

- 3 (a) State what is meant by the *mass* of a body.

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[1]

- (b) Two blocks travel directly towards each other along a horizontal, frictionless surface. The blocks collide, as illustrated in Fig. 3.1.

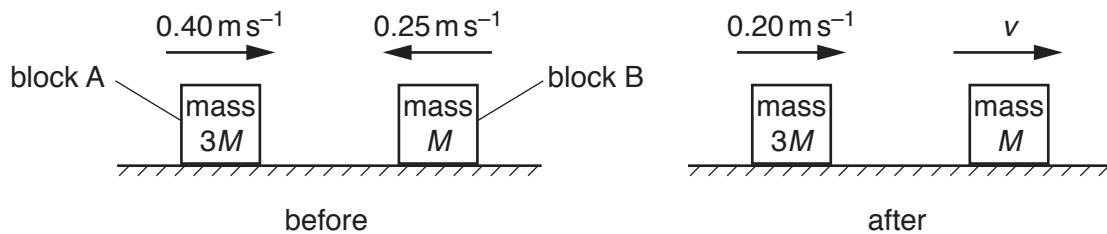


Fig. 3.1

Block A has mass $3M$ and block B has mass M .

Before the collision, block A moves to the right with speed 0.40 m s^{-1} and block B moves to the left with speed 0.25 m s^{-1} .

After the collision, block A moves to the right with speed 0.20 m s^{-1} and block B moves to the right with speed v .

- (i) Use Newton's third law to explain why, during the collision, the change in momentum of block A is equal and opposite to the change in momentum of block B.

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[2]

- (ii) Determine speed v .

$$v = \dots \text{ m s}^{-1} [3]$$

(iii) Calculate, for the blocks,

1. the relative speed of approach,

$$\text{relative speed of approach} = \dots \text{ms}^{-1}$$

2. the relative speed of separation.

$$\text{relative speed of separation} = \dots \text{ms}^{-1}$$

[2]

(iv) Use your answers in (b)(iii) to state and explain whether the collision is elastic or inelastic.

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..... [1]

[Total: 9]