

- 4 (a) State Hooke's law.

[1]

- (b) An elastic cord has an un-extended length of 13.0 cm. One end of the cord is attached to a fixed point C. A small ball of weight 5.0 N is hung from the free end of the cord. The cord extends to a length of 14.8 cm, as shown in Fig. 4.1.

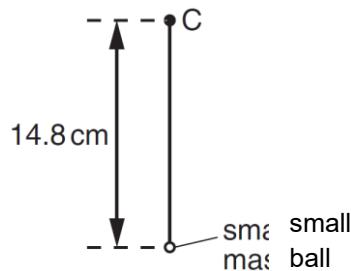


Fig. 4.1

The cord and ball are now made to rotate at constant angular speed ω in a vertical plane about point C. When the cord is vertical and above C, its length is the un-extended length of 13.0 cm, as shown in Fig. 4.2.

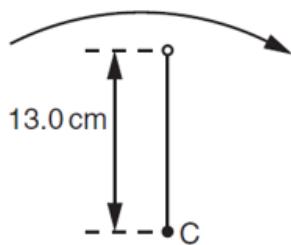


Fig. 4.2

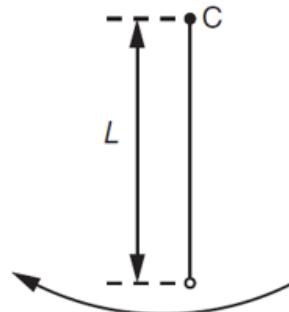


Fig. 4.3

The cord and ball rotate so that the cord is vertically below C, with length L, as shown in Fig. 4.3.

- (i) Explain whether the centripetal force on the ball in Fig. 4.2 is more than, equal to, or less than the weight of the ball.

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- (ii) Calculate the length L of the cord, assuming it obeys Hooke's law.

length = m [5]

[Total: 7]

