

Revision Questions – Motion and Motion Graphs 1

1. In each of the following cases an object moves along a straight line in the same direction.

(a) An object moves with a constant acceleration. Its velocity increases from 10 m/s to 52m/s in 7 seconds. Calculate its acceleration.

.....

(b) An object moves with a constant acceleration of 4m/s^2 . How long will it take for its velocity to increase from 20m/s to 60m/s?

.....

(c) An object starts from rest and moves with a constant acceleration of 8m/s^2 . What speed does it reach in 6 seconds time?

.....

(d) An object moving at 7 m/s starts accelerating with a constant acceleration of 5m/s^2 . What speed does it reach after 4 seconds?

.....

(e) An object moves at a constant acceleration of 8 m/s^2 . What is its initial velocity if it reaches a velocity of 50m/s in 4 seconds?

.....

(f) An object slows down with a constant deceleration of 3m/s^2 . How long will it take for it to slow down from a speed of 35m/s to 14m/s ?

.....

(g) An object slows down from 45m/s to 21m/s in 6 seconds.
Calculate its deceleration.

.....

(h) An object moving with a velocity of 60m/s starts decelerating with a constant deceleration of 5 m/s^2 . Calculate its velocity after 7 seconds.

.....

2. Sam cycles due east with a constant speed of 5m/s for 8 seconds and then cycles due south with a constant speed of 6m/s for 4 seconds.

Calculate,

(i) the total distance Sam travels.

.....

(ii) his average speed for the whole journey.

.....

(iii) the magnitude of the displacement he makes during the whole journey.

.....

(iv) the magnitude of his average velocity.

.....

3. A girl leaves her home and cycles due north at a constant speed of 7m/s for 10 seconds. She then cycles due west for 5 seconds to reach a shop. The total distance she cycles from her home to the shop is 90m.

(i) How far does the girl cycle due west?

.....

(ii) Calculate the average speed of the girl for her journey from home to the shop.

.....

(iii) Calculate the magnitude of the displacement made by the girl during her journey from home to the shop.

.....

(iv) What is the magnitude of her average velocity for her journey to the shop?

.....

(v) The girl returns home after 3 minutes.

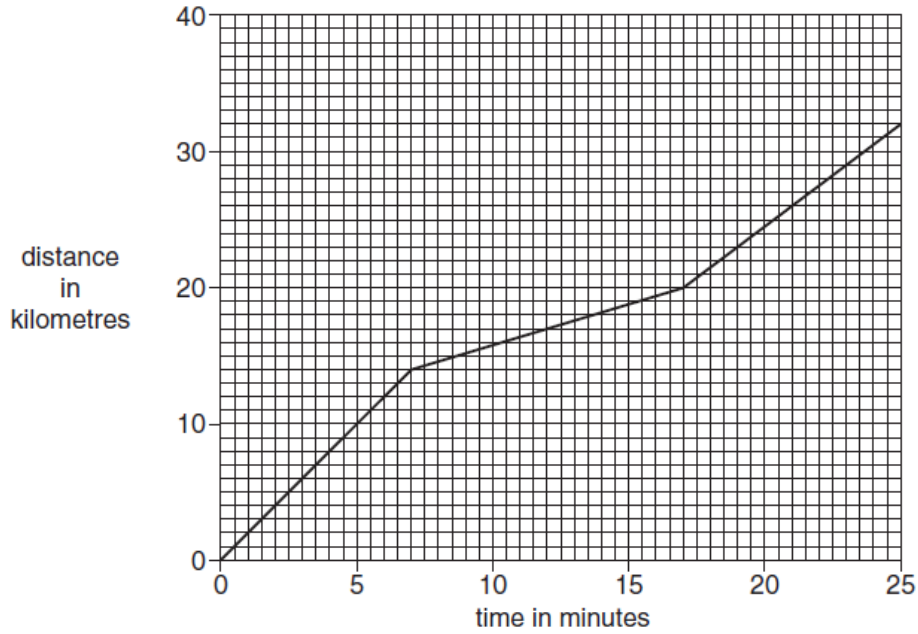
What is the displacement she makes in her whole journey from her home to the shop and back to the home?

.....

Question 4 is on the next page.

4.

Ann is driving along the motorway.
The graph shows the journey she takes.



(i) What is Ann's average speed during the whole journey?

average speed = km/min [1]

(ii) What is Ann's speed during the **middle part** of her journey?

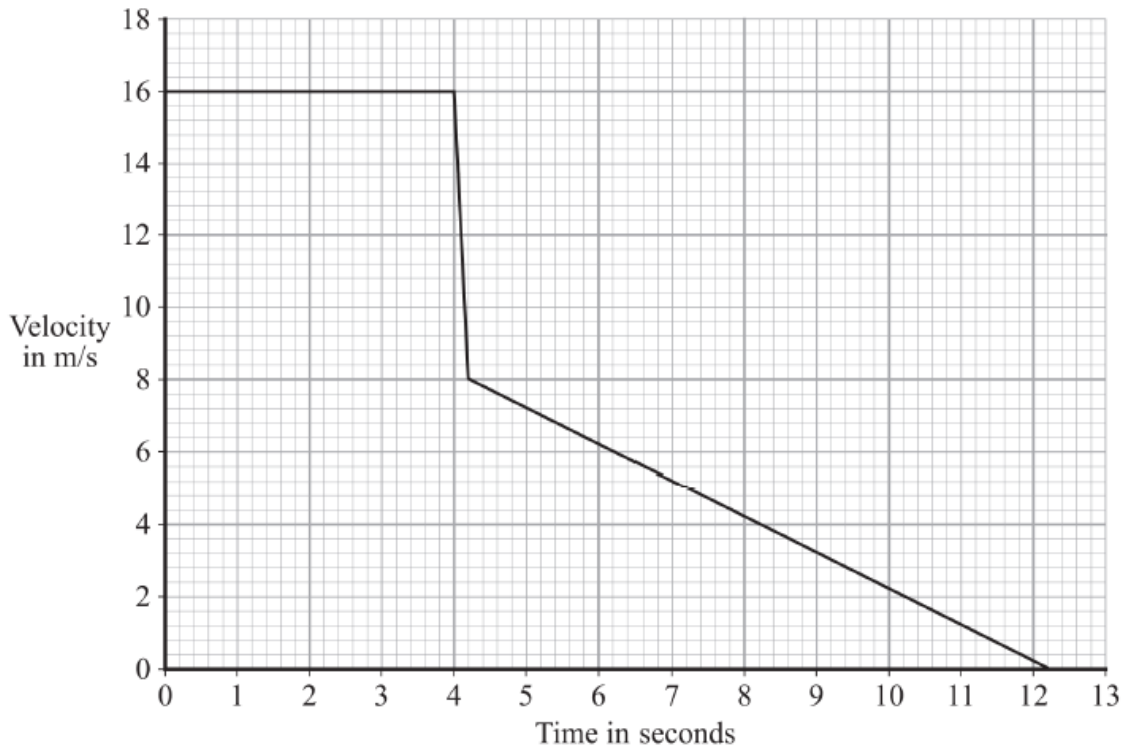
speed = km/min [1]

Question 5 is on the next page.

5.

In an experiment at an accident research laboratory, a car driven by remote control was crashed into the back of an identical stationary car. On impact the two cars joined together and moved in a straight line.

- (a) The graph shows how the *velocity* of the remote-controlled car changed during the experiment.



- (i) How is the *velocity* of a car different from the speed of a car?

.....
(1 mark)

- (ii) Use the graph to calculate the distance travelled by the remote-controlled car before the collision.

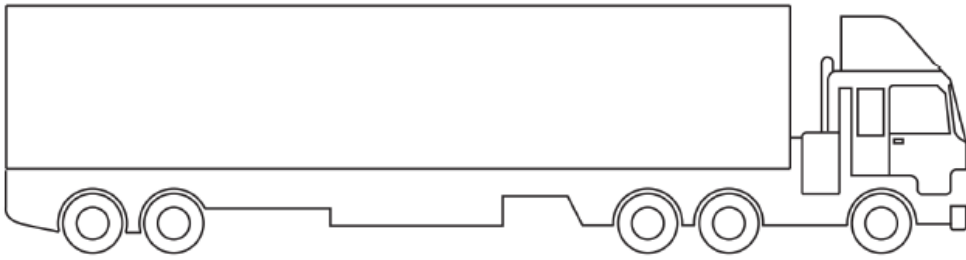
Show clearly how you work out your answer.

.....
.....

Distance = m
(2 marks)

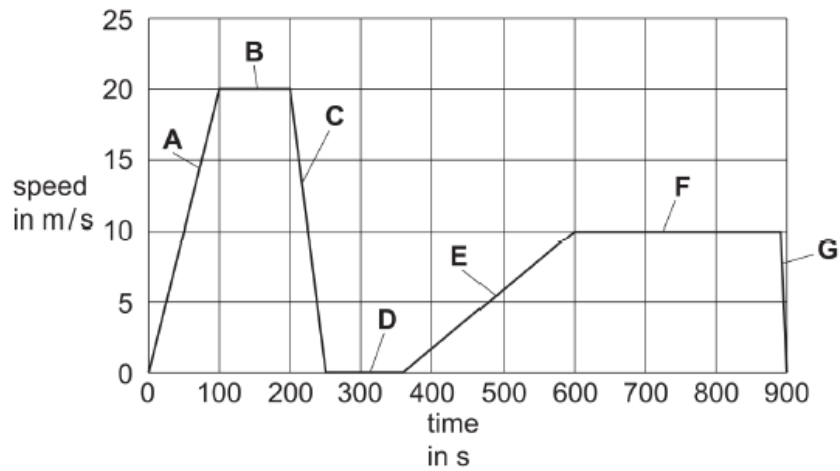
6.

This question is about the speed of a lorry.



The lorry makes a short journey.

The tachograph records the journey as this speed-time graph.



(a) Here are some statements about the motion of the lorry.

Which region of the graph, **A**, **B**, **C**, **D**, **E**, **F** or **G**, best fits each statement?

Write the **one** correct letter in the box next to each statement.

stopped at traffic lights

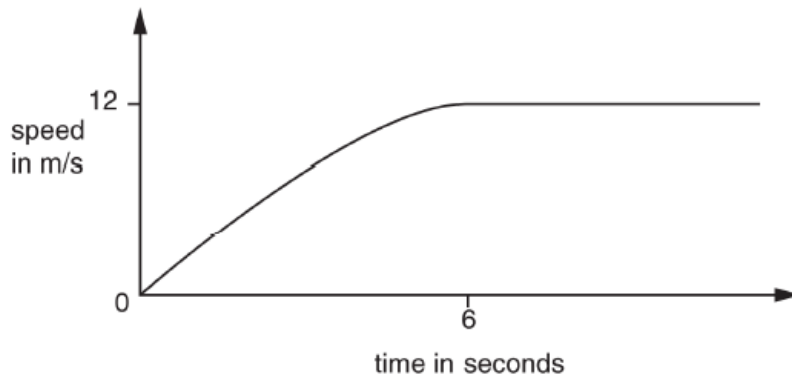
making an emergency stop

moving at the fastest speed of the journey

[3]

7.

A sprinter runs a 100 m race.
The graph shows how his speed changed during the race.



(a) The highest speed of the sprinter was 12 m/s.

Which two of the following statements together explain why the average speed was less than 12 m/s.

Put ticks (✓) in the **two** boxes next to the correct answers.

The sprinter's speed was 12 m/s only for the last part of the race.

The sprinter gets tired at the end of the race.

The sprinter increases his speed at the beginning of the race.

The sprinter moves at a constant speed of 10 m/s.

[2]

(b) Which of the following is the best meaning of instantaneous speed?

Put a tick (✓) in the box next to the correct answer.

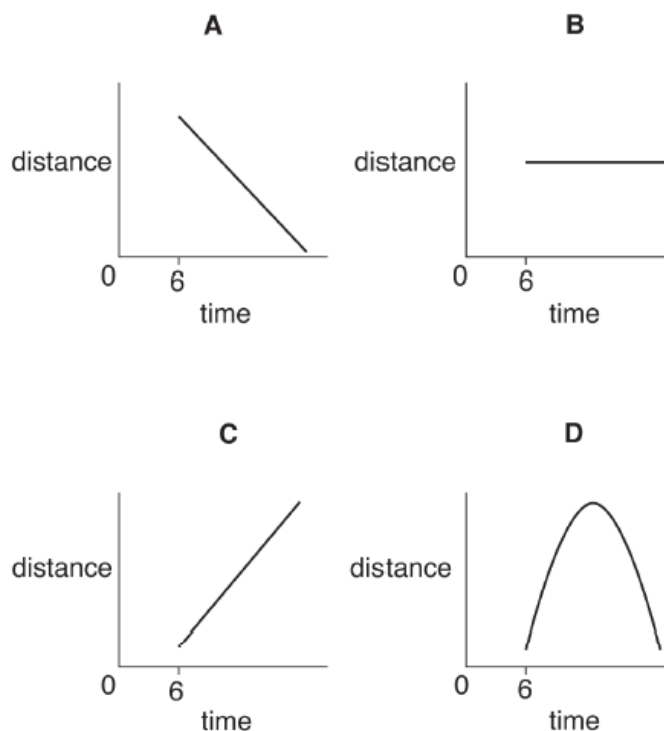
A very quick speed.

An average speed over a very short time.

A constant speed.

[1]

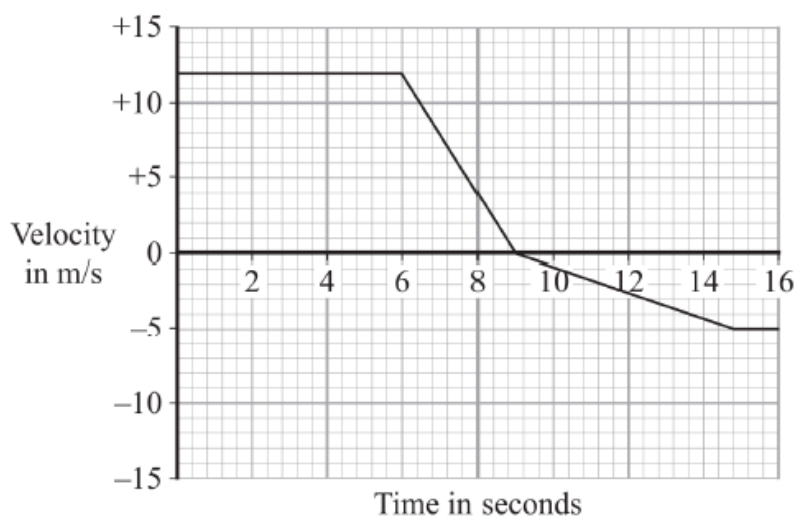
(c) Which of the following graphs **A**, **B**, **C** and **D** could be the distance-time graph for the sprinter during the last part of the race?



answer [1]

8.

A car is driven along a straight road. The graph shows how the velocity of the car changes during part of the journey.



(a) Use the graph to calculate the deceleration of the car between 6 and 9 seconds.

Show clearly how you work out your answer and give the unit.

.....
.....
.....

Deceleration =
(3 marks)

(b) At what time did the car change direction?

..... seconds
(1 mark)