

- 4 Two blocks slide directly towards each other along a frictionless horizontal surface, as shown in Fig. 4.1. The blocks collide and then move as shown in Fig. 4.2.

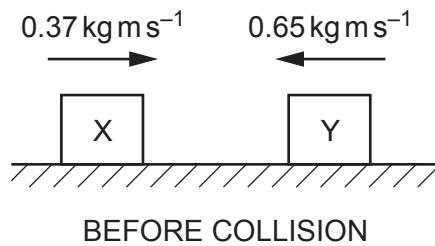


Fig. 4.1

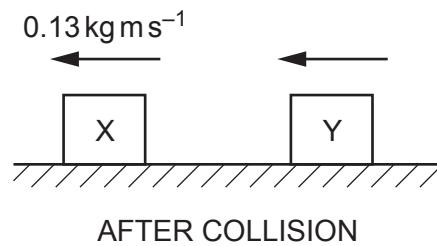


Fig. 4.2

Block X initially moves to the right with a momentum of 0.37 kg m s^{-1} . Block Y initially moves to the left with a momentum of 0.65 kg m s^{-1} . After the blocks collide, block X moves to the left back along its original path with a momentum of 0.13 kg m s^{-1} . Block Y also moves to the left after the collision.

- (a) Block X has an initial kinetic energy of 0.30 J .

Calculate the mass of block X.

$$\text{mass} = \dots \text{kg} \quad [3]$$

- (b) Determine the magnitude of the momentum of block Y after the collision.

$$\text{momentum} = \dots \text{kg m s}^{-1} \quad [1]$$

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- (c) Block X exerts an average force of 7.7 N on block Y during the collision.

Calculate the time that the blocks are in contact with each other.

time = s [2]

[Total: 6]