

- 2 (a) Explain what is meant by a system is in *equilibrium*.

.....
.....
.....

[2]

- (b) In a children's game, small balls are thrown at wood blocks in order to turn them over. One such block, of mass 300 g, with each side of length 10 cm, is shown in Fig. 2.1 below.

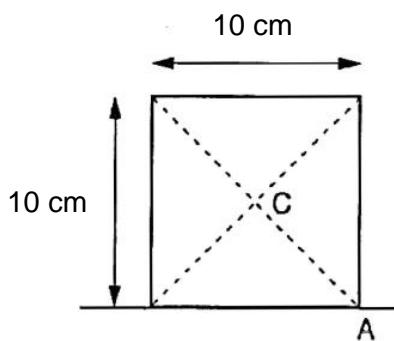


Fig. 2.1

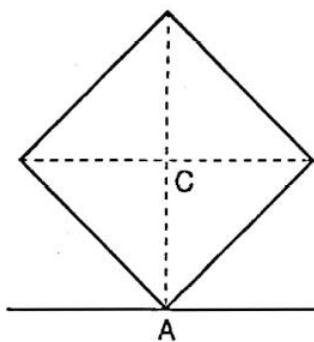


Fig. 2.2

In order to turn the block over, the centre of gravity C must be raised such that that C is vertically above the corner A, as shown in Fig. 2.2.

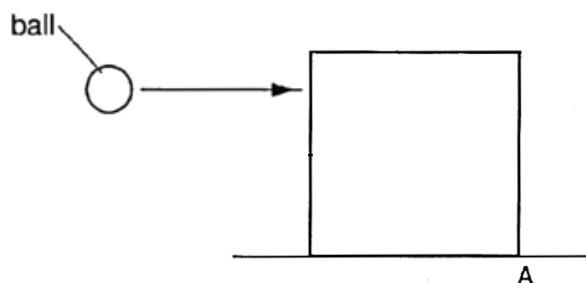


Fig. 2.3

The block is struck by a ball of mass 15 g travelling horizontally 1.0 cm below the top surface of the block as shown in Fig. 2.3. The collision is perfectly elastic and, without sliding, the block turns about the corner A.

- (i) Label on Fig. 2.3, the forces acting on the block when the ball just hits the block causing it to turn about corner A.

[2]

- (ii) Hence or otherwise, determine the minimum force needed for ball to act on the block in order for the block to turn about A.

force = N [3]