**6.**

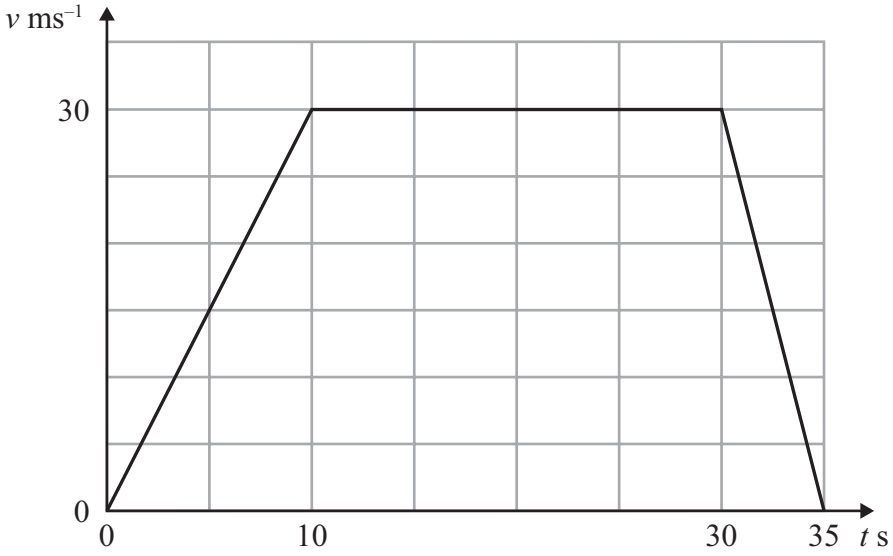


**Figure 4**

The point $O$ lies on a straight horizontal road.
At time $t = 0$, a car leaves $O$ and travels along the road.

The velocity-time graph in Figure 4 shows the velocity, $v\,\text{m s}^{-1}$, of the car at time $t$ seconds for the first 35 seconds of its journey.

(a) Find

(i) the acceleration of the car for the period $0 \leqslant t \leqslant 10$

(ii) the deceleration of the car for the period $30 \leqslant t \leqslant 35$

**(2)**

(b) Sketch an acceleration-time graph for the car for the period $0 \leqslant t \leqslant 35$

**(2)**

(c) Find the distance travelled by the car for the period $0 \leqslant t \leqslant 35$

**(2)**

When $t = 5$, a motorcycle starts from rest at $O$.
The motorcycle travels along the same road as the car and in the same direction.

For the period $5 \leqslant t \leqslant 20$, the acceleration of the motorcycle is $A\,\text{m s}^{-2}$, where $A$ is a positive constant.

The motorcycle catches up with the car when $t = 20$

(d) Find the value of $A$.

**(4)**

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**(Total for Question 6 is 10 marks)**

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