

**AQA - Forces and motion – GCSE Combined Science Physics**

1. June/2021/Paper\_2F/No.3

0 3

The stopping distance of a car is the sum of the thinking distance and the braking distance.

0 3 . 1

The thinking distance is affected by the reaction time of the driver.

Which **two** of the following can affect the reaction time of the driver?

**[2 marks]**

Tick (✓) **two** boxes.

Damaged brakes

Taking drugs

Tiredness

Wet roads

Worn tyres

Scientists measured the reaction time for drivers of different ages.

Figure 6 shows the results.

Figure 6



0 3 . 2

At what age did the drivers have the lowest mean reaction time?

[1 mark]

Age = \_\_\_\_\_ years

0 3 . 3

What was the lowest mean reaction time?

[1 mark]

Time = \_\_\_\_\_ seconds

The braking distance of a car is the distance travelled between the driver applying the brakes and the car stopping.

0 3 . 4 Complete the sentences.

Choose answers from the box.

Each answer may be used once, more than once or not at all.

[2 marks]

decreases

stays the same

increases

When the brakes are applied, the kinetic energy of the

car \_\_\_\_\_ .

The temperature of the brakes \_\_\_\_\_ .

0 3 . 5 A car is travelling at a speed of 12 m/s.

The driver applies the brakes and the car decelerates at a constant  $3.0 \text{ m/s}^2$ .

Calculate the braking distance of the car.

Use the equation:

$$\text{braking distance} = \frac{(\text{speed})^2}{2 \times \text{deceleration}}$$

Choose the unit from the box.

[3 marks]

m	kg	s
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Braking distance = \_\_\_\_\_ Unit \_\_\_\_\_

0 3 . 6 To pass the UK driving test, people must know the typical stopping distance of a car at certain speeds.

Suggest **one** reason why.

[1 mark]

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## 2. June/2021/Paper\_2F/No.5(5.3)

0 5 . 3

During the first 14 seconds the average speed of the rocket aeroplane on the runway will be 35 m/s.

Calculate the distance that the rocket aeroplane will travel during the first 14 seconds.

Use the equation:

$$\text{distance travelled} = \text{average speed} \times \text{time}$$

[2 marks]

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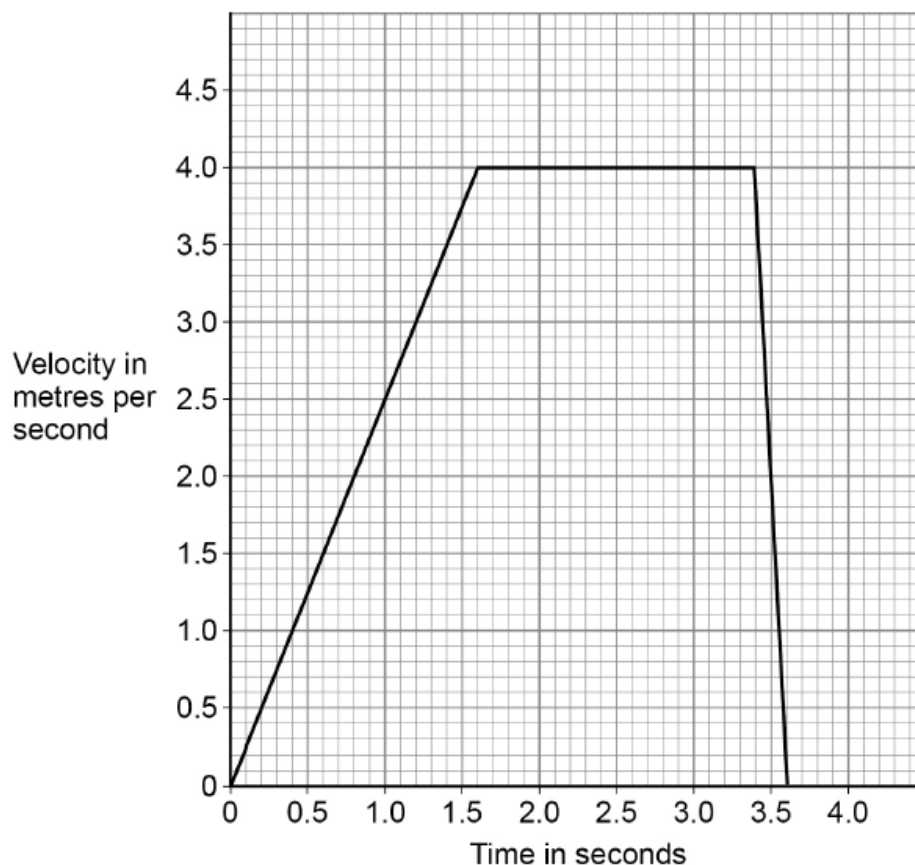
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Distance travelled = \_\_\_\_\_ m

3. June/2021/Paper\_2F/No.7(7.3\_7.7)

Figure 10 shows a velocity–time graph for the player running with the ball.

Figure 10



07.3 Determine the acceleration of the player between 0 and 1.6 s.

[2 marks]

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Acceleration = \_\_\_\_\_ m/s<sup>2</sup>

07.4 Describe the motion of the player between 3.4 s and 3.6 s.

[1 mark]

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The force exerted on the player when she is tackled causes her to accelerate.

0 7 . 5

Write down the equation which links acceleration ( $a$ ), mass ( $m$ ) and resultant force ( $F$ ).

[1 mark]

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0 7 . 6

The player accelerates at  $25 \text{ m/s}^2$  when a resultant force of  $1800 \text{ N}$  acts on her.

Calculate the mass of the player.

[3 marks]

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Mass = \_\_\_\_\_ kg

0 7 . 7

The tracking device sends data to a computer during the game.

Suggest **one** advantage of the data being sent during the game.

[1 mark]

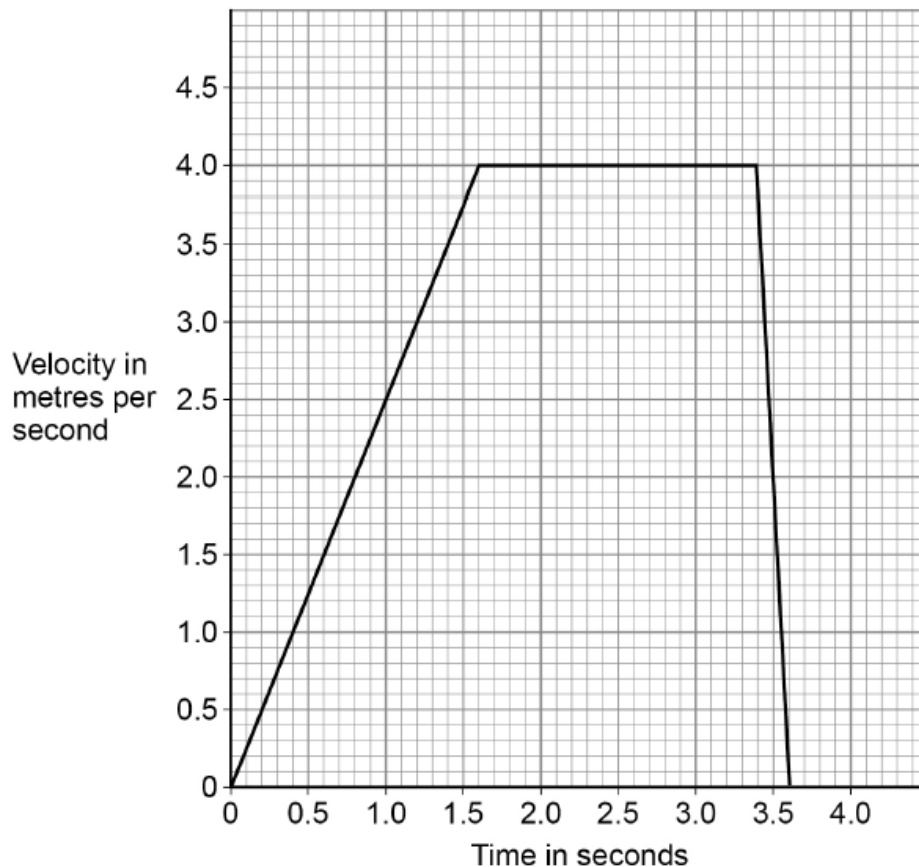
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4. June/2021/Paper\_2H/No.2(2.3\_2.7)

Figure 3 shows a velocity–time graph for the player running with the ball.

Figure 3



0 2 . 3

Determine the acceleration of the player between 0 and 1.6 s.

[2 marks]

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Acceleration = \_\_\_\_\_ m/s<sup>2</sup>

0 2 . 4

Describe the motion of the player between 3.4 s and 3.6 s.

[1 mark]

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The force exerted on the player when she is tackled causes her to accelerate.

- 0 2 . 5 Write down the equation which links acceleration ( $a$ ), mass ( $m$ ) and resultant force ( $F$ ).

[1 mark]

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- 0 2 . 6 The player accelerates at  $25 \text{ m/s}^2$  when a resultant force of 1800 N acts on her.

Calculate the mass of the player.

[3 marks]

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Mass = \_\_\_\_\_ kg

- 0 2 . 7 The tracking device sends data to a computer during the game.

Suggest **one** advantage of the data being sent during the game.

[1 mark]

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