Speed, distance and acceleration

Physics Paper 2 calculations | AQA Combined Science 8464 and AQA GCSE Physics 8463 | 14 questions, 40 marks

GCSE science calculations

Scan for the solutions

Equations for this topic (cover this box to practise recalling them)

- distance travelled = speed × time learn this one
- acceleration = $\frac{\text{change in velocity}}{\text{time taken}}$ learn this one
- $(\text{final velocity})^2 - (\text{initial velocity})^2 = 2 \times \text{acceleration} \times \text{distance}$ on the physics equation sheet

Name: _____ **Date:** _____ **Score:** _____ **/ 40**

1 Ibrahim cycles to school at a constant speed of 6 m/s for 50 s.

Calculate the distance he travels.

(2 marks)

Answer _____

2 A car joins a motorway. Its velocity increases from 4 m/s to 22 m/s in 6 s.

Calculate the acceleration of the car.

(2 marks)

Answer _____

3 Grace walks along a straight path. Her distance-time graph is a straight line through these points:

Time in s	0	10	20	30
Distance in m	0	14	28	42

Use the gradient of the graph to calculate her speed.

(2 marks)

Answer _____

4 An e-scooter travels at a constant speed of 18 km/h for 4 minutes.

Calculate the distance it travels in metres.

(3 marks)

Answer _____

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5 A train leaves a station. It speeds up from rest to 72 km/h in 40 s.

Calculate the acceleration of the train.

(3 marks)

Answer _____

6 A coach travels along the M5 at an average speed of 25 m/s for 2.5 hours.

Calculate the distance it travels. Give your answer in kilometres.

(3 marks)

Answer _____

7 A lift in a shopping centre rises 24 m at a constant speed of 1.6 m/s.

Calculate the time the lift takes.

(2 marks)

Answer _____

8 A cyclist is moving at 3 m/s. She accelerates at 1.5 m/s^2 for 8 s.

Calculate her final velocity.

(3 marks)

Answer _____

9 A car is travelling at 20 m/s. The driver brakes and the car decelerates at 5 m/s^2 until it stops.

Calculate the braking distance.

(3 marks)

Answer _____

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10 A delivery van starts from rest. Its velocity-time graph is made of two straight lines:

Time in s	0	4	10
Velocity in m/s	0	8	8

From 0 s to 4 s the line slopes up from 0 m/s to 8 m/s. From 4 s to 10 s the line is flat at 8 m/s.

a. Use the gradient of the graph to calculate the acceleration of the van in the first 4 s.

b. Use the area under the graph to calculate the total distance the van travels in the 10 s. Show your working.

(4 marks)

Answer _____

11 **Higher tier**

A ball is dropped from rest from a height of 1.8 m. It accelerates downwards at 9.8 m/s^2. Ignore air resistance.

Calculate the speed of the ball just before it hits the ground. Give your answer to 2 significant figures. Show your working.

(3 marks)

Answer _____

12 A train is travelling at 108 km/h. It brakes with a constant deceleration and stops in a distance of 1200 m.

a. Calculate the deceleration of the train. Show your working.

b. Calculate the time the train takes to stop.

(5 marks)

Answer _____

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13 A bus of mass 12 000 kg pulls away from a bus stop. It speeds up from rest to 9.0 m/s in 15 s. In this time it travels 68 m.

Calculate the acceleration of the bus.

(2 marks)

Answer _____

14 Amir walks 1.2 km to the shop in 15 minutes. He spends 10 minutes in the shop, then takes 20 minutes to walk the same 1.2 km home.

Calculate Amir's average speed on the walk to the shop, in m/s. Give your answer to 2 significant figures.

(3 marks)

Answer _____

End of questions | Total 40 marks

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