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.

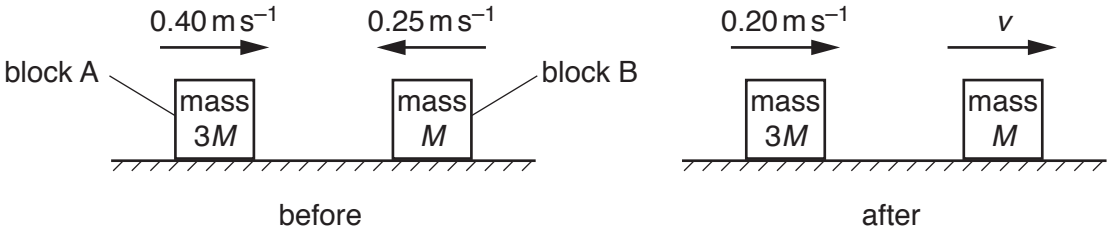

Fig. 3.1

Block A has mass 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*.

(i) 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 = ... m s^{-1} [3]

(iii) Calculate, for the blocks,

1. the relative speed of approach,

relative speed of approach = ... $m\,s^{-1}$

2. the relative speed of separation.

relative speed of separation = ... $m\,s^{-1}$
[2]

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

.....

.....[1]

[Total: 9]