

- 3 (a) Define force.

[1]

- (b) A ball falls vertically downwards towards a horizontal floor and then rebounds along its original path, as illustrated in Fig. 3.1.

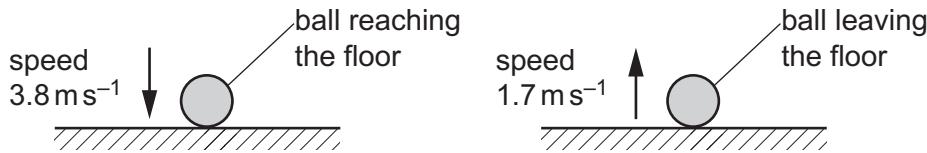


Fig. 3.1

The ball reaches the floor with speed 3.8 ms^{-1} . The ball is then in contact with the floor for a time of 0.081 s before leaving it with speed 1.7 ms^{-1} . The mass of the ball is 0.062 kg .

- (i) Calculate the loss of kinetic energy of the ball during the collision.

$$\text{loss of kinetic energy} = \dots \text{ J} [2]$$

- (ii) Determine the magnitude of the change in momentum of the ball during the collision.

$$\text{change in momentum} = \dots \text{ Ns} [2]$$

- (iii) Show that the magnitude of the average resultant force acting on the ball during the collision is 4.2 N .

[1]

(iv) Use the information in (iii) to calculate the magnitude of:

1. the average force of the floor on the ball during the collision

average force = N

2. the average force of the ball on the floor during the collision.

average force = N
[2]