

- 4 A steel ball of mass 73 g is held 1.6 m above a horizontal steel plate, as illustrated in Fig. 4.1.

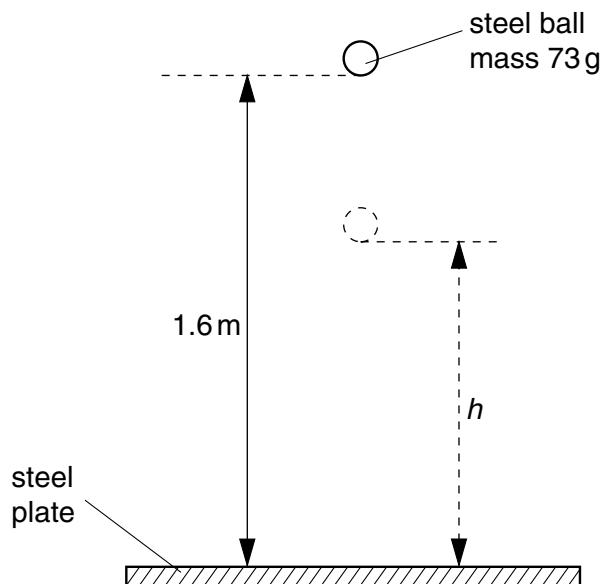


Fig. 4.1

The ball is dropped from rest and it bounces on the plate, reaching a height h .

- (a) Calculate the speed of the ball as it reaches the plate.

$$\text{speed} = \dots \text{m s}^{-1} \quad [2]$$

- (b) As the ball loses contact with the plate after bouncing, the kinetic energy of the ball is 90% of that just before bouncing. Calculate

- (i) the height h to which the ball bounces,

$$h = \dots \text{m}$$

- (ii) the speed of the ball as it leaves the plate after bouncing.

speed = m s^{-1}

[4]

- (c) Using your answers to (a) and (b), determine the change in momentum of the ball during the bounce.

change = Ns [3]

- (d) With reference to the law of conservation of momentum, comment on your answer to (c).

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