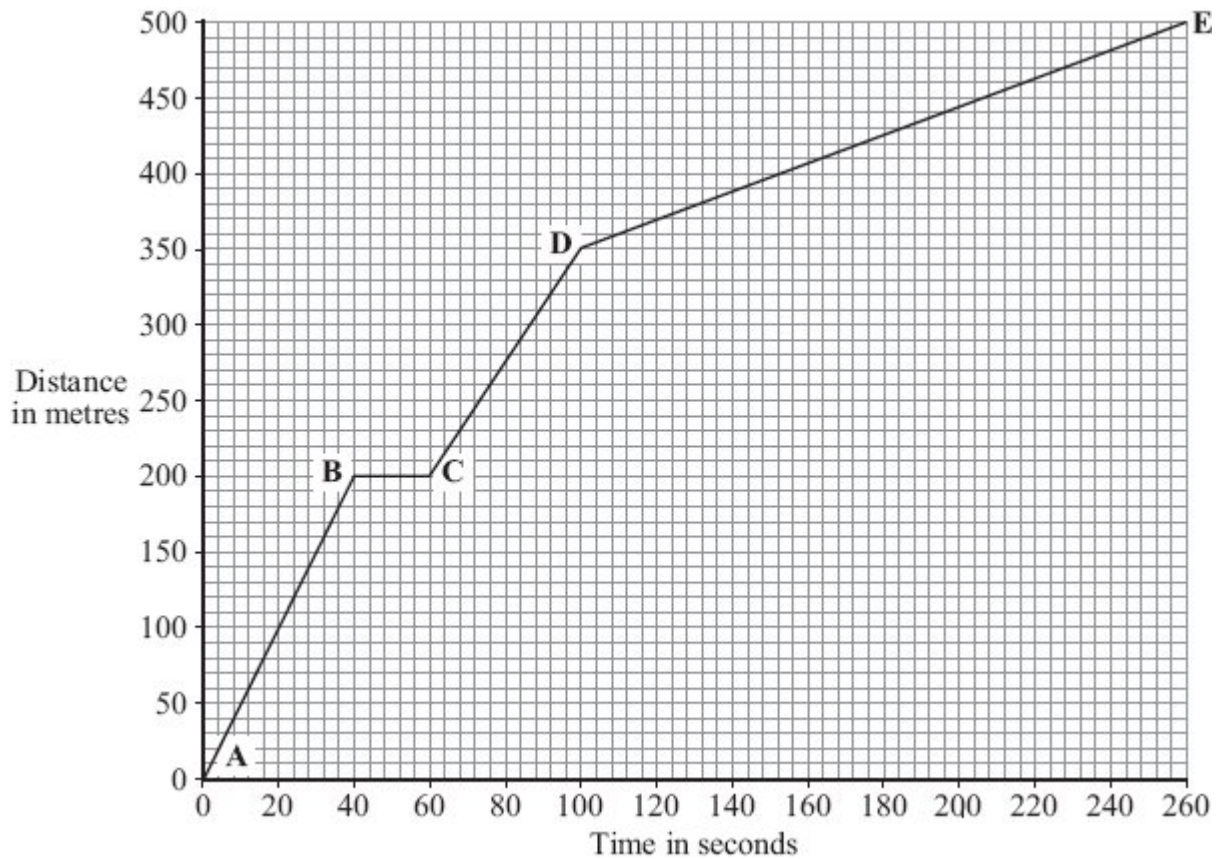


Q1. Part of a bus route is along a high street.

The distance – time graph shows how far the bus travelled along the high street and how long it took.



(a) The bus travels the **slowest** between points **D** and **E**.

How can you tell this from the graph?

.....

(1)

(b) There is a bus stop in the high street.
 This is marked as point **B** on the graph.

(i) What is the distance between point **A** on the graph and the bus stop?

Distance metres

(1)

(ii) How long did the bus stop at the bus stop?
 Show clearly how you work out your answer.

.....

Time = seconds

(2)

(d) 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 200 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)

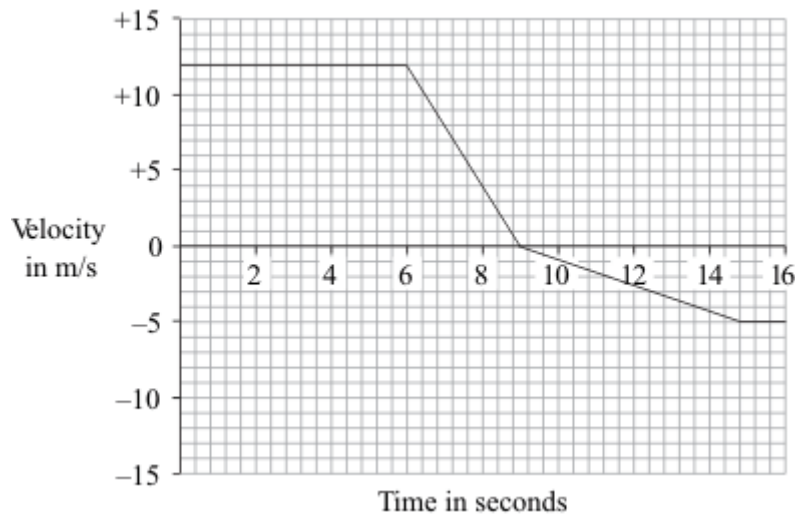
(ii) After how many seconds did the cyclist overtake the bus?

The cyclist overtook the bus after seconds.

(1)

(Total 8 marks)

Q2. 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)

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

(1)

(Total 4 marks)

Distance and Velocity time graphs

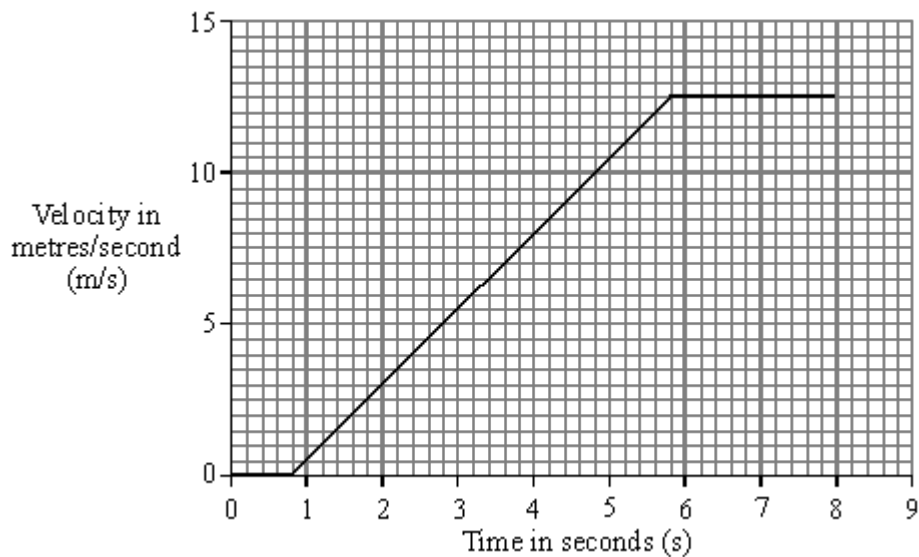
(b) Calculate the gradient of the graph between point **B** and point **C**. Show clearly how you get your answer.

.....

gradient =

(3)
(Total 6 marks)

Q5. A car travelling along a straight road has to stop and wait at red traffic lights. The graph shows how the velocity of the car changes after the traffic lights turn green.



(a) Calculate the distance the car travels while accelerating. Show clearly how you work out your answer.

.....

Distance =metres

(3)

M1. (a) shallowest slope/ gradient

*accept smallest distance in biggest time
accept longest time to travel the same distance
accept the line is not as steep
accept it is a less steep line
do **not** accept the line is not steep*

1

(b) **A – B**

If 2 or 3 boxes are ticked no mark

1

(c) (i) 200 m

1

(ii) 20 s

allow 1 mark for correctly identifying 60 s or 40 s from the graph

2

(d) (i) straight line starting at origin

accept within one small square of the origin

1

passing through $t = 200$ and $d = 500$

1

(ii) 166

*accept any value between 162 and 168
accept where their line intersects
given graph line correctly read ± 3 s*

1

[8]

M2. (a) 4

allow 1 mark for extracting correct information 12

2

m/s²

ignore negative sign

1

(b) 9 (s)

1

[4]

M3. (a) Quality of written communication

for correct use of term speed in all correct examples

Distance and Velocity time graphs

Q ✓ Q ✗

1

*describes all 3 sections correctly for 2 marks
describes 2 or 1 section correctly for 1 mark*

max 2

A – B constant speed

*do **not** accept pace for speed*

B – C (has accelerated) to a higher (constant) speed

C – D goes back to original / lower (constant) speed

*allow for 1 mark, initial and final (constant) speeds are the same
accept velocity for speed
ignore reference to direction*

(b) 62.5

allow answer to 2 s.f.

*allow 1 mark for drawing a correct triangle **or** for using two correct
pairs of coordinates*

allow 1 mark for correct use of y/x

ignore units

3

[6]

M4. (a) 48

allow for 1 mark correct method shown, ie 6×8

***or** correct area indicated on the graph*

2

(b) diagonal line from (0,0) to (6,48) / (6, their (a))

*if answer to (a) is greater than 50, scale must be changed to gain
this mark*

1

horizontal line at 48m between 6 and 10 seconds

accept horizontal line drawn at their (a) between 6 and 10 seconds

1

[4]

M5. (a) concentration / tiredness / drugs / alcohol

*accept any reasonable factor that could affect a driver's reactions
do **not** accept speed or any physical condition unrelated to the
driver*

1

(b) 31.25

Distance and Velocity time graphs

credit for 1 mark correct attempt to calculate the area under the slope **or** for using the equation
 $distance = \text{average velocity (speed)} \times time$
credit for 1 mark use of correct velocity change (12.5) and correct time (5) **or** answer of 62.5

3

(c) 2.5

credit for 1 mark triangle drawn on slope **or** correct equation **or** two correct pairs of coordinates
credit for 1 mark use of correct velocity change (12.5) and correct time (5)
accept time = between 4.8 and 5.2 if used in (b)
do not accept an attempt using one pair of coordinates taken from the slope

3

metres / second / second **or** metres / second / squared **or** m/s² **or** ms⁻²

1

(d) (i) force = mass \times acceleration

accept correct transformation

accept $F = m \times a$

accept  provided subsequent use of Δ is correct

do **not** accept an equation in units

1

(ii) 2250

credit their (c) \times 900 for 2 marks

credit 1 mark for correct substitution

2

[11]

M6. (a) (i) acceleration / speeding up

do not accept acceleration increases

1

(ii) constant / steady velocity

accept constant / steady speed

1

Distance and Velocity time graphs

(b) 10

3

m/s² or ms⁻²

reject ms⁻²

if answer not correct then allow 1 mark for

$$\text{acceleration} = \frac{\text{change in velocity}}{\text{time taken for change}}$$

$$\text{and allow 1 mark for } \frac{40 \text{ (m/s)}}{4 \text{ (s)}}$$

1

[6]