

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

.....  
 .....[1]

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

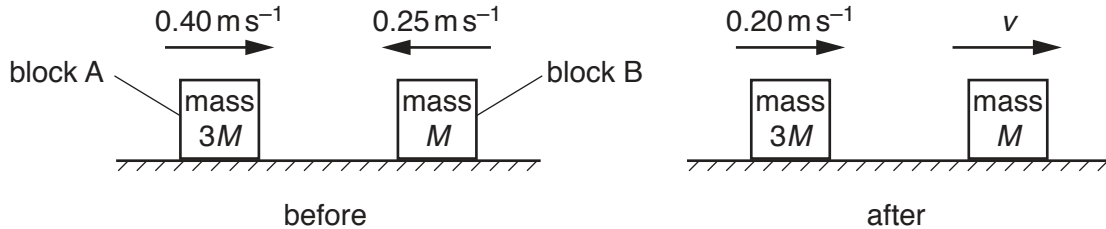


Fig. 3.1

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

Before the collision, block A moves to the right with speed  $0.40 \text{ ms}^{-1}$  and block B moves to the left with speed  $0.25 \text{ ms}^{-1}$ .

After the collision, block A moves to the right with speed  $0.20 \text{ ms}^{-1}$  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.

.....  
 .....  
 .....  
 .....[2]

- (ii) Determine speed  $v$ .

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

(iii) Calculate, for the blocks,

1. the relative speed of approach,

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

2. the relative speed of separation.

relative speed of separation = .....  $\text{ms}^{-1}$   
[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]