Physics unit 5 homework – Forces

For each of the questions below: -

Highlight the command word if there is one & annotate what the command word means. - Answer the question!

Q1 Figure 1 shows a cyclist with a trailer attached to his bike.

Figure 1

(a)   Describe how Newton's Third Law applies to the forces between the bike and the trailer.

_____

_____

(2)

(b)   A student investigated how the stopping distance of the bike was affected by the mass of the load.

The same person rode the same bike throughout the investigation.

Give **two** other variables which the student should have controlled.
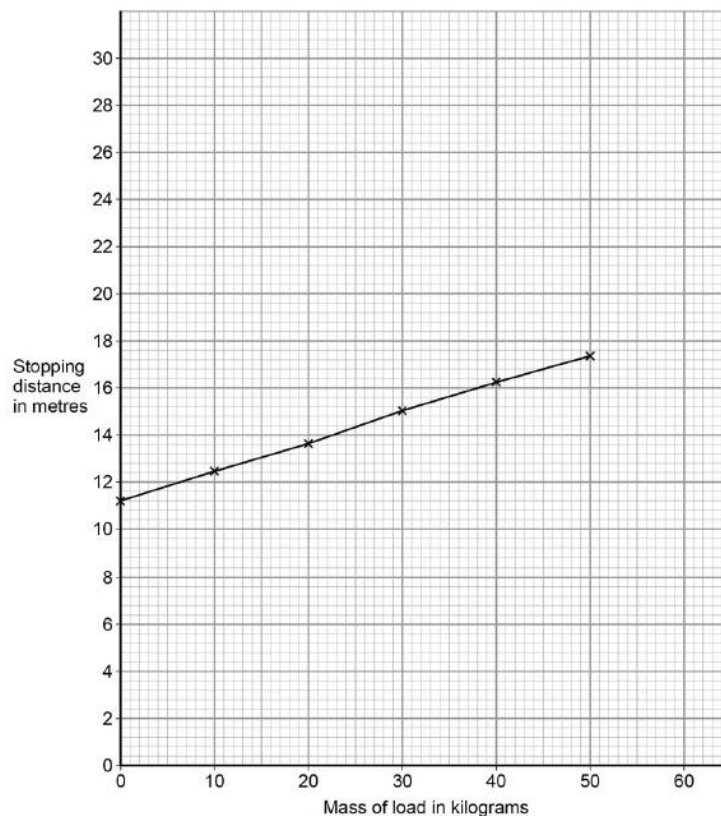
1. _____

2. _____

(2)

(c)   **Figure 2** shows the results of the investigation.

Figure 2

Physics unit 5 homework – Forces
For each of the questions below: -
Highlight the command word if there is one & annotate what the command word means. - Answer the question!

Draw a line on **Figure 2** to show how the stopping distance would be different if a heavier cyclist rode the bike.

(1)

(d)   At one time in the investigation the cyclist was distracted.

The distraction increased the stopping distance of the bike but did **not** affect the braking distance.

Explain why the stopping distance increased.

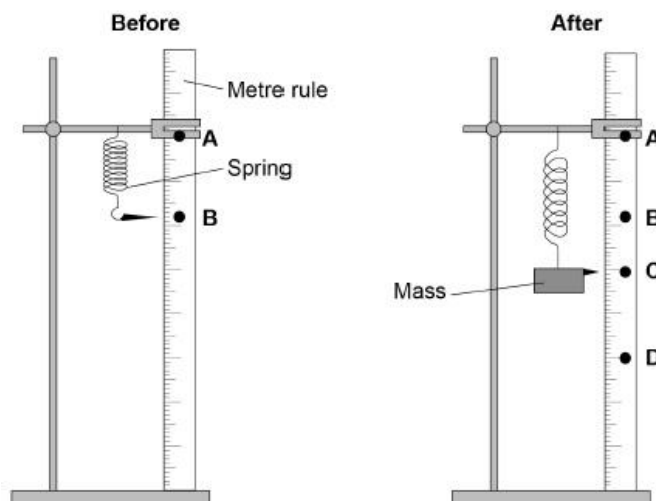_____

_____

_____

_____

_____

_____

(3)

Q2 A student investigated the relationship between the force applied to a spring and the extension of the spring.

This is the method used.

1.   Hang a spring from a rod.

2.   Hang a mass from the spring.

3.   Measure the extension of the spring.

4.   Repeat steps 2 and 3 using different masses.

Figure 1 shows a spring before and after a mass had been hung from it.

Figure 1

Physics unit 5 homework – Forces

For each of the questions below: -

Highlight the command word if there is one & annotate what the command word means. - Answer the question!

(a)   Give **two** ways in which the appearance of the spring has changed.

1. _____

_____

2. _____

_____

(2)

(b)   The extension of the spring is the distance between which **two** points on the metre rule?

Use letters from the diagram in **Figure 1**.

_____ and _____

(1)

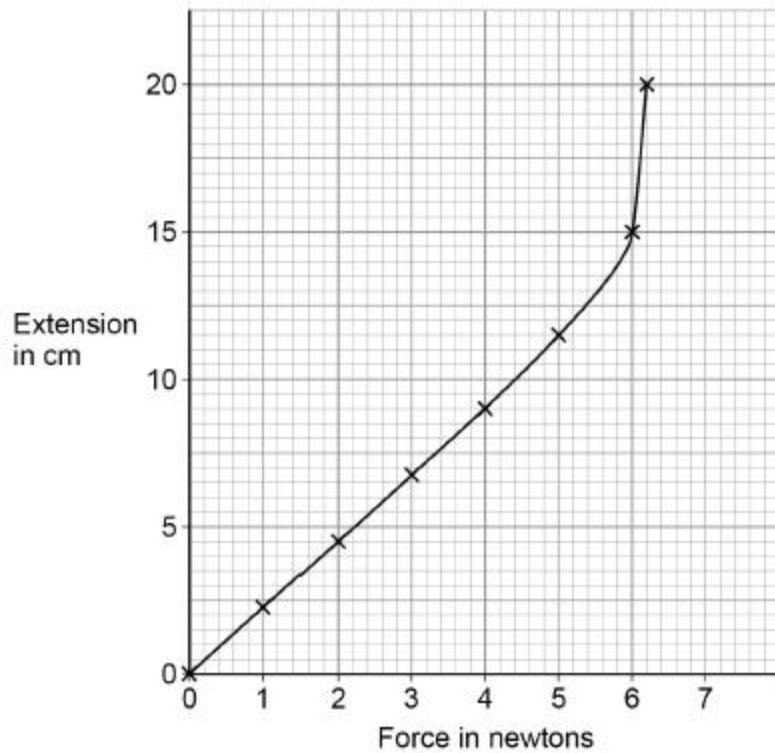(c)   The force applied to the spring is the weight of the mass hanging from the spring.

Write the equation that links gravitational field strength, mass and weight.

_____

(1)

Figure 2 shows the student's results.

Figure 2

Force in newtons

(d)   During the investigation the limit of proportionality of the spring was exceeded.

What is the value of force at which this happened?

Give a reason for your choice.

3

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For each of the questions below: -
Highlight the command word if there is one & annotate what the command word means. - Answer the question!

Force = _____ N

Reason _____

_____

(2)

(e) Suggest how the student could obtain a more accurate answer for the limit of proportionality of the spring.

You should include the additional readings the student should take.

_____

_____

_____

(2)

(f) Write the equation that links extension, force and the spring constant.

_____

(1)

(g) A different spring has a spring constant of 18 N/m

When an apple is hung from the spring, the spring extends 6.4 cm

The spring does not go past the limit of proportionality.

Calculate the force exerted by the apple on the spring.

_____

_____

_____

_____

Force = _____ N

(3)

Q3 Figure 1 shows the forces acting on a car while it is moving.

Figure 1

Air resistance ← ... → Driving force

(a) What is the resultant force acting on the car when it is travelling at constant velocity?

Resultant force = _____ N

(1)