4. The points A and B lie on the same straight horizontal road.

Figure 2, on page 11, shows the speed-time graph of a cyclist P, for his journey from A to B.
At time $t = 0$, P starts from rest at A and accelerates uniformly for 9 seconds until his speed is $V\,\text{m s}^{-1}$

He then travels at constant speed $V\,\text{m s}^{-1}$

When $t = 42$, cyclist P passes B.

Given that the distance AB is 120 m,

(a) show that $V = 3.2$

(3)

(b) Find the acceleration of cyclist P between $t = 0$ and $t = 9$

(2)

Cyclist P continues to cycle along the road in the same direction at the same constant speed, $V\,\text{m s}^{-1}$

When $t = 6$, a second cyclist Q sets off from A and travels in the same direction as P along the same road. She accelerates for T seconds until her speed is $3.6\,\text{m s}^{-1}$

She then travels at constant speed $3.6\,\text{m s}^{-1}$

Cyclist Q catches up with P when $t = 54$

(c) On Figure 2, on page 11, sketch a speed-time graph showing the journeys of **both** cyclists, for the interval $0 \leqslant t \leqslant 54$

(3)

(d) Find the value of T

(5)

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Question 4 continued

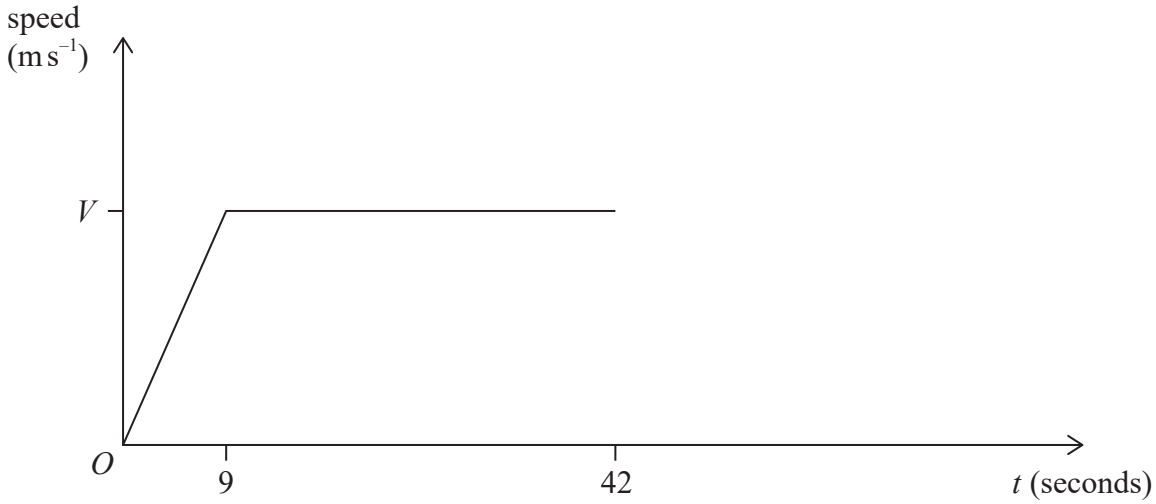

Figure 2

A copy of Figure 2 is on page 13 if you need to redraw your answer to part (c).

Question 4 continued

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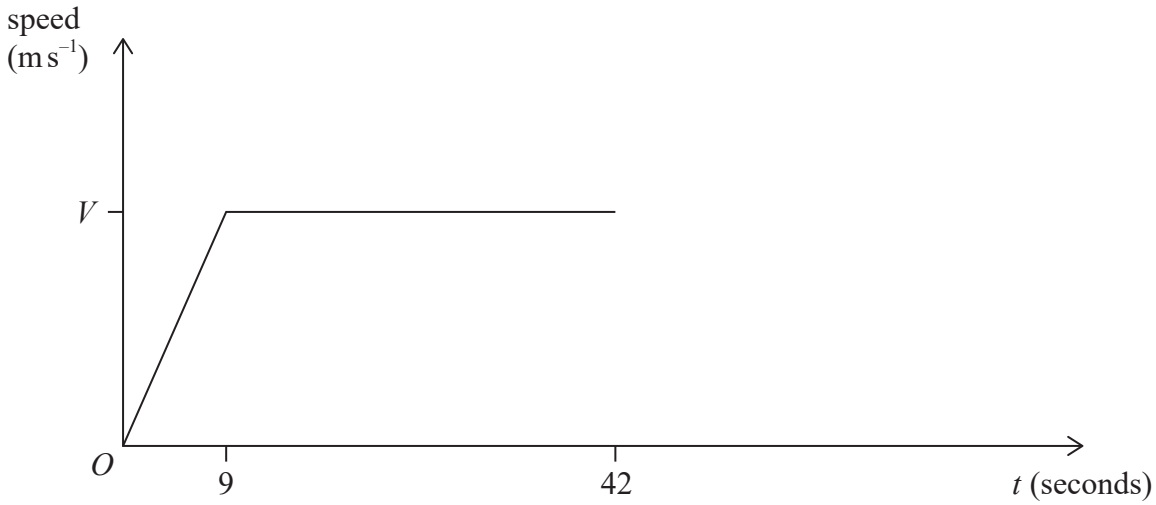
Question 4 continued

Only use this copy of Figure 2 if you need to redraw your answer to part (c).



Copy of Figure 2

(Total for Question 4 is 13 marks)

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