

- 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.

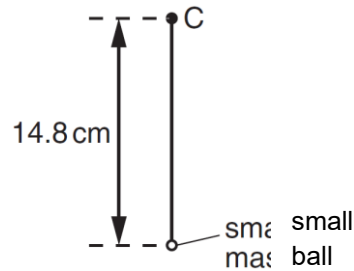


Fig. 4.1

The cord and ball are now made to rotate at constant angular speed  $\omega$  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.

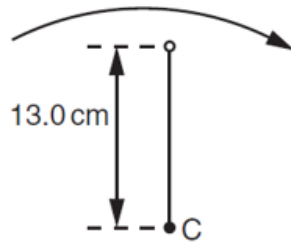


Fig. 4.2

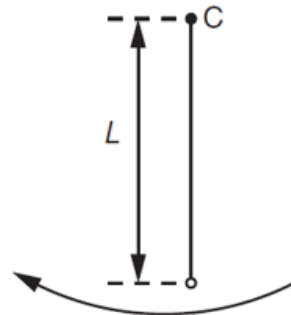


Fig. 4.3

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]

