

# Solutionbank M1

Heinemann Modular Maths for Edexcel AS and A-level

## 8 Momentum

### Exercise A, Question 1

#### Question:

Calculate the momentum of:

- (a) a train, of mass 120 tonnes, travelling at  $40 \text{ m s}^{-1}$ ,
- (b) a table tennis ball, of mass 3 g, travelling at  $4 \text{ m s}^{-1}$ ,
- (c) a car, of mass 1200 kg, travelling at 36 kph.

#### Solution:

- (a) 120 tonnes is 120 000 kg

$$\begin{aligned} \text{Momentum, } mv &= 120\,000 \times 40 \\ &= 4\,800\,000 \text{ Ns} \end{aligned}$$

- (b) 3 g is 0.003 kg

$$\begin{aligned} \text{Momentum, } mv &= 0.003 \times 4 \\ &= 0.012 \text{ Ns} \end{aligned}$$

$$\begin{aligned} 36 \text{ kph} &= 36\,000 \text{ m per hour} \\ &= \frac{36\,000}{60 \times 60} \text{ m s}^{-1} \end{aligned}$$

- (c)  $= 10 \text{ m s}^{-1}$

$$\begin{aligned} \text{Momentum, } mv &= 1200 \times 10 \\ &= 12\,000 \text{ Ns} \end{aligned}$$