5.

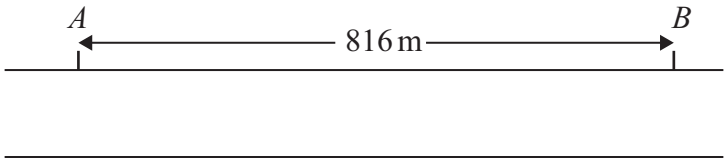

Figure 1

Two posts, A and B, are fixed at the side of a straight horizontal road and are 816 m apart, as shown in Figure 1.
A car and a van are at rest side by side on the road and level with A.
At time $t = 0$, the car and the van start to move in the direction AB.

The car accelerates from rest with constant acceleration for T seconds until it reaches a speed of $24\,\text{m s}^{-1}$
The car then moves at a constant speed of $24\,\text{m s}^{-1}$

The van accelerates from rest with constant acceleration for 12 s until it reaches a speed of $V\,\text{m s}^{-1}$
The van then moves at a constant speed of $V\,\text{m s}^{-1}$

When the car has been moving at $24\,\text{m s}^{-1}$ for 30 s, the van draws level with the car at B, and each vehicle has then travelled a distance of 816 m.

(a) Sketch, on the same diagram, a speed-time graph for the motion of each vehicle from A to B.

(3)

(b) Find the value of T.

(3)

(c) Find the value of V.

(3)

(Total for Question 5 is 9 marks)