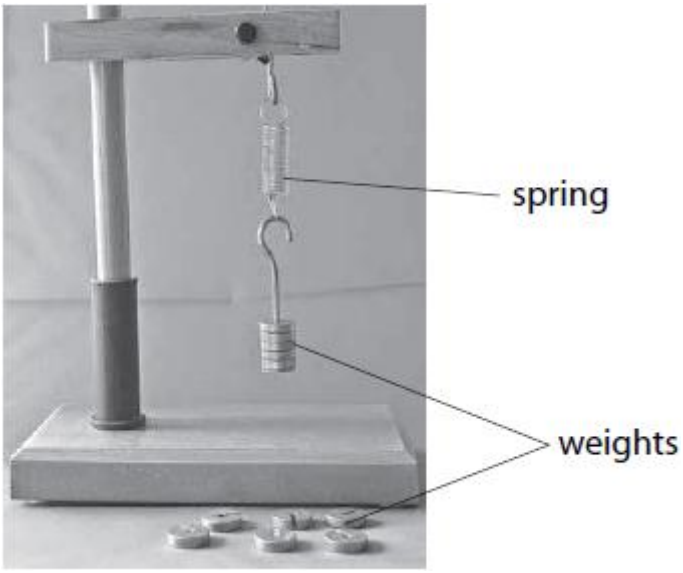


**Figure 12**

The student investigates the extension of the spring using six different weights.
The results are shown in Figure 13.

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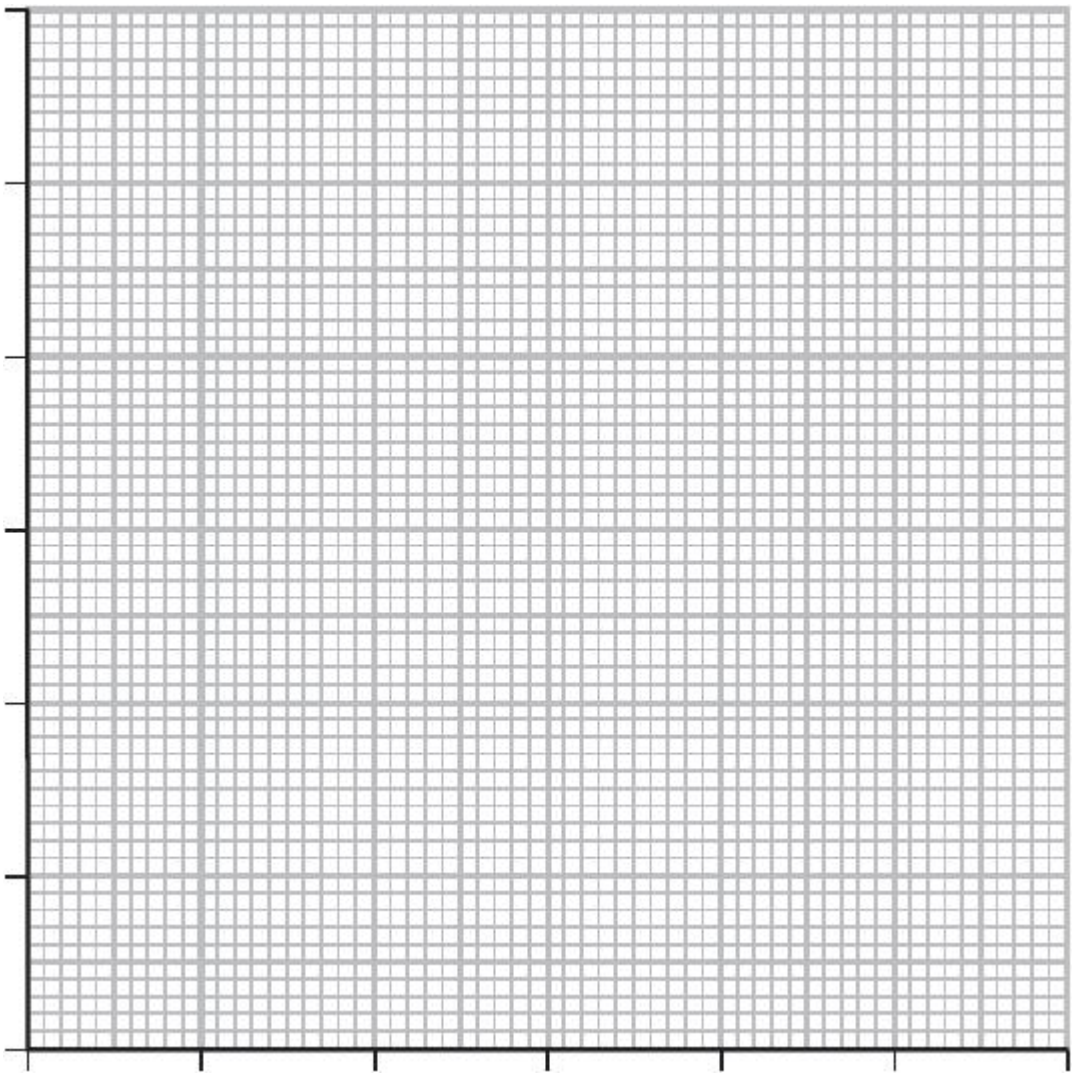
| weight (N) | extension (mm) |
|---|---|
| 0.20 | 4.0 |
| 0.40 | 8.0 |
| 0.60 | 12.0 |
| 0.80 | 16.0 |
| 1.00 | 20.0 |
| 1.20 | 24.0 |

**Figure 13**

(i) Draw a graph for the readings, using the grid shown.

**(3)**



(ii) The student writes this conclusion:
'*The extension of the spring is directly proportional to the weight stretching the spring.*'

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Comment on the student's conclusion.

**(3)**

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(c) The student extends the investigation by finding information about the stretching of wires.

The student finds the graph shown in Figure 14 for the stretching of a wire.

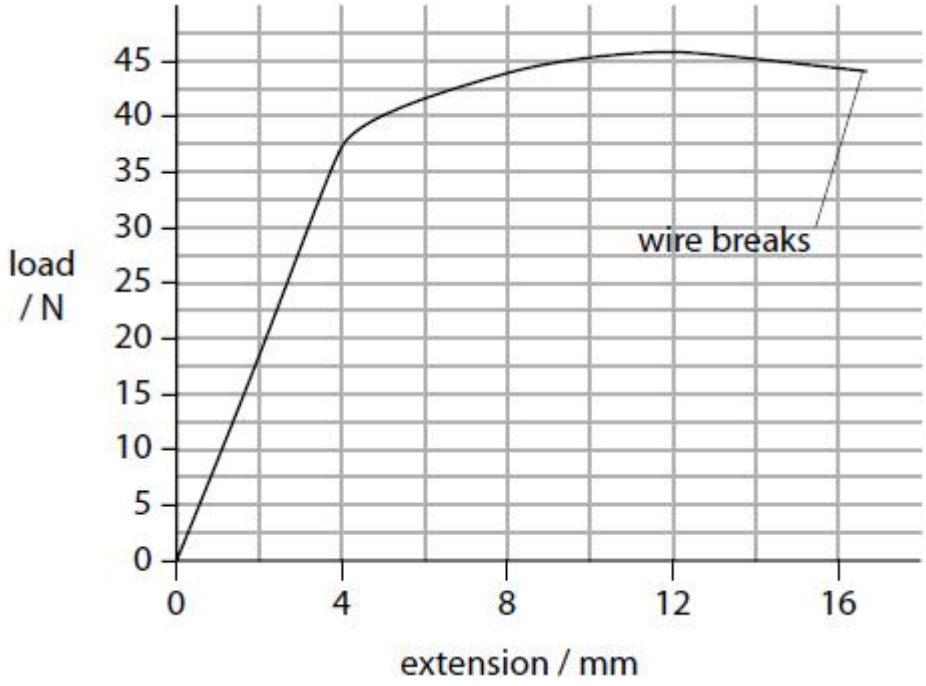


**Figure 14**

Describe the non-linear stretching of the wire shown in Figure 14.

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**(Total for question = 11 marks)**

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