AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 6.5.4.1.3

Velocity

Past-paper questions

Tier	**Higher**
Question groups	**2**
Available paper years	**2020–2021**

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.

6.5.4.1.3 Velocity

Question 01

November 2020 | 8464/P/2H | Original Q4

0 4 **Figure 8** shows a girl bowling a ball along a ten-pin bowling lane.

Figure 8



The girl is trying to knock down the ten pins at the end of the bowling lane.

0 4 . 1 Velocity is a vector quantity, speed is a scalar quantity.

Describe what is meant by a vector quantity and a scalar quantity.

[2 marks]

Vector quantity _____

_____

Scalar quantity _____

_____

0 4 . 2 The bowling lane is horizontal.

Explain why the bowling ball decelerates as it travels along the lane.

[2 marks]

_____

_____

_____

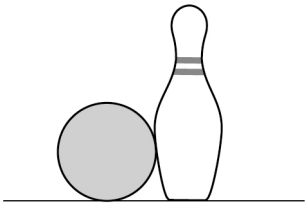
_____

6.5.4.1.3 Velocity

Question 01 · continued

Figure 9 shows the bowling ball hitting one of the pins.

Figure 9



0 4 . 3 Write down the equation that links mass (*m*), momentum (*p*) and velocity (*v*).

[1 mark]

0 4 . 4 The bowling ball has a velocity of 5.0 m/s when it hits the pin.

The momentum of the bowling ball is 26 kg m/s

Calculate the mass of the bowling ball.

[3 marks]

Mass = _____ kg

Question 4 continues on the next page

6.5.4.1.3 Velocity

Question 01 · continued

0 4 . 5 Explain why the bowling ball slows down when it hits the pin.

You should use ideas about momentum in your answer.

[3 marks]

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6.5.4.1.3 Velocity

Question 02

0 2 Professional rugby players wear a tracking device that measures their velocity and acceleration.

Figure 2 shows a player wearing a tracking device.

The player is tackling another player who is running with the ball.

Figure 2



0 2 . 1 Velocity and acceleration are both vector quantities.

What is a vector quantity?

[1 mark]

Tick (✓) **one** box.

- A quantity with both magnitude and direction ☐
- A quantity with direction only ☐
- A quantity with magnitude only ☐

6.5.4.1.3 Velocity

Question 02 · continued

0 2 . 2 Which of the following is a vector quantity?

[1 mark]

Tick (✓) **one** box.

Displacement ☐

Distance ☐

Time ☐

Work done ☐

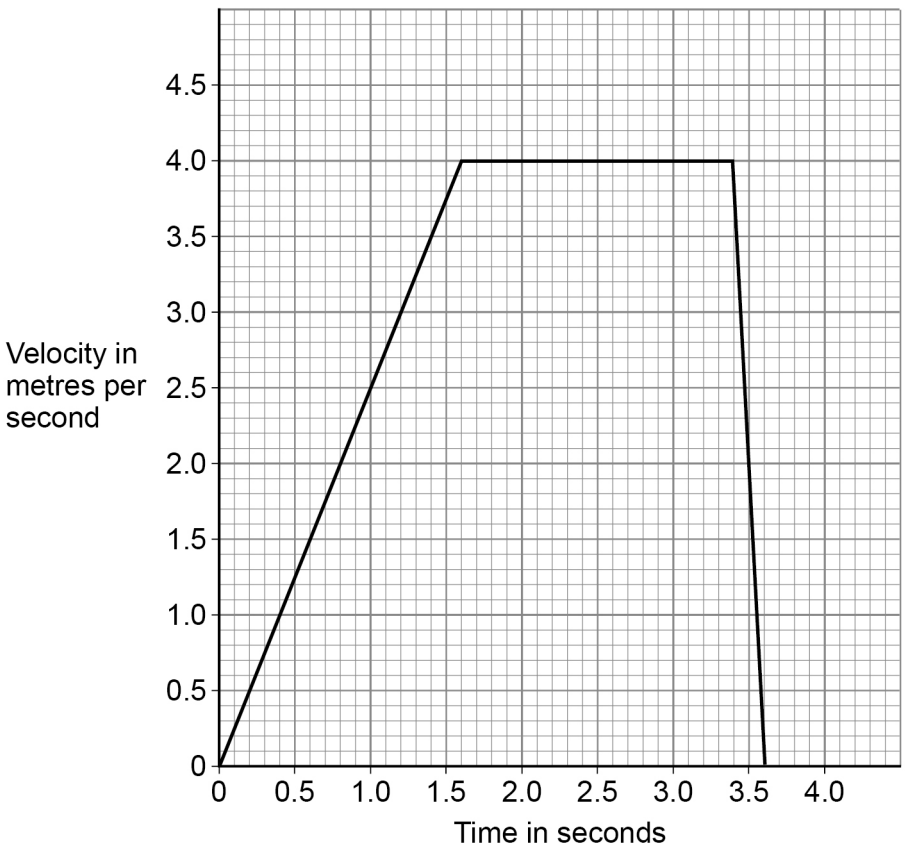
Question 2 continues on the next page

6.5.4.1.3 Velocity

Question 02 · continued

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]

Acceleration = _____ m/s^2

0 2 . 4 Describe the motion of the player between 3.4 s and 3.6 s.

[1 mark]

6.5.4.1.3 Velocity

Question 02 · continued

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]

0 2 . 6 The player accelerates at 25 m/s^2 when a resultant force of 1800 N acts on her.

Calculate the mass of the player.

[3 marks]

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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