



7.3.2 Distance Time Graphs

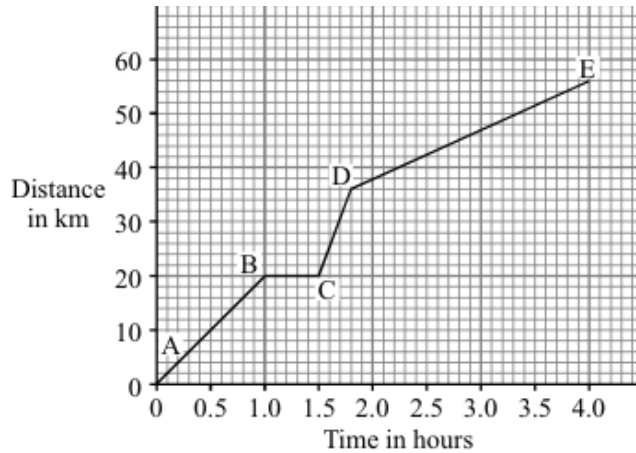


35 minutes



39 marks

- Q1.** A cyclist goes on a long ride. The graph shows how the distance travelled changes with time during the ride.



- (i) Between which **two** points on the graph was the cyclist moving at the fastest speed?

.....

(1)

- (ii) State **one** way cyclists can reduce the air resistance acting on them.

.....

.....

(1)

- (iii) How long did the cyclist stop and rest?

.....

(1)

- (iv) Write down the equation which links distance, speed and time.

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(1)

- (v) Calculate, in km/hr, the average speed of the cyclist while moving.

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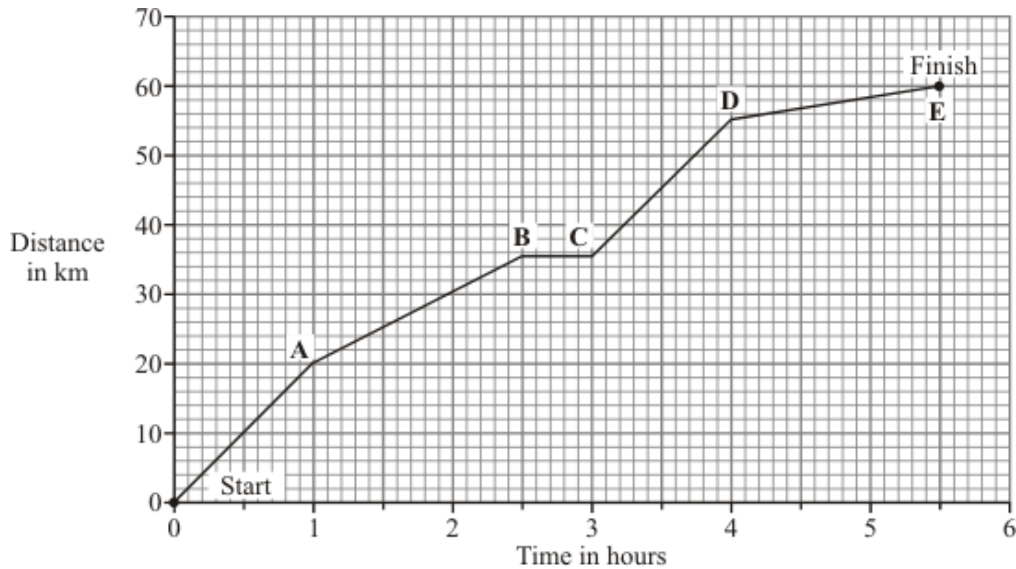
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Average speed = km/hr

(3)

(Total 7 marks)

- Q2.** A horse and rider take part in a long distance race. The graph shows how far the horse and rider travel during the race.



- (a) What was the distance of the race?

distance = km

(1)

- (b) How long did it take the horse and rider to complete the race?

.....

(1)

- (c) What distance did the horse and rider travel in the first 2 hours of the race?

distance = km

(1)

- (d) How long did the horse and rider stop and rest during the race?

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(1)

- (e) Not counting the time it was resting, between which two points was the horse moving the slowest?

..... and

Give a reason for your answer.

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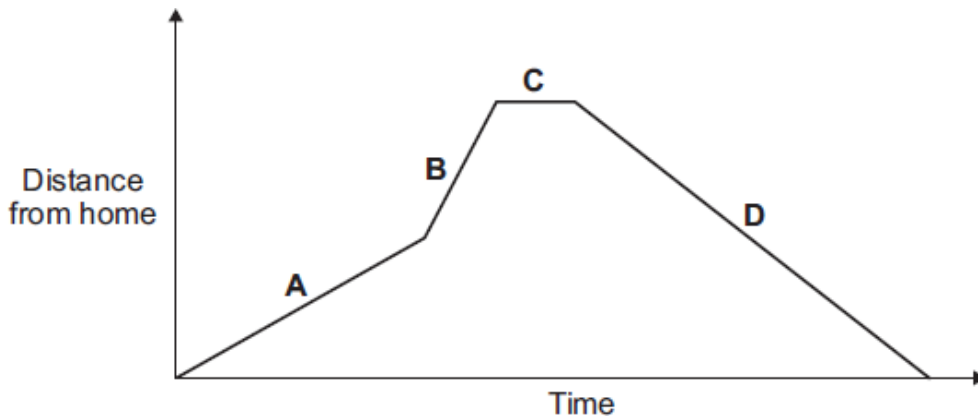
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(2)

(Total 6 marks)

Q3. (a) A person takes their dog for a walk.

The graph shows how the distance from their home changes with time.



Which part of the graph, **A**, **B**, **C** or **D**, shows them walking the fastest?

Write your answer in the box.

Give the reason for your answer.

.....

.....

(2)

(b) During the walk, both the speed and the velocity of the person and the dog change.

How is *velocity* different from *speed*?

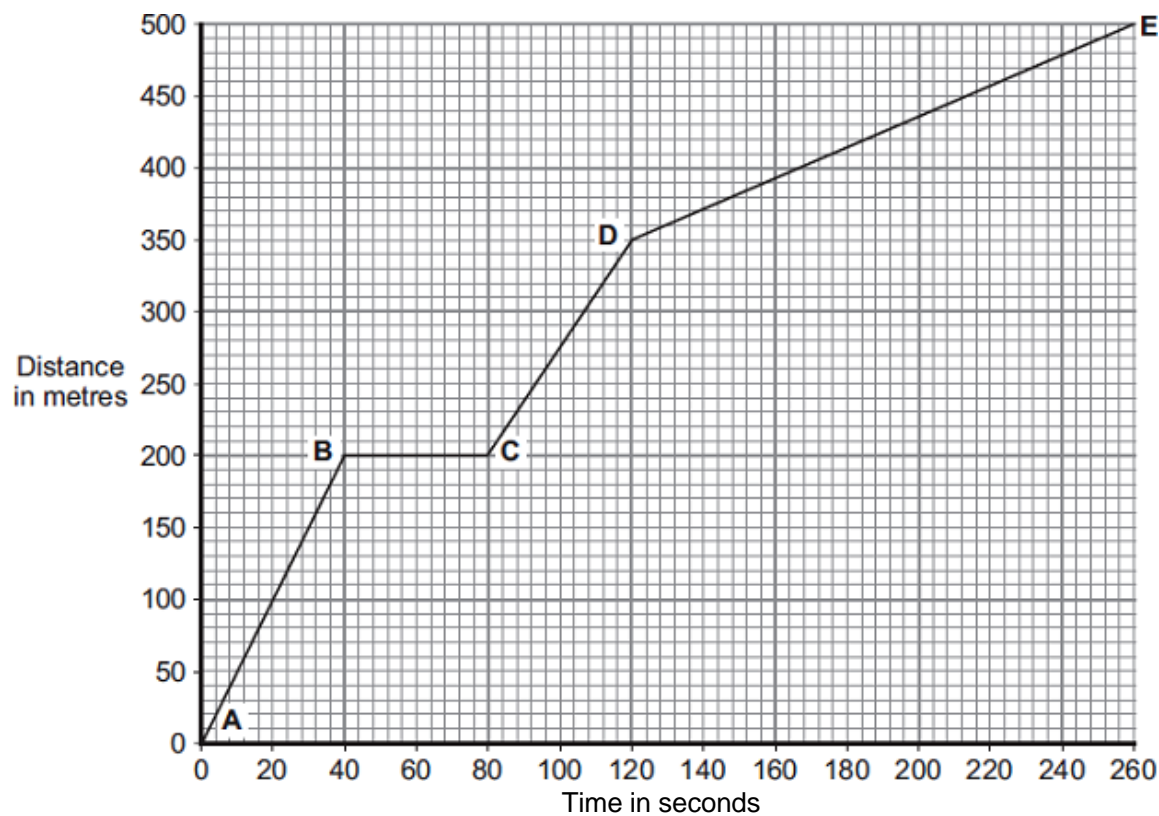
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(1)

(Total 3 marks)

Q4. Part of a bus route is along a high street.
 The distance-time graph shows how far the bus travelled along the high street and how long it took.



(a) Between which two points was the bus travelling the slowest?

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

Points	Tick (✓)
A – B	
C – D	
D – E	

Give a reason for your answer.

.....

(2)

- (b) The bus travels at 5 m/s between points **A** and **B**.
The bus and passengers have a total mass of 16 000 kg.

Use the equation in the box to calculate the momentum of the bus and passengers between points **A** and **B**.

$\text{momentum} = \text{mass} \times \text{velocity}$
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Show clearly how you work out your answer.

.....
.....

Momentum = kg m/s

(2)

- (c) A cyclist made the same journey along the high street.
The cyclist started at the same time as the bus and completed the journey in 220 seconds. The cyclist travelled the whole distance at a constant speed.

- (i) Draw a line on the graph to show the cyclist's journey.

(2)

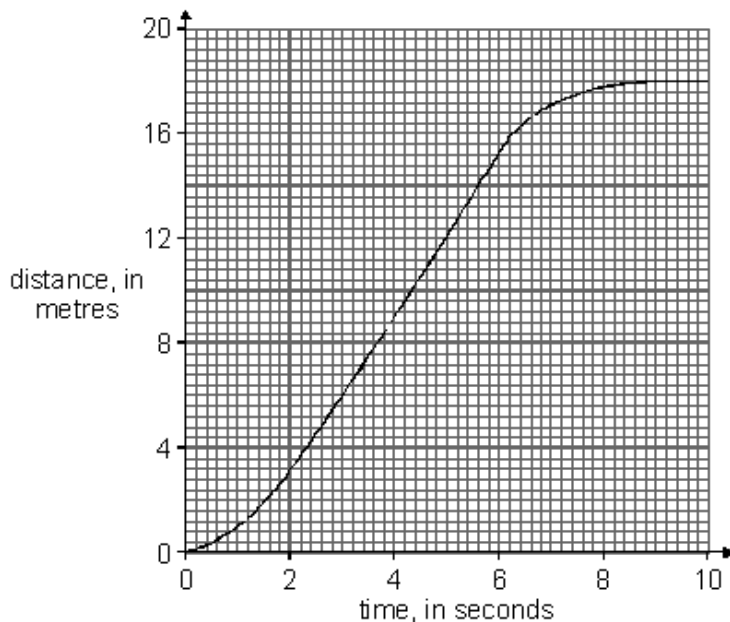
- (ii) After how many seconds did the cyclist overtake the bus?

The cyclist overtook the bus after seconds.

(1)

(Total 7 marks)

- Q5.** A remote-controlled car was timed over a period of 10 seconds.
A graph of **distance** against **time** is shown below.



(a) Describe the motion of the car between:

(i) 2 seconds and 6 seconds;

.....

1 mark

(ii) 9 seconds and 10 seconds.

.....

1 mark

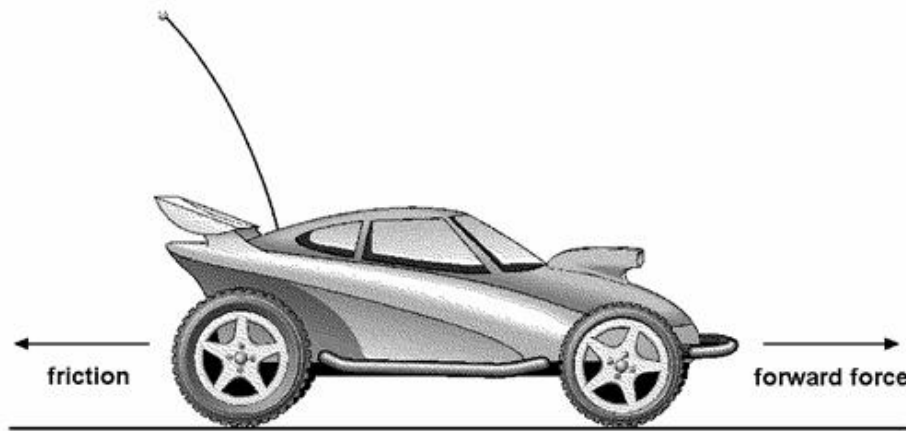
(b) Calculate the average speed of the car between 0 and 10 seconds.
Give the unit.

.....

.....

2 marks

(c) The diagram below shows **two** of the forces acting on the car when it is moving.



(i) When the motor was switched off, the car slowed down and then stopped.

While the car was slowing down, which of the following was true? Tick the correct box.

Friction was zero and the forward force was greater than zero.

☐

The forward force was zero and friction was greater than zero.

☐

Friction was zero and the forward force was zero.

☐

The forward force and friction were both greater than zero.

☐

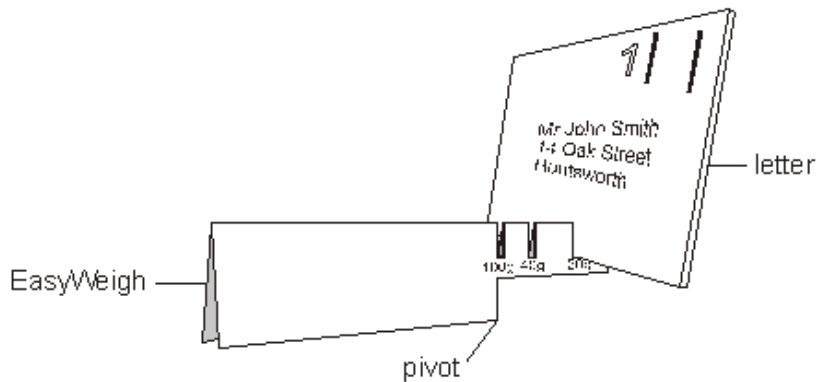
1 mark

- (ii) Use the graph to find the time when the car started to slow down.

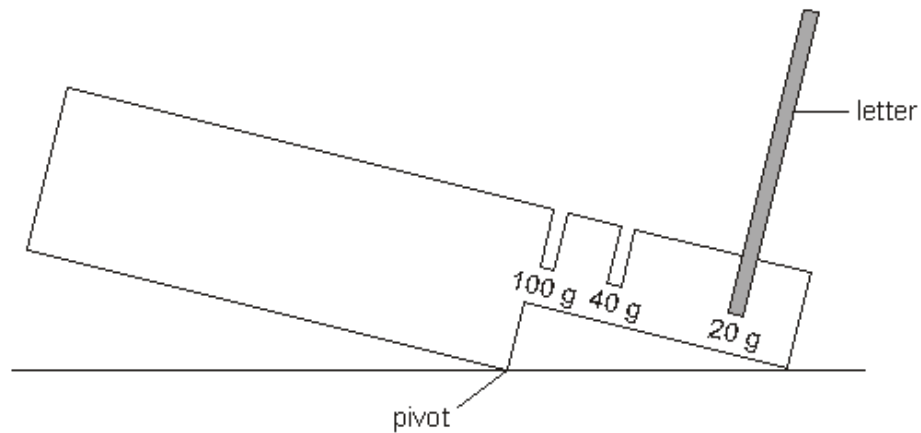
The car started to slow down after s.

1 mark
Maximum 6 marks

- Q6.** The drawing below shows a cardboard scale called an EasyWeigh. It can be used to estimate the mass of letters.



- (a) Clare put a letter in the 20 g slot. The scale tipped as shown below.



She then put the same letter in the 40 g slot. The scale did **not** tip.

- (i) What do these results tell you about the mass of Clare's letter?

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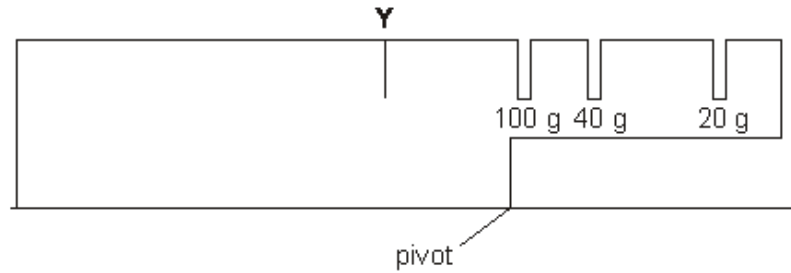
1 mark

- (ii) What could Clare do to this cardboard scale to weigh her letter more accurately?

.....
.....

1 mark

- (b) (i) Clare drew a short line to show where she thought she should cut a slot to weigh a 150 g letter. She labelled the slot Y.



Why could Clare **not** use a slot at Y to weigh a 150 g letter?

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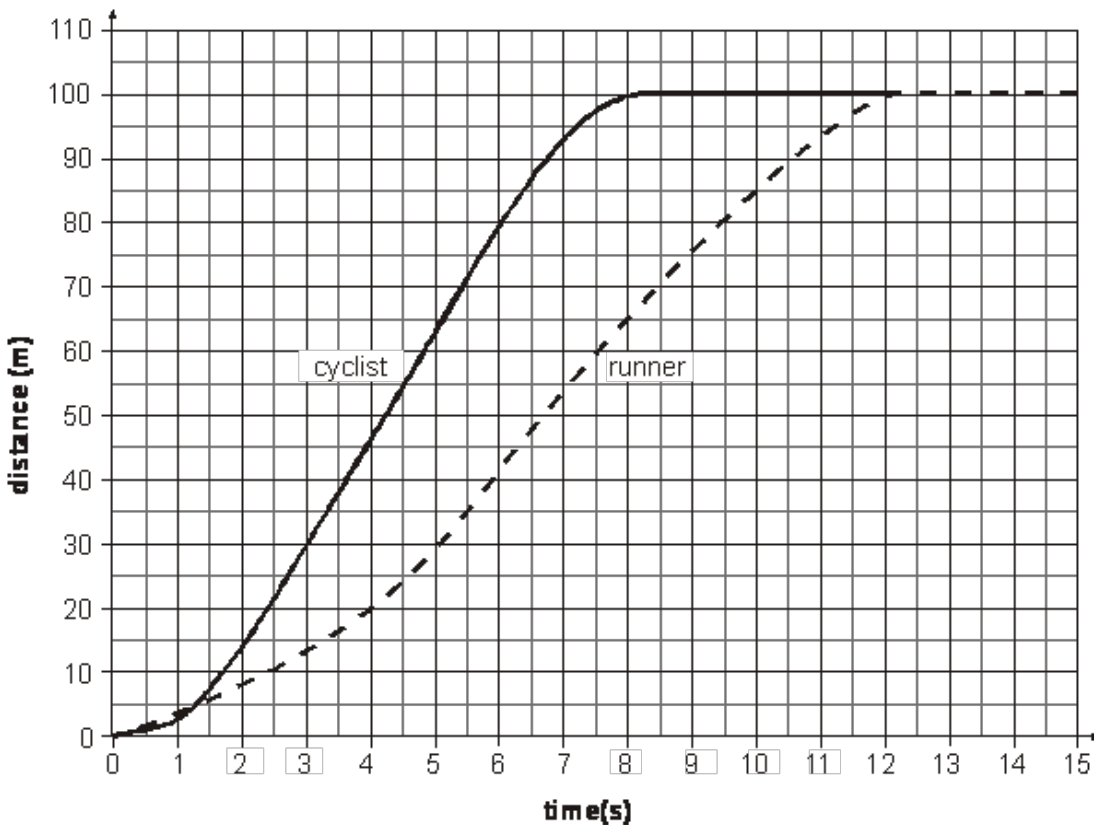
1 mark

- (ii) Clare wanted to cut a slot to weigh a 70 g letter.

On the diagram above, draw a short line to show where the slot should be cut.

1 mark
 maximum 4 marks

- Q7.** A cyclist and a runner have a race.
 The distance-time graph for the race is shown below.



Use the graph to answer the following questions.

- (a) (i) How much time did it take the cyclist to travel 100 m?

..... s

1 mark

- (ii) When the cyclist finished the race how far behind was the runner?

..... m

1 mark

- (iii) How much more time did the runner take compared with the cyclist to complete the race?

..... s

1 mark

- (b) The cyclist is travelling at a constant speed between 3 seconds and 6 seconds.

How does the graph show this?

.....

.....

1 mark

- (c) (i) When the race started, a walker set off at a steady speed of 2m/s.

Draw a line on the graph on the opposite page to show the distance covered by the walker in the first 15 seconds. Use a ruler.

1 mark

- (ii) Calculate how much time it will take for the walker to walk 100m.

.....

..... s

1 mark

maximum 6 marks

