

- 1 Body A of mass m and speed u_1 makes an elastic head-on collision with body B of mass $2m$ and speed u_2 as shown in Fig. 1.1.

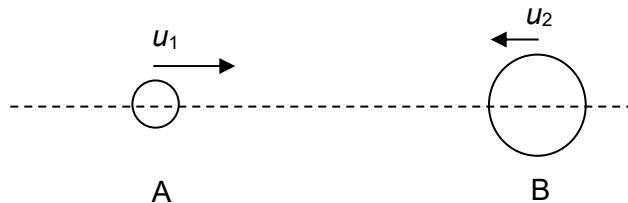


Fig. 1.1

- (a) Describe the subsequent motion of the two bodies knowing that

(i) the collision is head-on,

[1]

(ii) the collision is elastic.

[1]

- (b) Given that the speeds u_1 is 4.0 m s^{-1} and u_2 is 2.0 m s^{-1} , determine the velocity of each body after the collision.

velocity of A = m s^{-1}

velocity of B = m s^{-1} [4]

- (c) Bodies A and B are steel ball bearings. If their motions occur in a vertical plane as shown in Fig. 1.2, with u_1 directed downwards and u_2 upwards, the principle of conservation of momentum can still be applied in analysing the collision between them.

Fig. 1.3 shows a similar scenario, but with a piece of styrofoam of negligible mass attached to the top of body B.

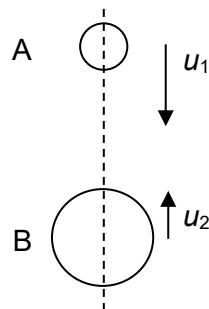


Fig. 1.2

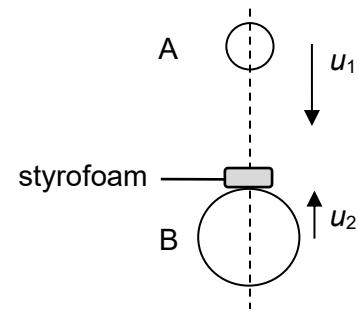


Fig. 1.3

Explain why the principle of conservation of momentum cannot be applied in analysing the collision in Fig. 1.3.

[2]

