

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.

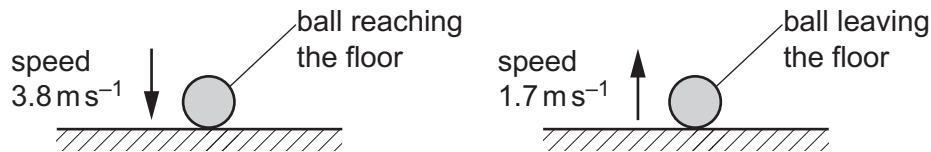


Fig. 3.1

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.

loss of kinetic energy = J [2]

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

change in momentum = 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]