

# Solutionbank M1

Heinemann Modular Maths for Edexcel AS and A-level

## 2 Kinematics in one dimension

### Exercise B, Question 1

#### Question:

A car accelerates at  $2 \text{ m s}^{-2}$  from rest for 10 seconds along a straight road.

(a) Find the distance travelled by the car and the speed it reaches.

(b) After the 10 seconds its acceleration changes to  $0.5 \text{ m s}^{-2}$  and then remains constant for a further 5 seconds. Find the speed of the car and the total distance that it has travelled at the end of the 15 seconds.

#### Solution:

$$s = ut + \frac{1}{2}at^2$$

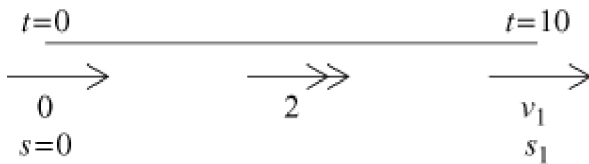
$$s_1 = 0 \times 10 + \frac{1}{2} \times 2 \times 10^2$$

(a)  $s_1 = 100 \text{ metres}$

$$v = u + at$$

$$v_1 = 0 + 2 \times 10$$

$$v_1 = 20 \text{ m s}^{-1}$$



$$v = u + at$$

$$v_2 = 20 + 0.5 \times 5$$

$$v_2 = 22.5 \text{ m s}^{-1}$$

(b)  $s = ut + \frac{1}{2}at^2$

$$s_2 = 20 \times 5 + \frac{1}{2} \times 0.5 \times 5^2 = 106.25 \text{ m}$$

$$\therefore \text{total distance} = s_1 + s_2 = 100 + 106.25 = 206.25 \text{ metres}$$

