

- 3 A trolley A moves along a horizontal surface at a constant velocity towards another trolley B which is moving at a lower constant speed in the same direction. Fig. 3.1 shows the trolleys at time $t = 0$.



Fig. 3.1

Table 3.1 shows data for the trolleys.

Table 3.1

trolley	mass/kg	initial speed/ ms^{-1}
A	0.25	0.48
B	0.75	0.12

The two trolleys collide elastically and then separate. Resistive forces are negligible.

Fig. 3.2 shows the variation with time t of the velocity v for trolley B.

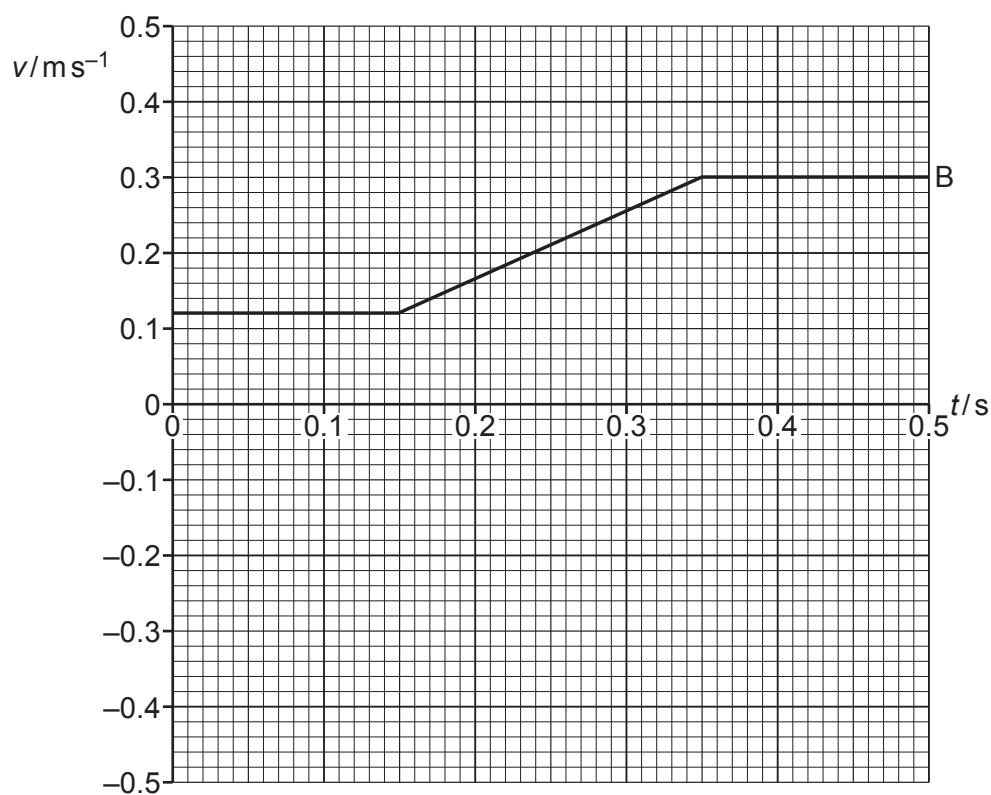


Fig. 3.2

- (a) State what is represented by the area under a velocity–time graph.

..... [1]

- (b) Use Table 3.1 and Fig. 3.2 to determine:

- (i) the acceleration of trolley B during the collision

acceleration of B = ms^{-2} [2]

- (ii) the magnitude and direction of the final velocity of trolley A.

magnitude = ms^{-1}

direction [3]

- (c) On Fig. 3.2, sketch the variation of the velocity of trolley A with time t from $t = 0$ to $t = 0.50\text{ s}$.

[3]