

A



Surname _____

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Centre Number _____

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I declare this is my own work.

GCSE

COMBINED SCIENCE: TRILOGY

H

Higher Tier

Physics Paper 2H

8464/P/2H

Time allowed: 1 hour 15 minutes

At the top of the page, write your surname and other names, your centre number, your candidate number and add your signature.

[Turn over]



J U N 2 2 8 4 6 4 P 2 H 0 1

For this paper you must have:

- a protractor
- a ruler
- a scientific calculator
- the Physics Equations Sheet (enclosed).

INSTRUCTIONS

- Use black ink or black ball-point pen.
- Pencil should only be used for drawing.
- Answer ALL questions in the spaces provided.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.
- In all calculations, show clearly how you work out your answer.



INFORMATION

- **The maximum mark for this paper is 70.**
- **The marks for questions are shown in brackets.**
- **You are expected to use a calculator where appropriate.**
- **You are reminded of the need for good English and clear presentation in your answers.**

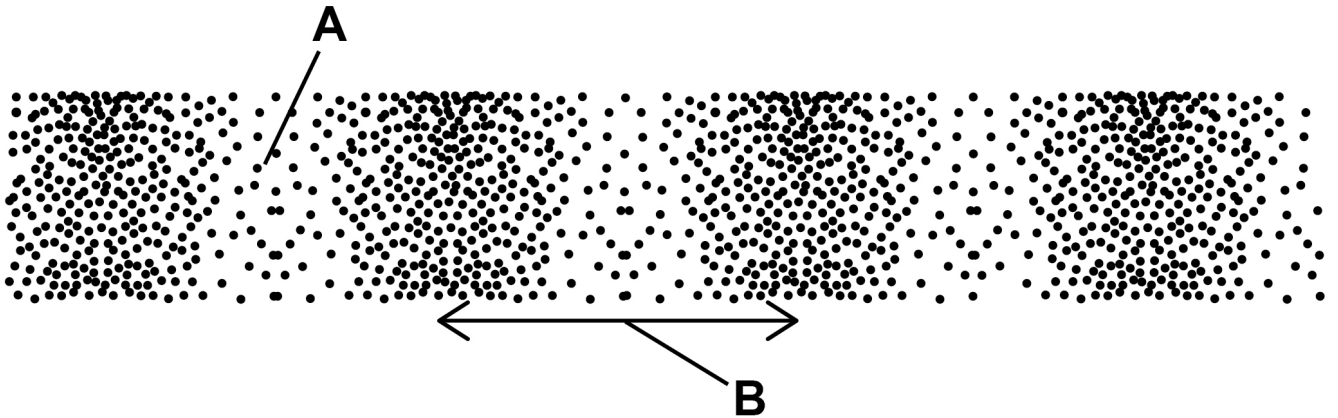
DO NOT TURN OVER UNTIL TOLD TO DO SO



01

FIGURE 1 shows a longitudinal wave.

FIGURE 1



01.1

What do the labels A and B on FIGURE 1 represent?

Choose answers from the list. [2 marks]

- amplitude
- frequency
- rarefaction
- reflection
- wavelength

A _____

B _____

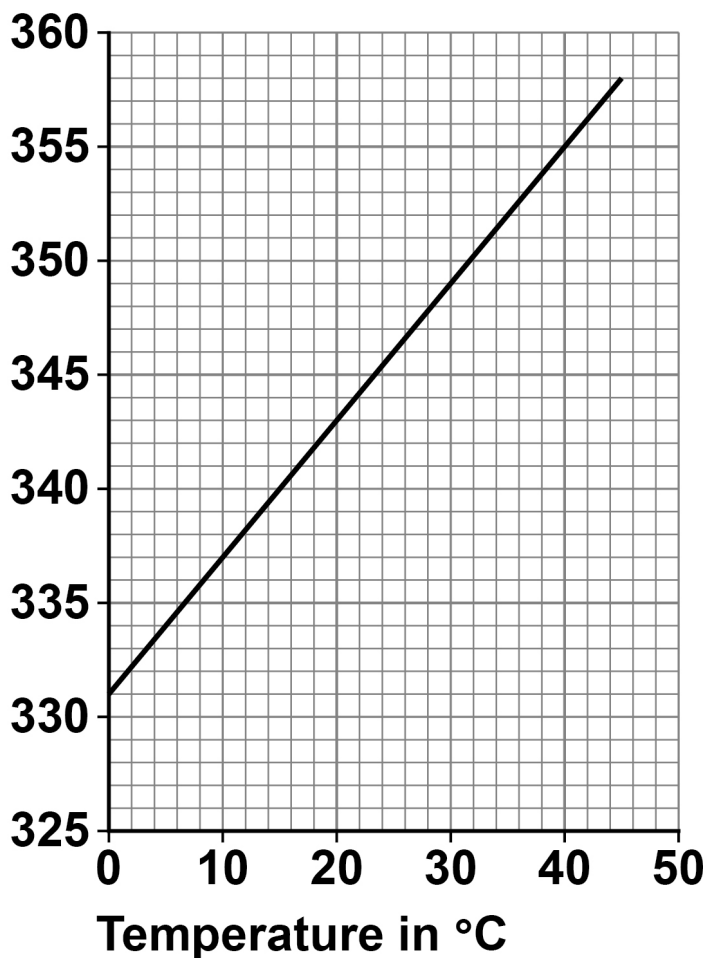


Sound waves are longitudinal.

FIGURE 2 shows how the speed of sound varies with the temperature of the air.

FIGURE 2

Speed in metres
per second



Use the Physics Equations Sheet to answer questions 01.3 and 01.4.



01.3

Write down the equation that links frequency (f), wavelength (λ) and wave speed (v). [1 mark]

01.4

A sound wave with a frequency of 300 Hz travels through the air.

The air has a temperature of 28.0 °C

Determine the wavelength of the sound wave.

Use FIGURE 2 on the opposite page. [4 marks]

[Turn over]



Wavelength = _____ **m**

11



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[Turn over]



02

FIGURE 3 shows competitors in the wheelchair race at the London Marathon.

The distance of the London Marathon is 42 000 m

FIGURE 3



Use the Physics Equations Sheet to answer questions 02.1 and 02.2.



02.1

Write down the equation that links distance (s), force (F) and work done (W). [1 mark]

02.2

During the race competitors work against air resistance.

The work done against air resistance by the winner of the race was 3 360 000 J

Calculate the average air resistance acting on the winner of the race. [3 marks]

Average air resistance = _____ N

[Turn over]



Use the Physics Equations Sheet to answer questions 02.3 and 02.4.

02.3

Which equation links distance travelled, speed and time? [1 mark]

Tick (✓) ONE box.

distance travelled = speed \times time

time = distance travelled \times speed

speed = distance travelled \times time



0	3
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FIGURE 4 shows a child playing with a toy train.
The train is on a bridge.

FIGURE 4



When the child lets go of the train, the train rolls down the bridge.

[Turn over]



Velocity = _____ **m/s**

[Turn over]



[Turn over]

8

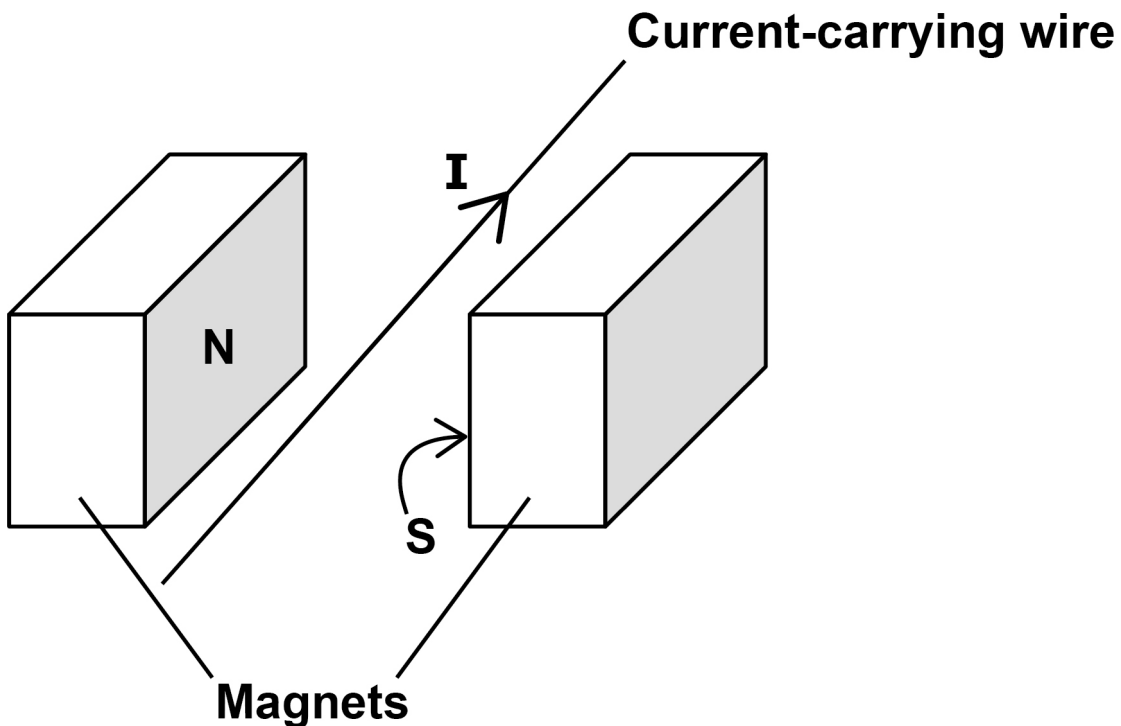


04

A teacher demonstrated the motor effect.

FIGURE 5 shows the equipment used.

FIGURE 5



04.1

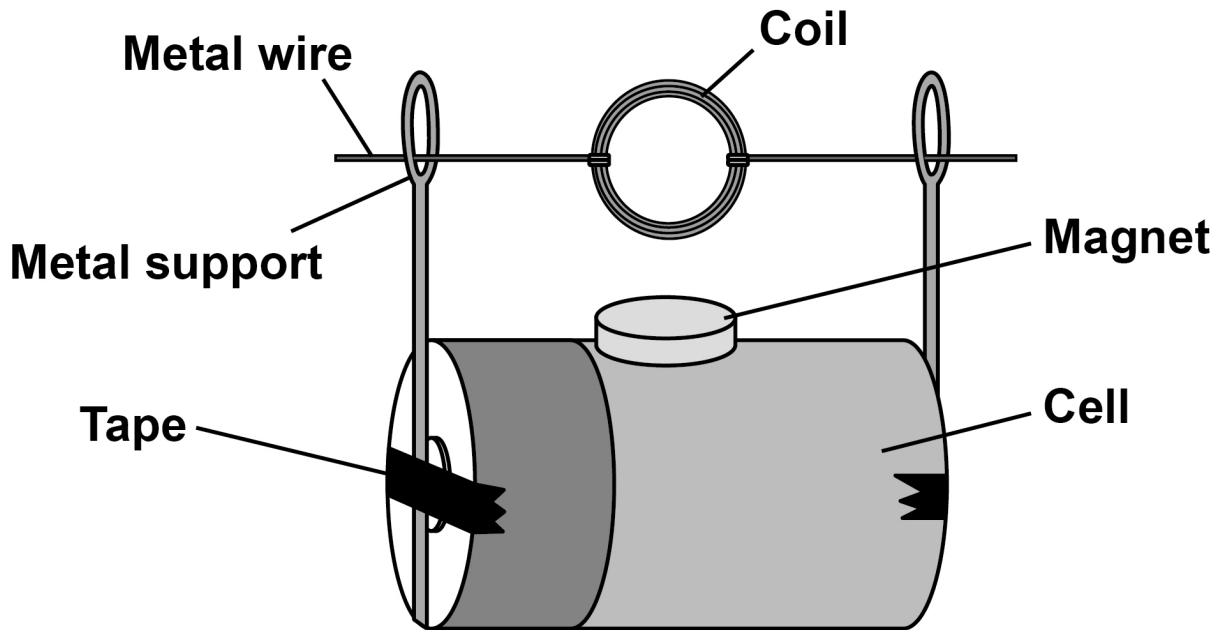
Explain why there is a force on the wire when there is a current in the wire. [2 marks]



04.3

FIGURE 6 shows a simple electric motor.

FIGURE 6



Explain ONE way that the motor could be changed to increase the rate at which the coil rotates. [2 marks]



[Turn over]

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7



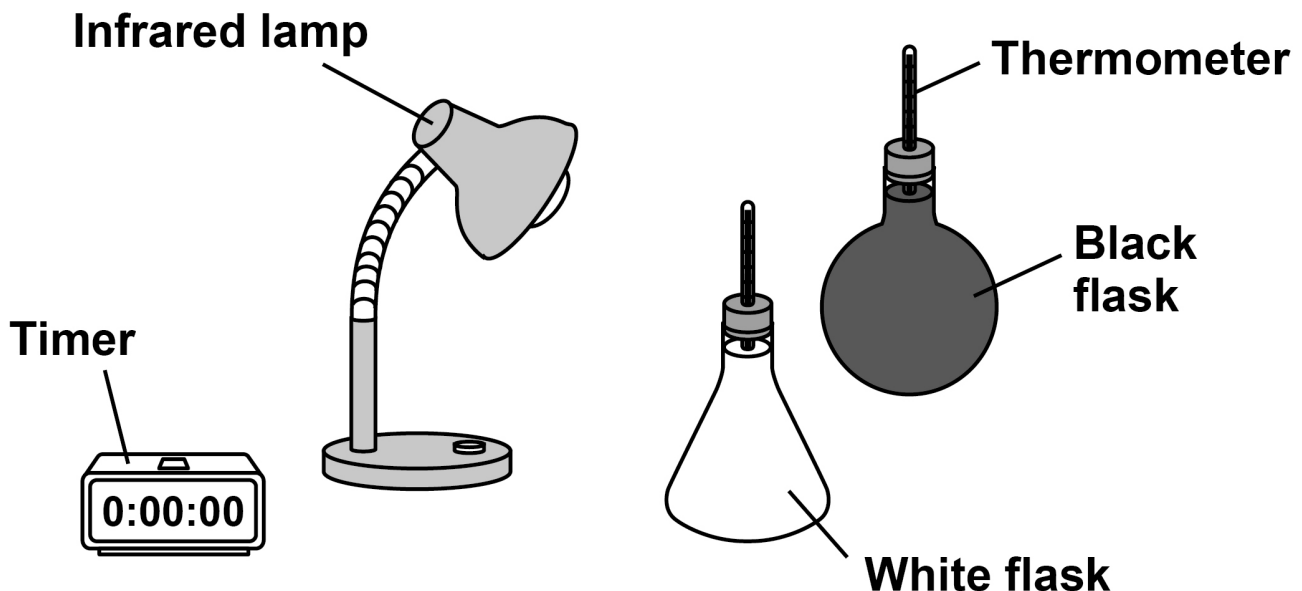
05

A student investigated how the colour of a surface affects the amount of infrared radiation the surface absorbs.

FIGURE 7 shows the equipment used.

The two flasks are painted different colours.

FIGURE 7



This is the method used.

1. Pour water at 20 °C into each flask.
2. Place a bung and thermometer into each flask.
3. Place each flask in front of the infrared lamp.
4. Measure the temperature of the water every 30 seconds for 10 minutes.



05.1

Explain TWO improvements to the method the student used. [4 marks]

1

2

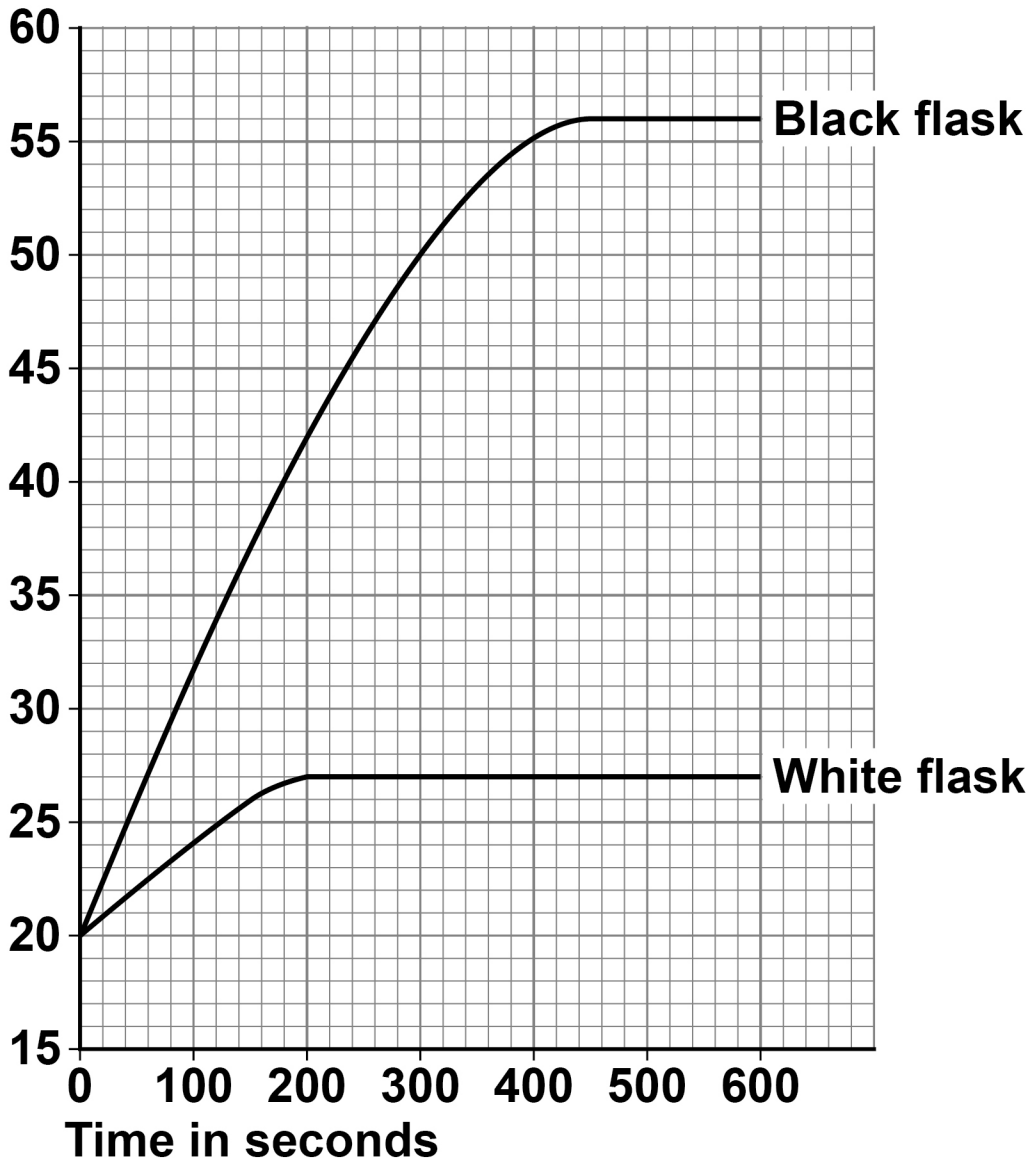
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FIGURE 8 shows the results for each flask.

FIGURE 8

Temperature
in °C



05.2**Complete the sentences. [2 marks]**

After 100 seconds the temperature difference between the black flask and the white flask was

_____ °C

The temperature of the white flask stopped increasing.

The temperature inside the black flask continued to

increase for a further _____ seconds.

05.3

The initial rate of absorption of infrared radiation by the black flask was greater than the initial rate of absorption by the white flask.

How does FIGURE 8, on the opposite page, show this?
[1 mark]

[Turn over]

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[Turn over]



06

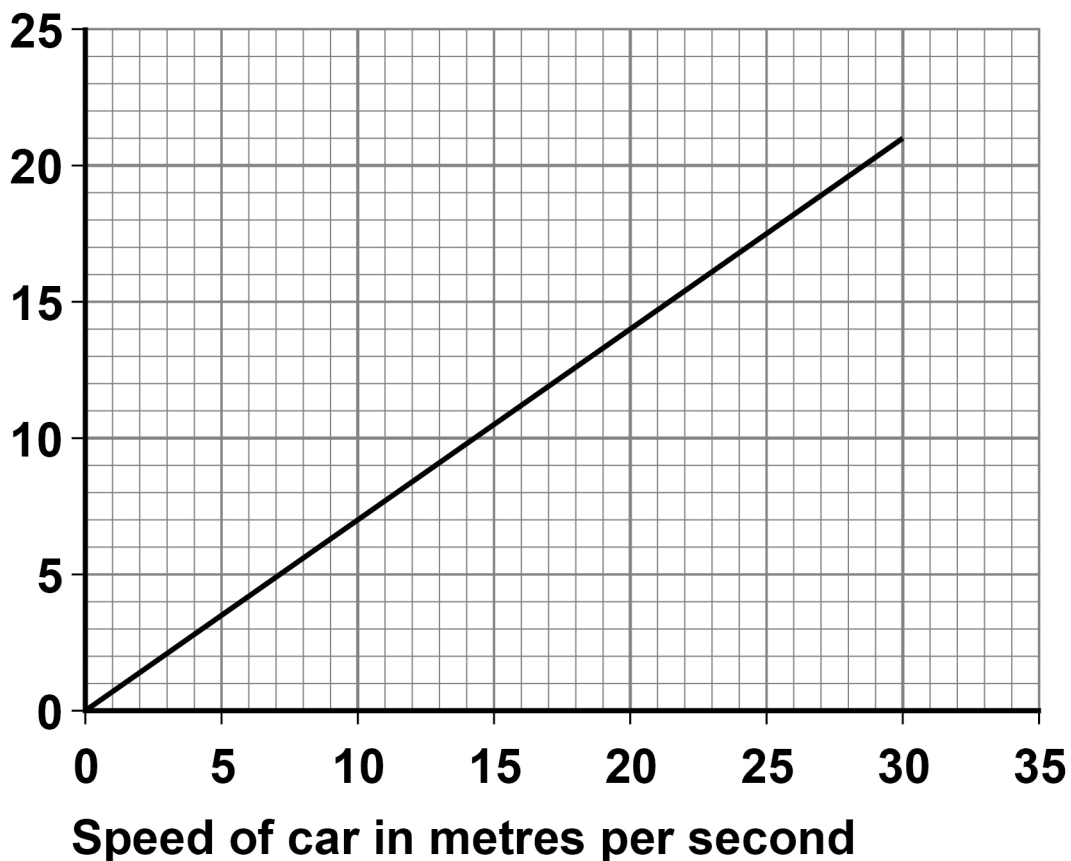
The distance a car travels during the driver's reaction time is called the thinking distance.

06.1

FIGURE 9 shows how thinking distance depends on speed for a car.

FIGURE 9

Thinking distance
in metres

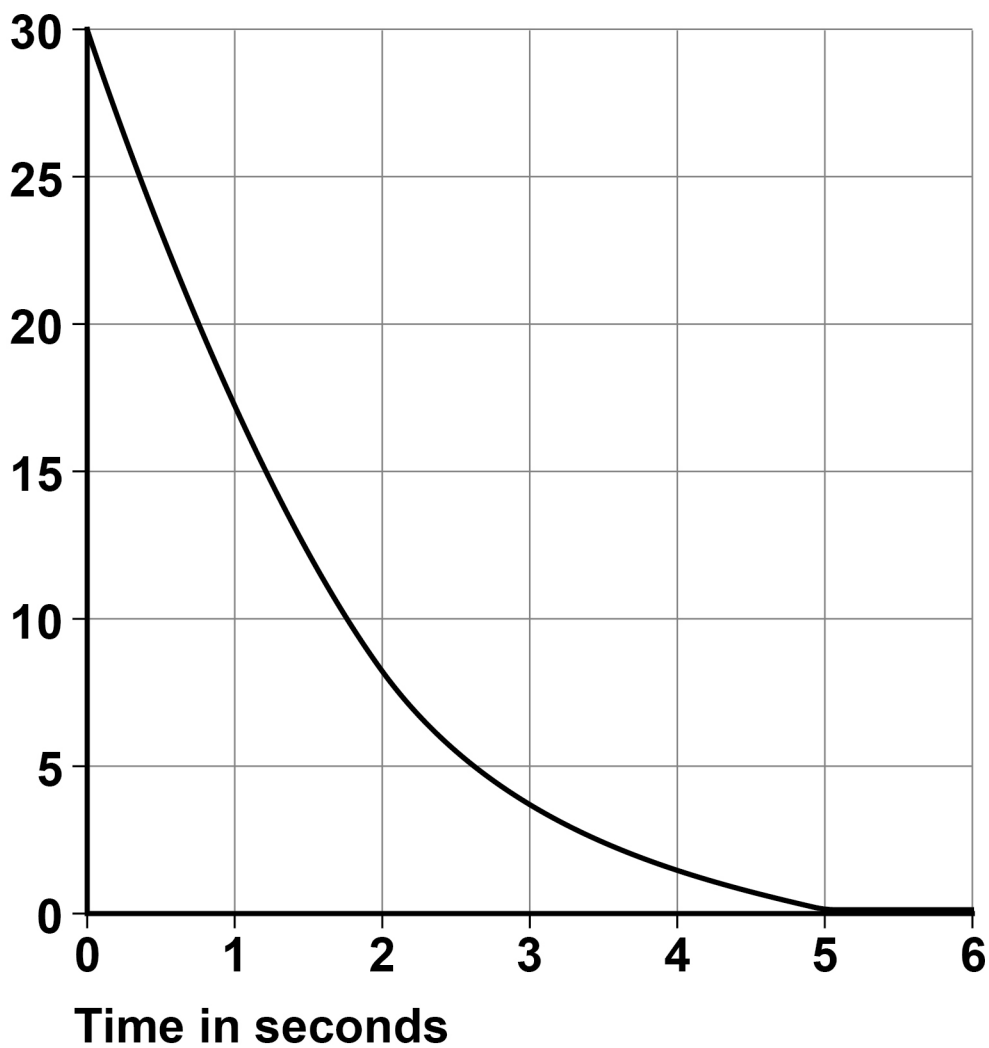


06.2

FIGURE 10 shows how the velocity of a car changes during braking.

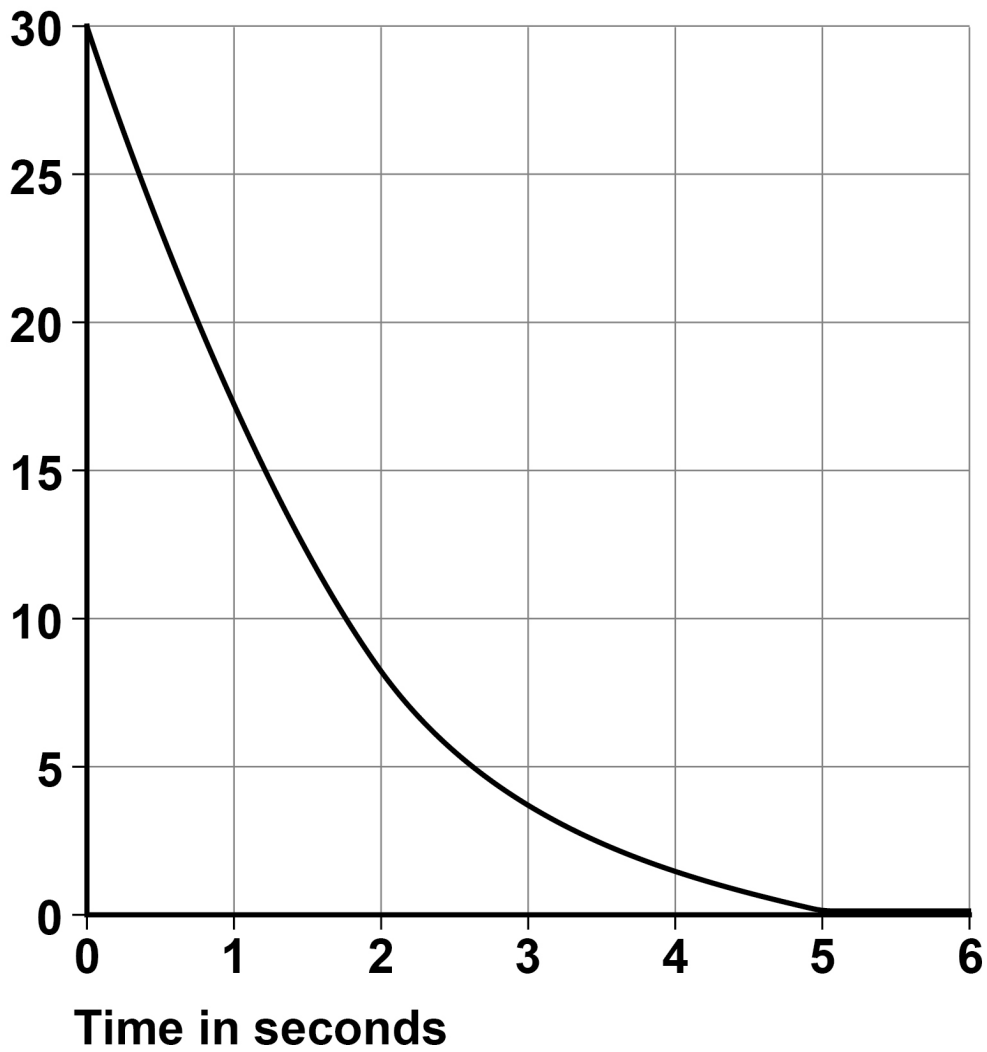
FIGURE 10

**Velocity in metres
per second**



REPEAT OF FIGURE 10

Velocity in metres
per second

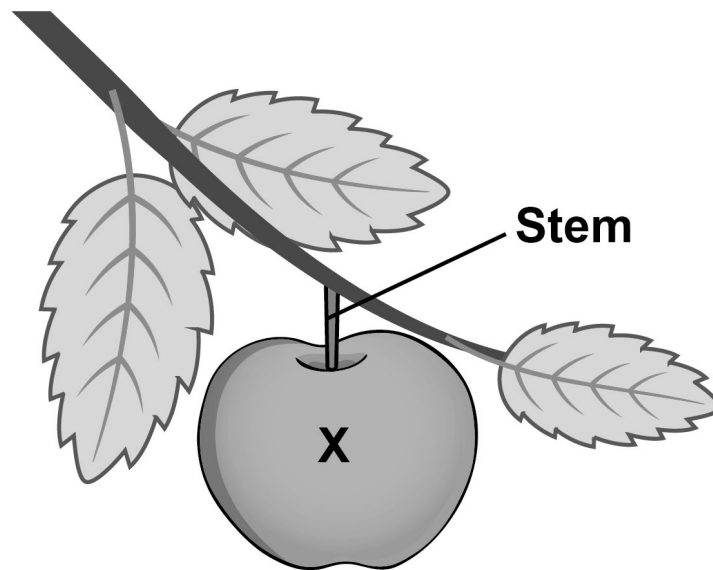


07

FIGURE 11 shows a stationary apple hanging from a tree.

The X marks the centre of mass of the apple.

FIGURE 11



07.1

Draw TWO arrows on FIGURE 11 to show the forces acting on the apple. [2 marks]



Distance = _____ m



END OF QUESTIONS

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12



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For Examiner's Use	
Question	Mark
1	
2	
3	
4	
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7	
TOTAL	

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