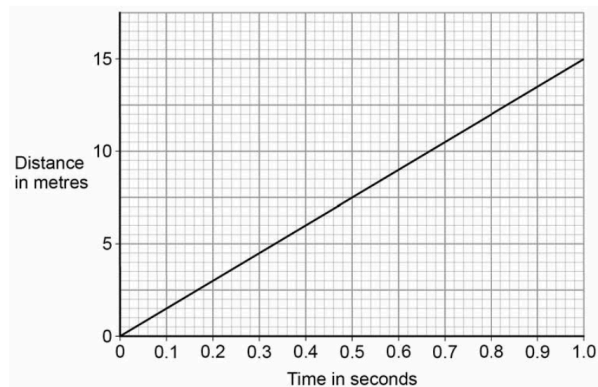


Q1. (2018)

a)

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]

b)

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

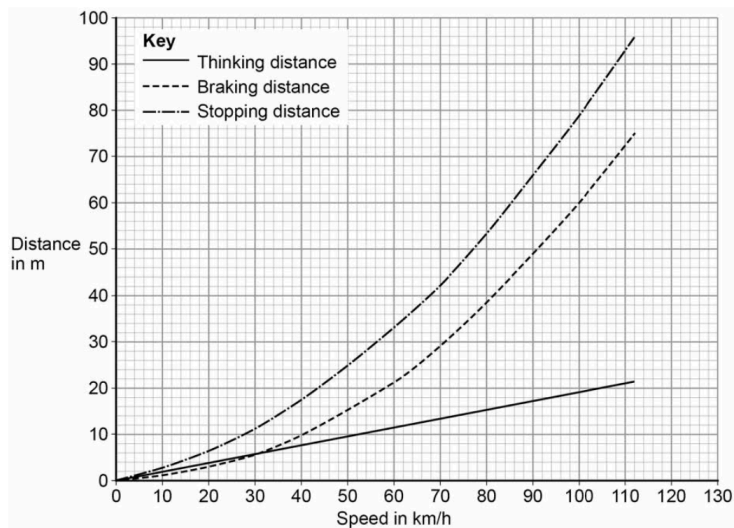
Explain why. Use ideas about energy in your explanation.

[2 marks]

Q2. (2018)

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



Describe the relationships shown in Figure 9

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

[6 marks]

Q3. (2020)

0 6 The speed limit on many roads in towns is 13.5 m/s

Outside schools this speed limit is often **reduced by** one-third.

a)

0 6 . 1 Calculate the reduced speed limit.

[2 marks]

b)

0 6 . 2 A reduced speed limit may reduce air pollution.

Explain **one** other advantage of a reduced speed limit.

[2 marks]

Q4. (2020)

0 6 . 3 **Figure 11** shows a car being driven at a constant speed past a speed camera.

Figure 11



The camera recorded two images of the car 0.70 s apart.

The car travelled 14 m between the two images being taken.

The maximum deceleration of the car is 6.25 m/s^2

Calculate the minimum braking distance for the car at the speed it passed the speed camera.

[6 marks]

Q5. (2020)

0 6 . 4 **Figure 12** shows a delivery van full of packages.

Figure 12



The driver delivers all the packages.

The empty van has a shorter stopping distance than the full van when driven at the same speed.

Explain why.

[3 marks]

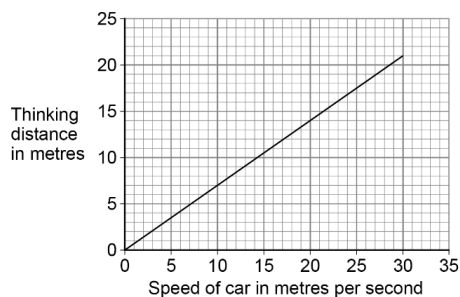
Q6. (2022)

0 6 The distance a car travels during the driver's reaction time is called the thinking distance.

a)

0 6 . 1 Figure 9 shows how thinking distance depends on speed for a car.

Figure 9



Determine the driver's reaction time.

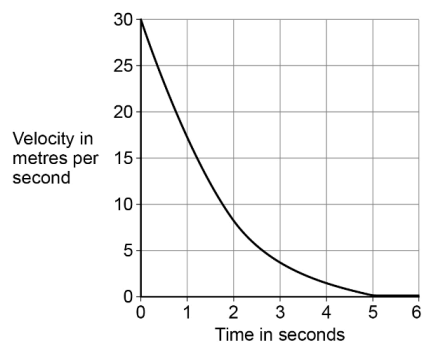
Use the Physics Equations Sheet.

[3 marks]

b)

0 6 . 2 Figure 10 shows how the velocity of a car changes during braking.

Figure 10



Determine the braking distance of the car.

[3 marks]

Q7. (2023)

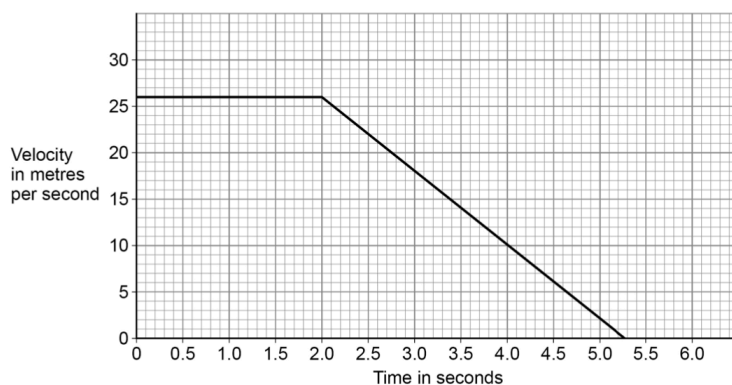
0 7

A car contains a device called a black box. The black box records the velocity and acceleration of the car.

The car was travelling at a constant velocity. The driver then reacted to a hazard.

Figure 11 shows the velocity–time graph for the car.

Figure 11



0 7 . 3 If the black box records large decelerations, it identifies that the driving may be dangerous.

Explain why large decelerations may be dangerous.

[2 marks]

Q8. (2024)

0 5 A safety test was carried out to determine how the speed of a car affects the stopping distance of the car.

a)

0 5 . 2 The reaction time of the driver was measured.

How can the reaction time of the driver be used to calculate the thinking distance?

[1 mark]

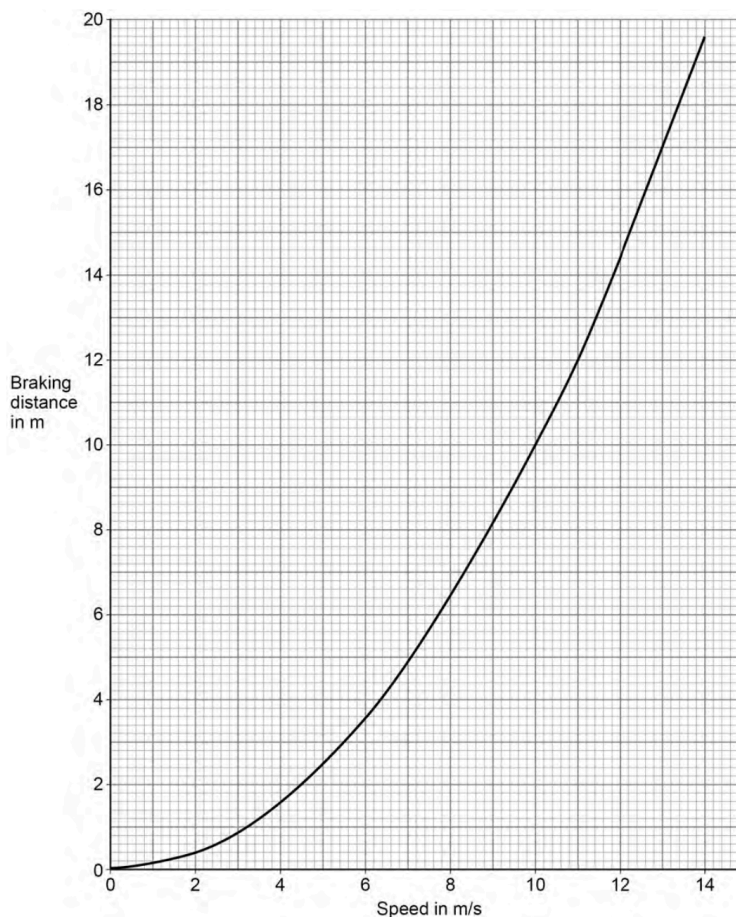
b)

The car was driven at a constant speed. The driver applied the maximum braking force, and the braking distance was measured.

The test was repeated at different speeds.

Figure 8 shows the results.

Figure 8



0 5 . 3 Which of the following gives the relationship between the speed and the braking distance?

[1 mark]

Tick (✓) **one** box.

braking distance $\propto \frac{1}{\text{speed}}$

☐

braking distance $\propto \text{speed}$

☐

braking distance $\propto \text{speed}^2$

☐