

MINISTRY OF EDUCATION
SECONDARY ENGAGEMENT PROGRAMME
GRADE 10
PHYSICS

WEEK 9: Deformation and Hooke's Law

WORKSHEET 1

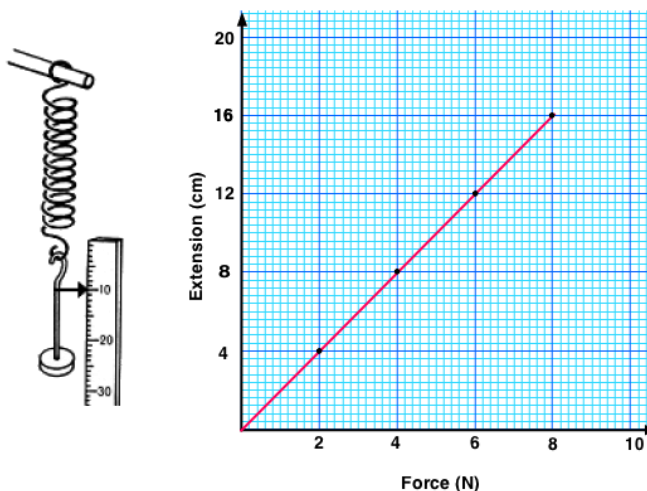
Choose the letter that corresponds to the BEST option

1. A group of students performed an experiment to investigate the relationship between the extension of a spring and a weight hanging on it. What were the variables?
- | | |
|------------------------|------------------------|
| a) Length and velocity | c) Extension and force |
| b) Mass and extension | d) Weight and mass |

Questions 2 and 3 refer to a vertical spring. The lengths of the spring when loaded with forces of 20N and 60N are 15 cm and 25 cm respectively.

2. What is the force per unit extension of the spring in Ncm^{-1} ?
- | | | | |
|--------|--------|--------|--------|
| a) 1.3 | b) 4.0 | c) 2.4 | d) 2.0 |
|--------|--------|--------|--------|
3. What is the length of the spring if the load is completely removed?
- | | | | |
|--------|---------|---------|---------|
| a) 5cm | b) 10cm | c) 15cm | d) 20cm |
|--------|---------|---------|---------|

4. A student carried out an investigation to examine the relationship between the extension (increase in length) of a spring and the force applied to it. The results obtained were put in the form of a graph as shown. Study the graph and determine what force causes an extension of 6 cm in the spring.



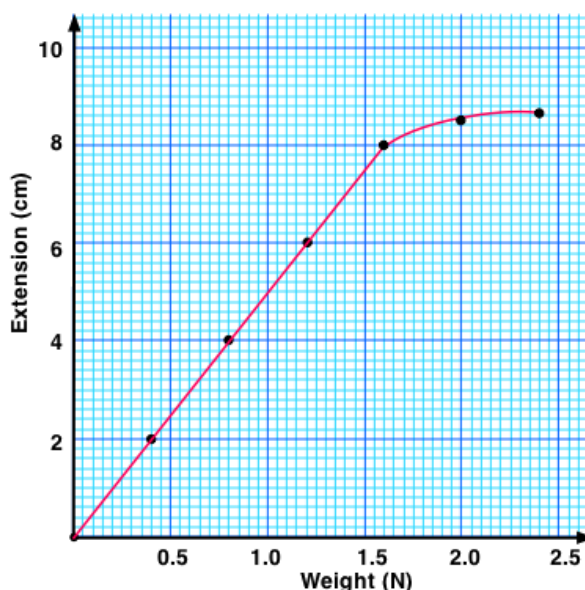
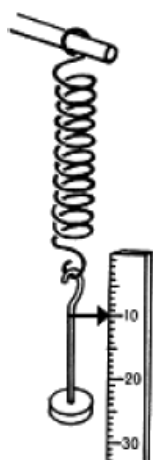
- | | | | |
|------|------|------|-------|
| a) 3 | b) 9 | c) 6 | d) 12 |
|------|------|------|-------|

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5. Robert Hooke (1635-1703) made a number of discoveries including the effect of force on elastic bodies now known as Hooke's law. Which one of the following statements is known as Hooke's Law?
- a) Every action has an equal and opposite reaction
 - b) Work = force x distance moved in the direction of the force.
 - c) When a body is in equilibrium, the sum of the clockwise moments is equal to the sum of the anticlockwise moments.
 - d) The extension of a stretched spring is proportional to the force causing it

6. A student was given a box of identical springs and asked to analyse them so that they could be used as newton meters.

The student performed an experiment, using the apparatus shown in the diagram, on one of the springs. In the experiment the student measured the increase in length of the spring caused by a number of weights. The spring was tested to destruction (that is weights were added until the spring was damaged). A graph of extension versus force was plotted as shown.

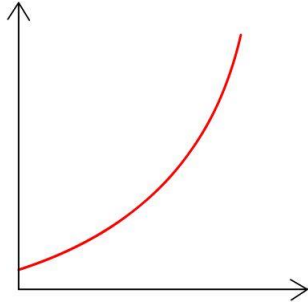


Estimate, from your graph, the weight after the addition of which the law seems no longer to apply.

- a) 8N
 - b) 1.5N
 - c) 2.0N
 - d) 1.6N
7. The spring constant, k , can be calculated by measuring the _____ of the straight line
- a) Gradient
 - b) Compression
 - c) Elasticity
 - d) Deformation

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8. A curved graph as seen below shows that the relationship between force and extension is



- a) Non-linear b) Directly Proportional c) Inversely Proportional d) Positive

9. Substances that elongate considerably and undergo plastic deformation before they break are known as

- a) Brittle substances c) Ductile substances
b) Breakable substances d) Elastic substances

10. A bungee cord has a spring constant of 112 N/m. How far will it stretch if a 50.0 kg mass is hung from it?

- a) 0.229m b) 0.446m c) 2.24m d) 4.38m

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Worksheet 1 - Answer Sheet

1. C
2. B
3. B
4. A
5. D
6. A
7. A
8. A
9. C
10. D