Forces and Elasticity

Question Paper

Level	GCSE (9-1)
Subject	Combined Science: Trilogy - Physics
Exam Board	AQA
Topic	6.5 Forces
Sub-Topic	Forces and Elasticity
Difficulty Level	Gold Level
Booklet	Question Paper

Time Allowed: **22 minutes**

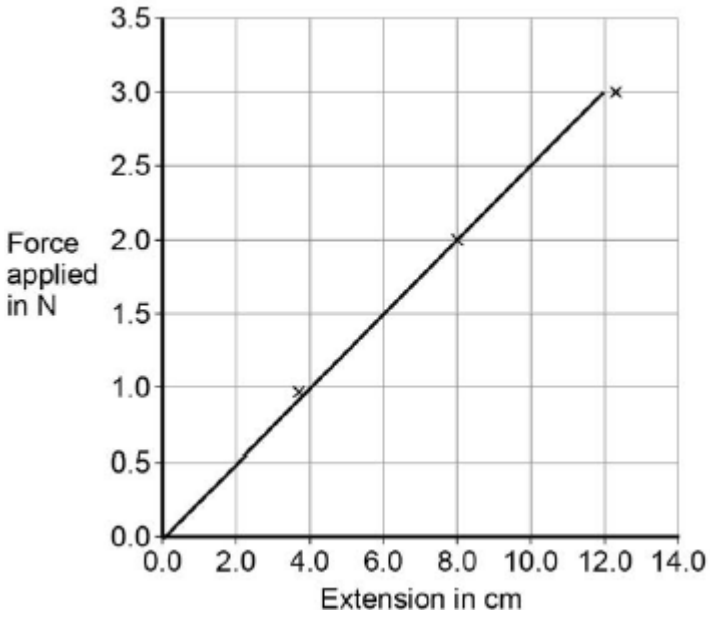
Score: **/21**

Percentage: **/100**

Grade Boundaries:

Q1.A student changed the force applied to a spring by adding weights.

The figure below shows a graph of her results.



(a) Write down the equation that links the force applied and extension for a spring.

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(1)

(b) Identify the pattern shown in the figure above.

Explain your answer.

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(2)

(c) Give **one** way the student could improve her investigation.

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(1)

(d) Describe the relationship between work done and elastic potential energy in stretching a spring.

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(2)

(e) Draw a line on the figure above to show the results for a stiffer spring.

Explain the reason for the line you have drawn.

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(3)

(f) Explain what would happen to the spring if the student kept adding weights?

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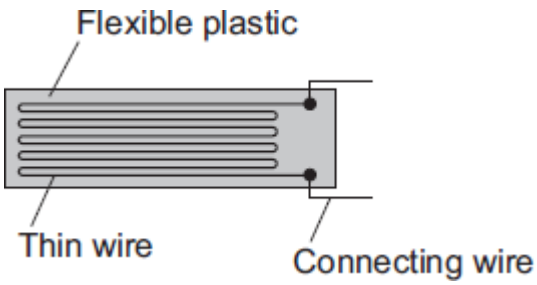
(2)
(Total 11 marks)

Q2. The diagram shows a strain gauge, which is an electrical device used to monitor a changing force.

Applying a force to the gauge causes it to stretch.
This makes the electrical resistance of the wire change.



(a) (i) Using the correct symbols, **add** to the diagram to show how a battery, an ammeter and a voltmeter can be used to find the resistance of the strain gauge drawn above.

(2)

(ii) When in use, the strain gauge is always connected to a d.c. power supply, such as a battery.

How is a d.c. (direct current) power supply different from an a.c. (alternating current) power supply?

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(1)

(b) Before any force is applied, the unstretched gauge, correctly connected to a 3.0 V battery, has a current of 0.040 A flowing through it.

(i) Calculate the resistance of the unstretched gauge.

Show clearly how you work out your answer.

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Resistance = ... Ω

(2)

(ii) Stretching the gauge causes the current flowing through the gauge to decrease.

What happens to the resistance of the gauge when it is stretched?

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(1)

(iii) What form of energy is stored in the gauge when a force is applied and the gauge stretches?

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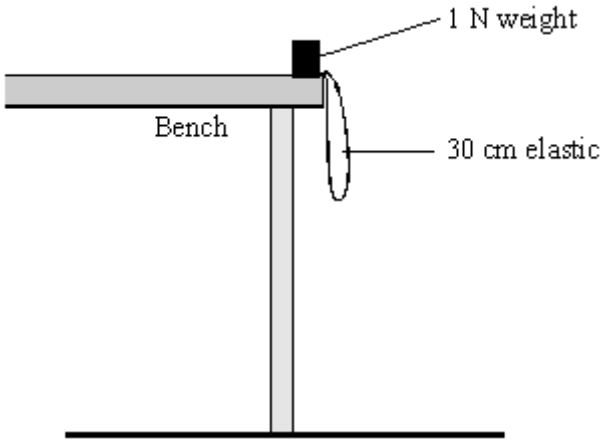
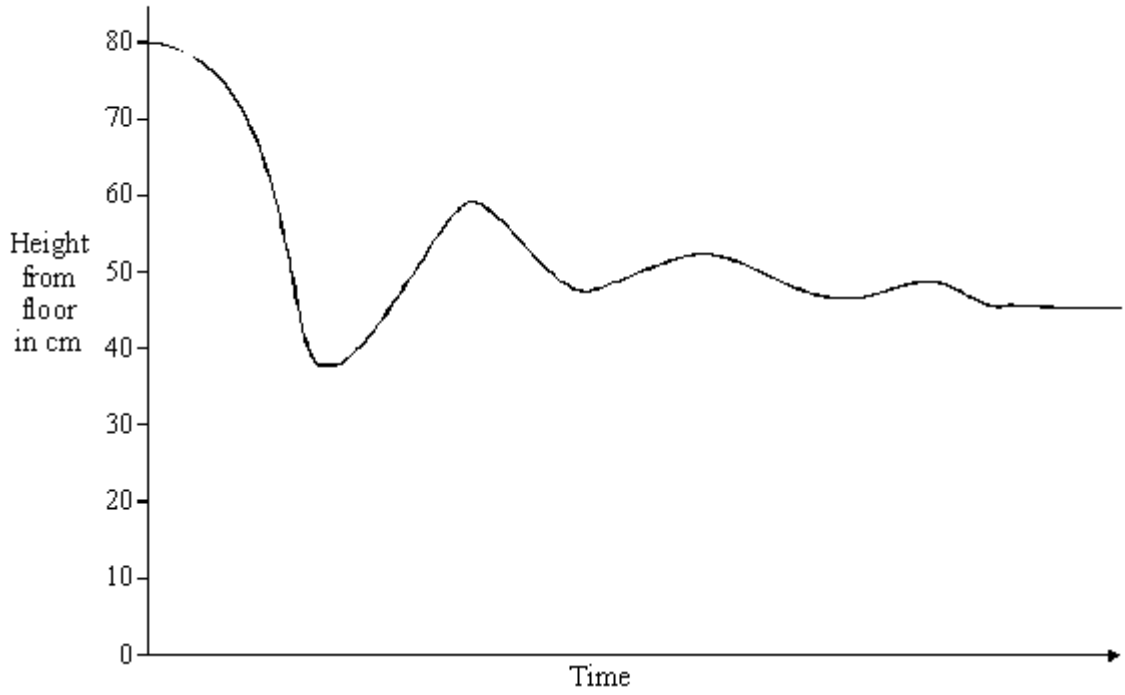
(1)
(Total 7 marks)

Q3. A 1 N weight is tied to a 30 cm long piece of elastic. The other end is fixed to the edge of a laboratory bench. The weight is pushed off the bench and bounces up and down on the elastic.



The graph shows the height of the weight above the floor plotted against time, as it bounces up and down and quickly comes to rest.



(a) Mark on the graph a point labelled **F**, where the weight stops falling freely.

(1)

(b) Mark on the graph a point labelled **S**, where the weight finally comes to rest.

(1)

(c) Mark **two** points on the graph each labelled **M**, where the weight is momentarily stationary.

(1)

(Total 3 marks)