AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 6.5.4.1.4

The distance–time relationship

Past-paper questions

Tier	**Higher**
Question groups	**2**
Available paper years	**2018–2025**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

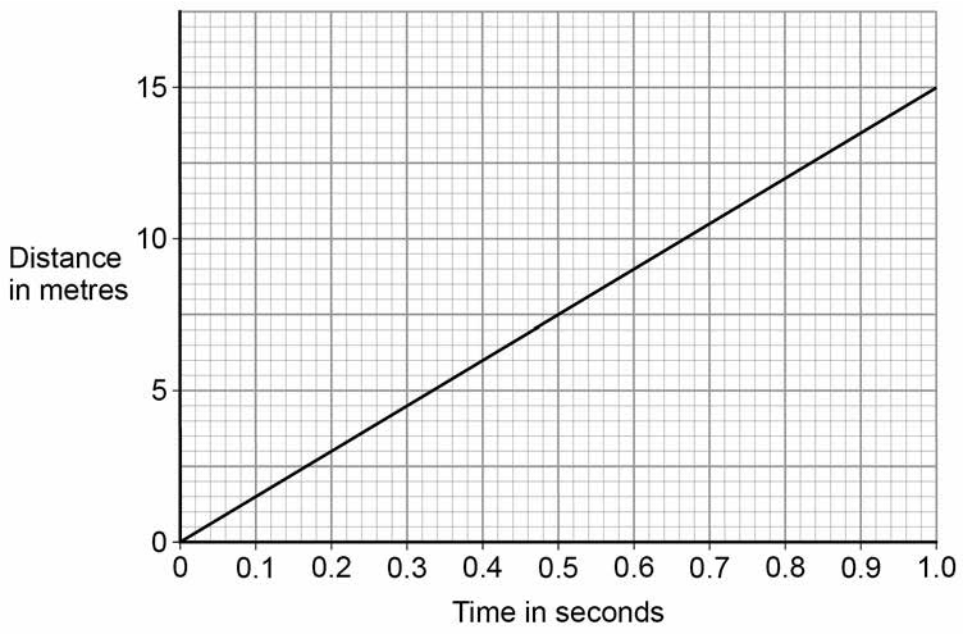
6.5.4.1.4 The distance–time relationship

Question 01

June 2018 | 8464/P/2H | Original Q6

0 6 . 1 **Figure 8** shows the distance-time graph for a car travelling at 15 m/s

Figure 8



When the driver is tired, his reaction time increases from 0.50 seconds to 0.82 seconds.

Determine the **extra** distance the car would travel before the driver starts braking.

[2 marks]

Distance = _____ m

0 6 . 2 When the brakes are used, the temperature of the brakes increases.

Explain why. Use ideas about energy in your explanation.

[2 marks]

Question 6 continues on the next page

6.5.4.1.4 The distance–time relationship

Question 01 · continued

0 6 . 3 A lorry travels 84 m with a constant acceleration of 2.0 m/s^2 to reach a velocity of 19 m/s

Calculate the initial velocity of the lorry.

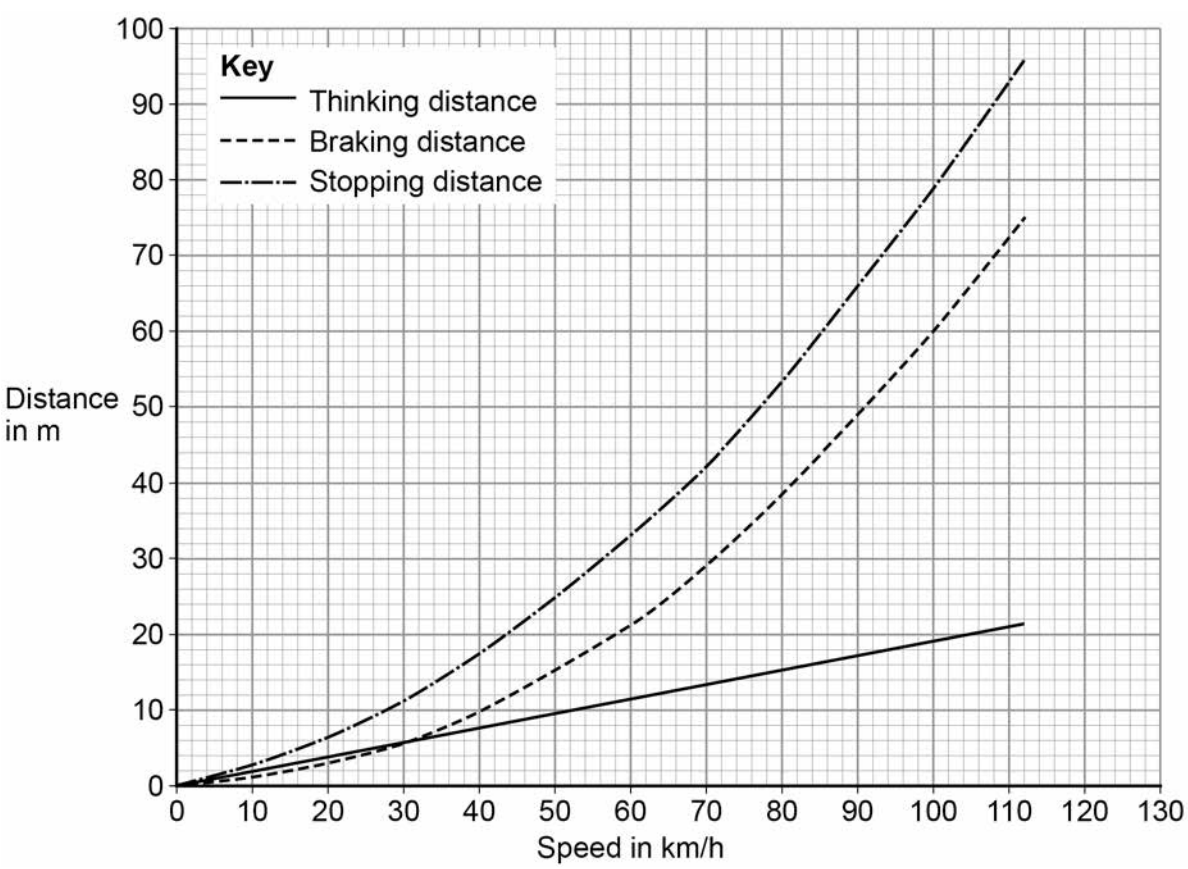
Use the Physics Equations Sheet.

[3 marks]

Initial velocity = _____ m/s

0 6 . 4 **Figure 9** shows how the thinking distance, braking distance and stopping distance for a car vary with the speed of the car.

Figure 9



6.5.4.1.4 The distance–time relationship

Question 01 · continued

June 2018 | 8464/P/2H | Original Q6

Describe the relationships shown in **Figure 9**

You should include factors that would affect the gradient of the lines.

[6 marks]

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6.5.4.1.4 The distance–time relationship

Question 02

June 2025 | 8464/P/2H | Original Q1

0 1 In a dog-sled race, a team of dogs pull on a rope attached to a sled.

Figure 1 shows a dog-sled team.

Figure 1



Use the Physics Equations Sheet to answer questions **01.1** and **01.2**.

0 1 . 1 What equation links distance travelled, speed and time?

[1 mark]

Tick (✓) **one** box.

distance travelled = speed × time ☐

speed = time × distance travelled ☐

time = distance travelled × speed ☐

6.5.4.1.4 The distance–time relationship

Question 02 · continued

0 1 . 2 The longest dog-sled race in the world covers a distance of 1 500 000 m.

One team finished the race in a time of 670 000 s.

Calculate the average speed of this team during the race.

[3 marks]

Average speed = _____ m/s

0 1 . 3 At the start of the race, 6 dogs pulled on the rope.

The average forward force on the sled from **each** dog was 370 N.

The backwards force on the sled from friction was 520 N.

Calculate the resultant force on the sled.

[2 marks]

Resultant force = _____ N

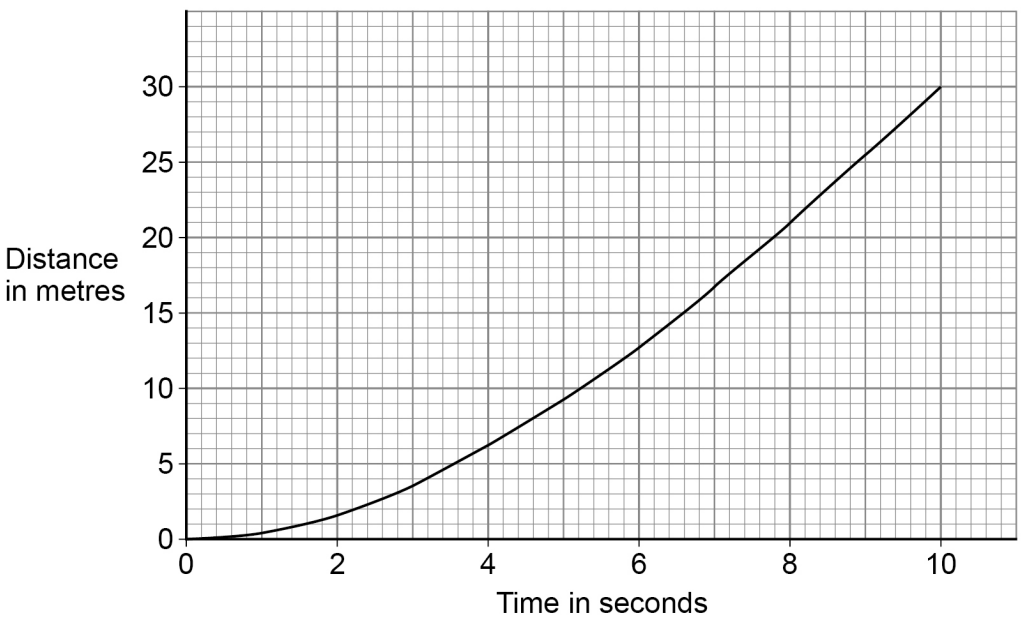
Question 1 continues on the next page

6.5.4.1.4 The distance–time relationship

Question 02 · continued

Figure 2 shows a distance–time graph for the sled at the start of the race.

Figure 2



0 1 . 4 What does the gradient of the graph in **Figure 2** represent?

[1 mark]

6.5.4.1.4 The distance–time relationship

Question 02 · continued

0 1 . 5 Later in the race, the sled moved at a constant speed along a flat, horizontal path.

What was the relationship between the size of the horizontal forces acting when the sled moved at a constant speed?

[1 mark]

Tick (✓) **one** box.

friction + air resistance < pull of the rope on the sled ☐

friction + air resistance = pull of the rope on the sled ☐

friction + air resistance > pull of the rope on the sled ☐

0 1 . 6 The rope exerted a force on the sled when the sled was moving.

What is the Newton's Third Law pair to the force of the rope on the sled?

[1 mark]

Tick (✓) **one** box.

The force of friction on the sled ☐

The force of the dogs on the rope ☐

The force of the sled on the rope ☐

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