Forces

Past Paper Questions AQA Physics GCSE

The thinking distance and braking distance for a car vary with the speed of the car.

01.

Explain the effect of **two** other factors on the **braking** distance of a car.

Do **not** refer to speed in your answer.

[4 marks]

02.

Which equation links acceleration (*a*), mass (*m*) and resultant force (*F*).

[1 mark]

Tick (✓) **one** box.

resultant force = mass × acceleration ☐

resultant force = mass × acceleration^2 ☐

resultant force = $\frac{\text{mass}}{\text{acceleration}^2}$ ☐

resultant force = $\frac{\text{mass}}{\text{acceleration}}$ ☐

03.

The mean braking force on a car is 7200 N.

The car has a mass of 1600 kg.

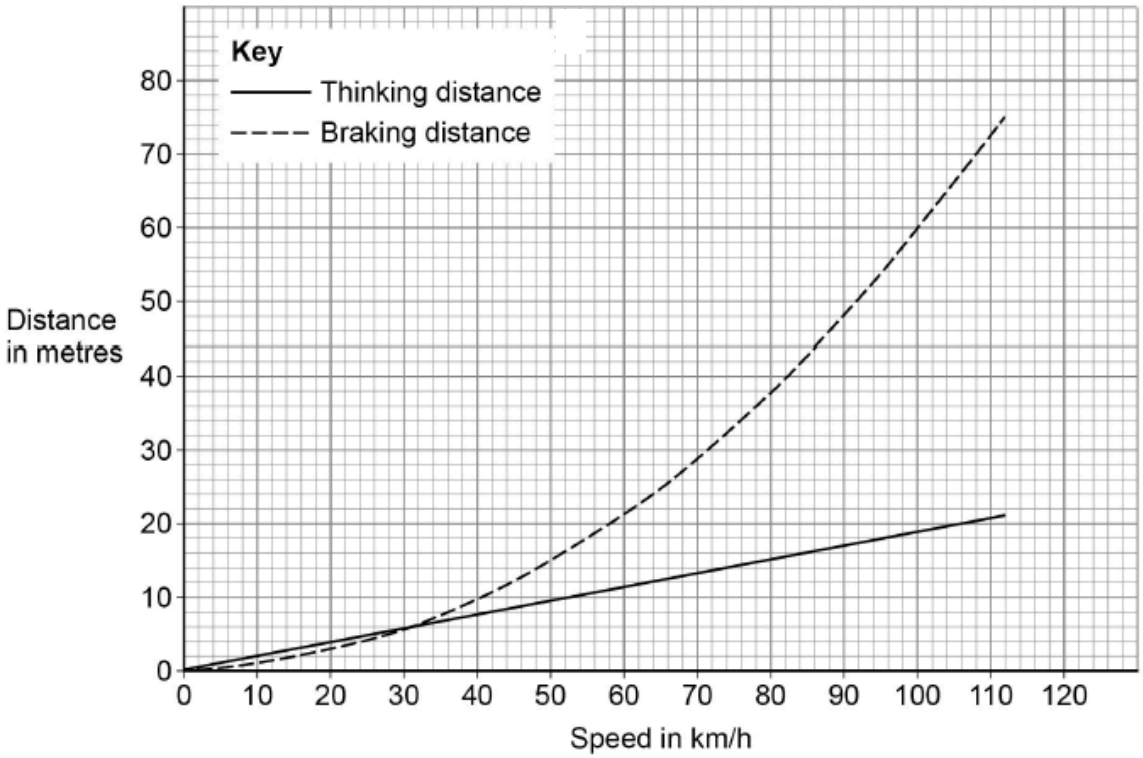
Calculate the deceleration of the car.

[3 marks]

Deceleration = _____ m/s^2

Figure 1 shows how the thinking distance and braking distance for a car vary with the speed of the car.

Figure 1



04.

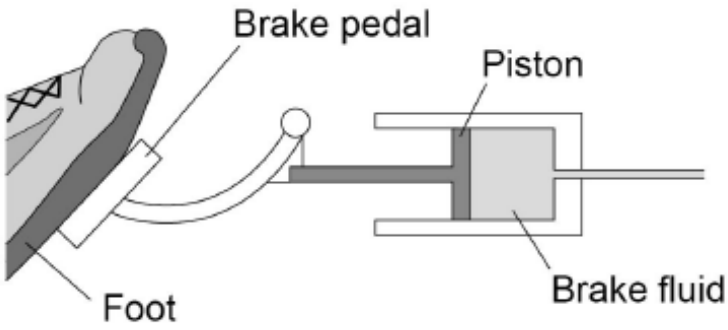
Determine the stopping distance when the car is travelling at 80 km/h.

[2 marks]

Stopping distance = _____ m

Figure 2 shows part of the braking system for a car.

Figure 2



05.

Which equation links area of a surface (A), the force normal to that surface (F) and pressure (p).

[1 mark]

Tick (✓) **one** box.

$p = F \times A$ ☐

$p = F \times A^2$ ☐

$p = \frac{F}{A}$ ☐

$p = \frac{A}{F}$ ☐

06.

When the brake pedal is pressed, a force of 60 N is applied to the piston.

The pressure in the brake fluid is 120 000 Pa.

Calculate the surface area of the piston.

Give your answer in standard form.

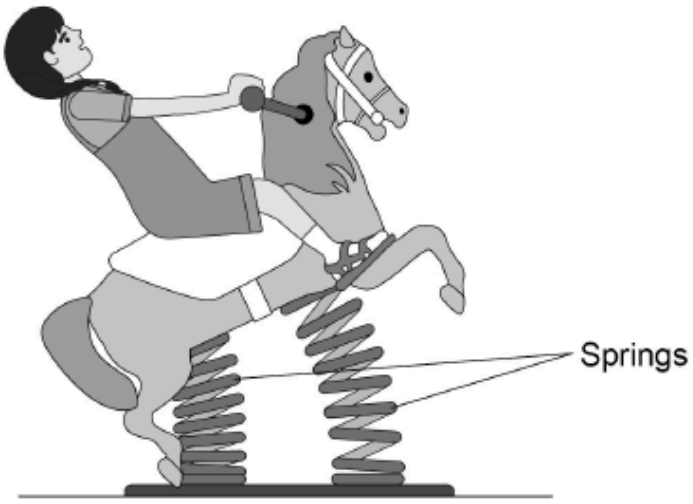
Give the unit.

[5 marks]

Surface area (in standard form) = _____ Unit _____

Figure 3 shows a child on a playground toy.

Figure 3



07.

The springs have been elastically deformed.

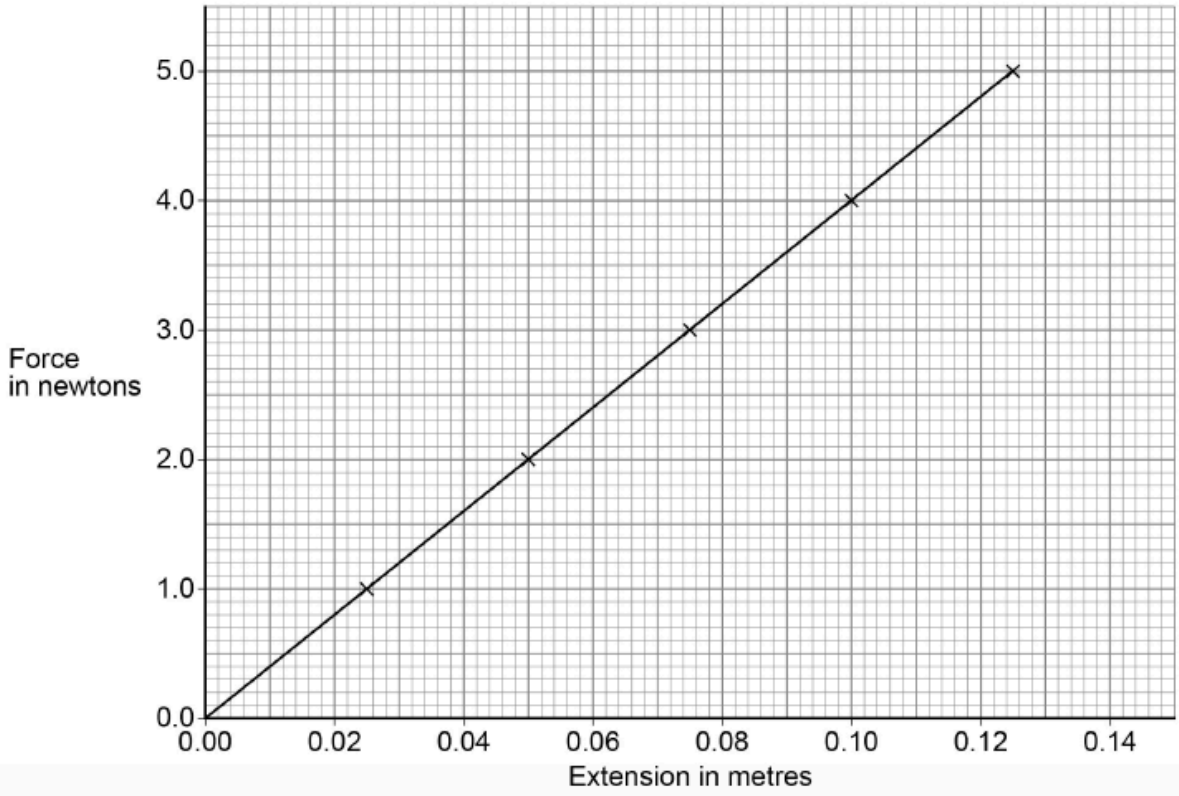
Explain what is meant by 'elastically deformed'.

[2 marks]

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

Figure 4 shows the results.

Figure 4



08.

Describe a method the student could use to obtain the results given in **Figure 4**.

You should include a risk assessment for **one** hazard in the investigation.

Your answer may include a diagram.

[6 marks]

09.

Which equation links extension (e), force (F) and spring constant (k).

[1 mark]

Tick (✓) **one** box.

force = spring constant × (extension)^2 ☐

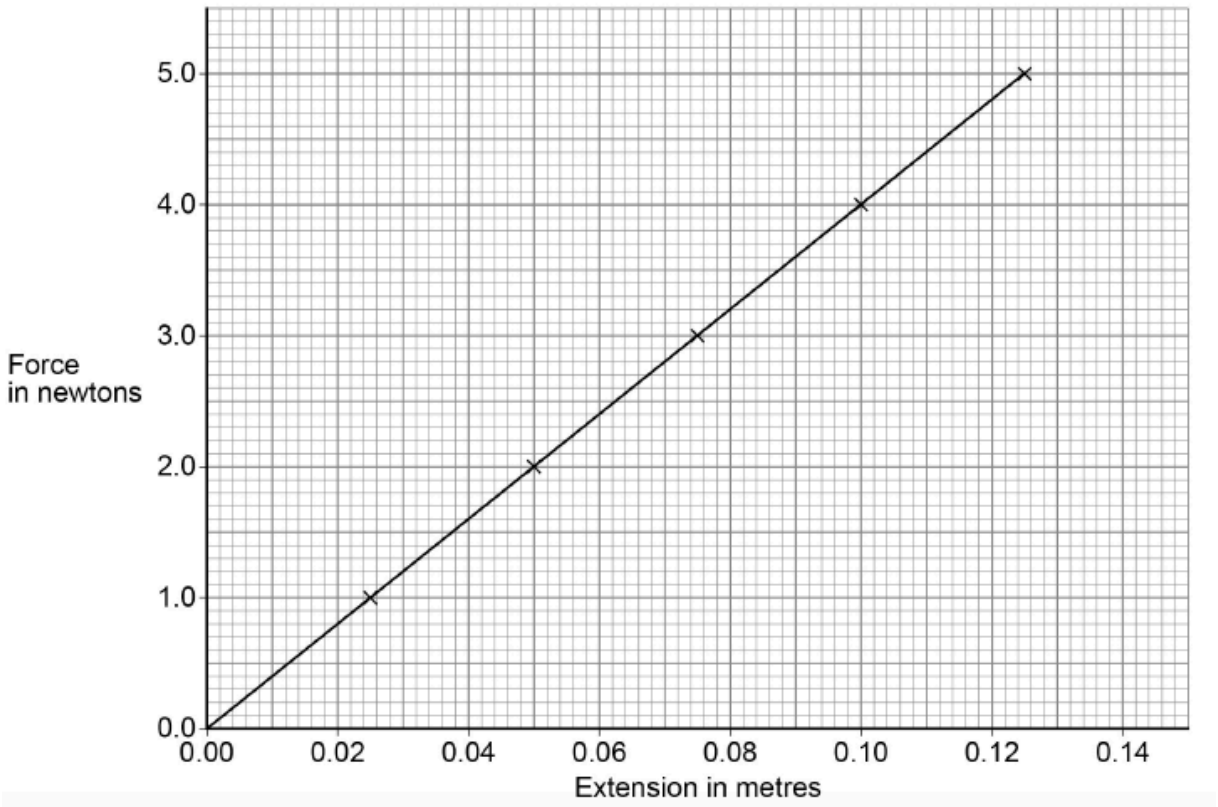
force = spring constant × extension ☐

force = $\frac{\text{extension}}{\text{spring constant}}$ ☐

force = $\frac{\text{spring constant}}{\text{extension}}$ ☐

Figure 4 is repeated below.

Figure 4



10.

Determine the spring constant of the spring.

Use **Figure 4**.

[3 marks]

Spring constant = _____ N/m

11.

The student concluded:

'The extension of the spring is directly proportional to the force applied to the spring.'

Describe how **Figure 4** supports the student's conclusion.

[2 marks]

12.

The student repeated the investigation using a different spring with a spring constant of 13 N/m.

Calculate the elastic potential energy of the spring when the extension of the spring was 20 cm.

Use the Physics Equations Sheet.

[3 marks]

Elastic potential energy = _____ J