

- 1 (a) Define displacement.

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

- (b) A small ball is thrown horizontally with a velocity v at A. It falls through a vertical height of 1.96 m before bouncing off a smooth horizontal table at B as shown in Fig. 1.1. It then bounces to a maximum height at C. Air resistance is negligible.

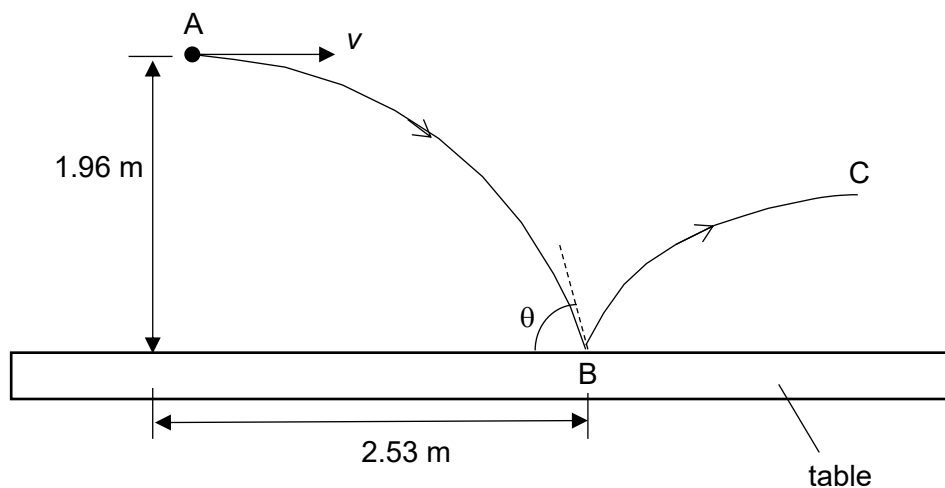


Fig. 1.1

Calculate, for the ball,

- (i) the value of v ,

$$v = \dots\dots\dots \text{ m s}^{-1} [3]$$

- (ii) the vertical component of the velocity v_y just before it hits the table at B,

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

- (iii) the angle θ the ball makes with the horizontal at B.

$$\theta = \dots\dots\dots^\circ \text{ [1]}$$

- (iv) State the magnitude and direction of the acceleration of the ball at C.

$$\text{magnitude and direction} = \dots\dots\dots \text{ [1]}$$

- (c) On the axes of Fig. 1.2, sketch the variation with time of the vertical component of velocity v_y of the ball, from A to C if air resistance is **not** negligible. Taking downward as positive.



Fig. 1.2