**2** Two blocks travel directly towards each other along a horizontal, frictionless surface. The blocks collide, as illustrated in Fig. 2.1.

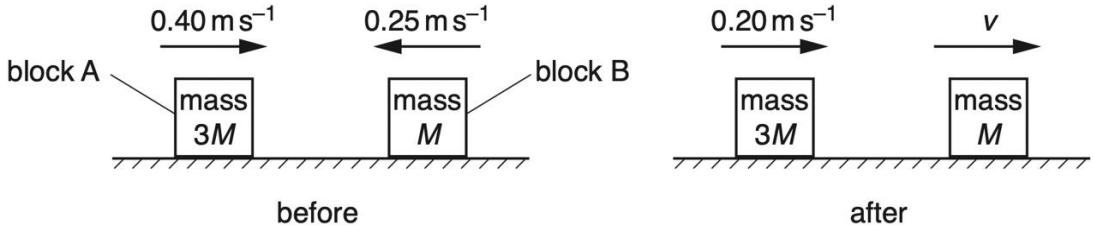


**Fig. 2.1**

Block A has mass 3*M* 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*.

**(a)** **(i)** Use Newton's laws of motion to explain why the change in momentum of each block is equal in magnitude and opposite in direction.

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..... [4]

**(ii)** Hence, explain whether it is possible for both blocks to be at rest simultaneously during the collision.

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..... [2]

**(b)** **(i)** Determine speed $v$.

$v$ = …….. m $s^{-1}$ [2]

**(ii)** Deduce whether the collision is elastic or inelastic.

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…… [2]

[Total: 10]