

# Solutionbank M1

Heinemann Modular Maths for Edexcel AS and A-level

## 2 Kinematics in one dimension

### Exercise B, Question 17

#### Question:

As a lift moves upwards from rest it accelerates at  $0.8 \text{ m s}^{-2}$  for 2 seconds, then travels 4 m at constant speed and finally slows down, with a constant deceleration, stopping in 3 seconds.  
Find the total distance travelled by the lift and the total time taken. [A]

#### Solution:

$$\text{1st part, } s = ut + \frac{1}{2}at^2$$

$$s_1 = 0 \times 2 + \frac{1}{2} \times 0.8 \times 2^2 = 1.6 \text{ m}$$

$$v = u + at$$

$$v_1 = 0 + 0.8 \times 2 = 1.6 \text{ m s}^{-1}$$

$$\text{2nd part, } s = ut$$

$$4 = 1.6 \times t_2$$

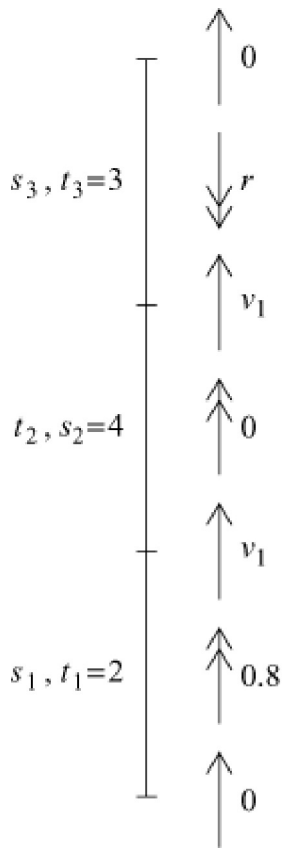
$$\therefore t_2 = \frac{4}{1.6} = 2.5 \text{ seconds}$$

$$\text{3rd part, } s = \frac{(u+v)}{2}t$$

$$s_3 = \frac{(1.6+0)}{2} \times 3 = 2.4 \text{ m}$$

$$\begin{aligned} \therefore \text{ total distance} &= s_1 + s_2 + s_3 \\ &= 1.6 + 4 + 2.4 \\ &= 8 \text{ metres.} \end{aligned}$$

$$\text{and total time} = t_1 + t_2 + t_3 = 2 + 2.5 + 3 = 7.5 \text{ seconds}$$



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