

- 4 A small ball is dropped from rest from height h_1 above the ground and falls vertically downwards. The ball collides with the ground and bounces back vertically upwards, reaching a maximum height h_2 . Fig. 4.1 shows the ball just before and just after hitting the ground.

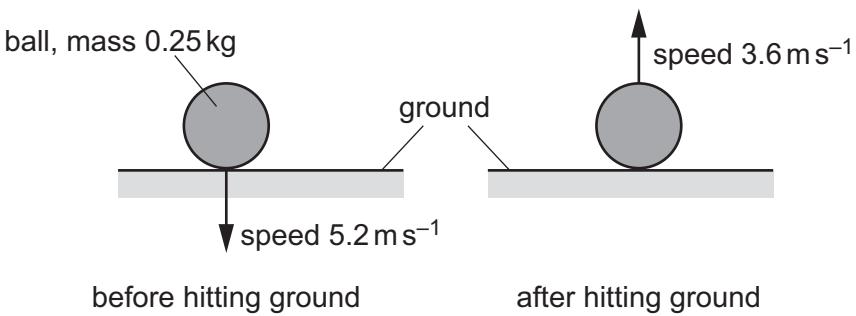


Fig. 4.1

The ball has mass 0.25 kg and is in contact with the ground for a time of 0.18 s.

Just before the ball hits the ground, it has speed 5.2 m s^{-1} . Just after it leaves the ground, it has speed 3.6 m s^{-1} .

Air resistance acting on the ball is negligible.

- (a) State and explain whether the collision is elastic or inelastic.

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.....
..... [1]

- (b) (i) Calculate the change in momentum of the ball during the collision with the ground.

$$\text{change in momentum} = \dots \text{ kg m s}^{-1} \quad [2]$$

- (ii) Determine the average force on the ball during the collision with the ground.

$$\text{force} = \dots \text{ N} \quad [2]$$





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- (c) Calculate the ratio $\frac{h_2}{h_1}$.

ratio = [3]

[Total: 8]